REMEDIAL INVESTIGATION REPORT

for the

FORMER CAMILLUS CUTLERY COMPANY SITE

52 & 54 Genesee Street
Village of Camillus
Onondaga County, New York

Brownfield Cleanup Program
Site No. C734142

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1.0 INTRODUCTION

TDK Engineering Associates, P.C. (TDK) has prepared this Remedial Investigation (RI) Report in connection with Brownfield Cleanup Program (BCP) Site I.D. C734142 (Site). Camillus Mills, LLC (Camillus Mills) entered the BCP as a Volunteer, in order to facilitate the investigation and where warranted, remediate contaminated media that is anticipated to be encountered during redevelopment of the Site into a mixed residential and commercial complex. The Brownfield Cleanup Agreement (BCA) was effective March 6, 2013. The investigation program was based on a Remedial Investigation Work Plan (RIWP), dated July 5, 2013[1], which was approved by the New York State Department of Environmental Conservation (DEC) on July 17, 2013[2].

1.1 Site Description

The 4.3-acre BCP Site is located at the former Camillus Cutlery Company property, 52 & 54 Genesee Street in the Village of Camillus (Village), Onondaga County, New York, approximately ½-mile south of the Camillus/Warners exit off New York State Route 5.

The Site is bordered by residential properties to the west and northwest, which are positioned at higher elevations, relative to the Site. The southwest and southeast corners of the Site border Solvay Bank and Camillus Kayak Shop (across Nine Mile Creek), respectively. Municipal and commercial properties are located to the south across Genesee Street (Village Hall and Camillus Animal Clinic) and the adjoining properties to the east and northeast (across Newport Road) are occupied by an Onondaga County Department of Water Environment Protection (WEP) sewage pump station and an inactive commercial building, which was most recently occupied by a tavern/restaurant.

Refer to the *Remedial Investigation Plan* [*Figures RI-1A/1B*] and *Site Location Map* [*Figure LM-1*] in Appendix 1 for additional information.

Note that a proposed Site segregation line has been established to delineate "West" and "East" Parcels on *Figures RI-1A* and *RI-1B*. Soil Cleanup Objectives (SCOs) pertaining to multiple future Site occupancies may potentially be defined within these areas. This boundary is preliminary and may be adjusted, pending analysis of future, confirmation samples in connection with the anticipated Remedial Action program.

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[1] *Remedial Investigation Work Plan for the Former Camillus Cutlery Company Site – Brownfield Cleanup Program Site No. C734142*, dated July 5, 2013.

[2] NYSDEC letter to Camillus Mills, LLC, dated July 17, 2013.

2.0 SITE HISTORY

2.1 General

Manufacturing operations at the former Camillus Cutlery began during the 1890's and continued until the mid-2000's. The Site was formerly traversed by a feeder to the Erie Canal, which appears to have been filled sometime during the 1940s and 1950s.

Throughout its history the facility primarily produced knives, with secondary products including but not limited to machetes, marlin spikes and surgical scalpels. The company closed in February 2007, and the Site has remained vacant since that time. Camillus Mills, LLC purchased the site on May 30, 2012.

On February 11, 2013 a fire destroyed the former (East) building. Removal of the resulting debris, down to the lower concrete floor slabs was completed in July 2013. The remaining (West) building has two stories and a footprint area of 20,460 square feet (sf).

2.2 Environmental

Information concerning the Site's environmental history was compiled from various sources, as documented in the RIWP. The analytical data was generated from a due diligence assessment conducted by Acquisition-Support Environmental (ASE) in 2008[3] on behalf of a prior owner. A recap of the pertinent information is provided below:

- Camillus Cutlery's manufacturing processes resulted in waste streams which likely contained heavy metals and petroleum distillates/solvents. The wastes included the following:
  - Lead-impacted corncob and charcoal, generated from heat treating/tempering and quenching/tumbling processes.
  - Filters/absorbents that contained lead.
  - Ignitable oil resulting from rust proofing processes.
  - Solvent/petroleum distillates from degreasing and parts cleaning operations.
  - Metal shavings (i.e., "swarf"), which were generated from the grinding and barreling operations.
  - Process wastewater that contained chromium and copper.
- Metals and semi-volatile organic compounds (SVOCs) were detected in the soil at concentrations which exceed current Unrestricted Use (UNR) Soil Cleanup Objectives

[3] *Screening-Level Site Investigation – Former Camillus Cutlery Site*, prepared by Acquisition-Support Environmental (ASE), dated October 30, 2008.

(SCOs)[4] during the 2008 preliminary investigation. Several detections in the wastewater collection area also exceeded current Restricted-Residential (RR) and Commercial (COMM) SCOs. These contaminants consisted primarily of the following:

- Lead, which was generated from heat treating/tempering of carbon steel blades using molten lead with a charcoal cover.
- Chromium, which likely had widespread use as a finishing metal.

- SVOCs were also detected in the soil to a lesser extent. These include polynuclear aromatic hydrocarbons (PAHs) that are found in connection with petroleum-based materials and coal, both of which are indicated as having been historically utilized on the Site.

- No Volatile Organic Compounds (VOCs) were detected in soils.

- Toluene was detected in the groundwater at levels that slightly exceed NYS groundwater standards[5]. Several metals exceeding groundwater standards were detected in monitoring wells near the wastewater collection chamber area.

2.3 Preliminary Areas of Concern

- The environmental history formed the basis for development of the initial (preliminary) Areas of Concern (AOC) shown on *Figures RI-1A/1B* [Appendix 1]. These included the following:

  - Adjacent to the former wastewater collection chamber, in the vicinity ASE borings SB-1 and SB-3 (2008).
  - Vicinity of ASE soil boring SB-6.
  - Former facility heating oil, coal storage and electrical transformer areas.
  - Ground surface adjacent to east side of East Building, due to proximity of the wastewater collection chamber and historical metals discharges.
  - Historical Cutlery process areas within the former eastern building footprint (e.g., heat treating, tempering, parts cleaning rooms).
  - Former "tile field" and/or "lagoon" areas identified within the historical records.

- The locations of the soil borings, groundwater monitoring wells and surface soil sampling points, in addition to the analytical parameters were determined in consideration of the preliminary AOCs.

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[4] 6 NYCRR Subpart 375.6: *Remedial Program Soil Cleanup Objectives.*

[5] 6 NYCRR Part 703: *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations.*

3.0 SITE RE-DEVELOPMENT

Camillus Mills proposes to convert the remaining building on the West Parcel into a mixed residential and commercial facility, with an approximately 80% to 20% split of the residential and commercial components, respectively. On February 1, 2016, the Village Board issued several approvals in connection with the proposed Site development. These included the following:

- Approval of a zoning change from Commercial to Planned Development District (PDD).
- Issuance of a Negative Declaration in connection with the State Environmental Quality Review (SEQR) process.
- Issuance of Site Plan Approval.

The proposed residences will be comprised of loft-style apartments, primarily on the second floor of the existing building. Immediate plans propose that the balance of the West Parcel will consist of parking and lawn/landscaping features. Development of the East Parcel will be considered at a future date.

4.0 REMEDIAL INVESTIGATION SUMMARY

4.1 Scope of Work - General

The RI included the following general tasks:

- A site mapping program.
- Advancing a total of eighteen soil borings throughout the Site.
- Installing groundwater monitoring wells within seven of the soil borings.
- Collecting representative soil and groundwater samples from the soil borings and monitoring wells, for laboratory analysis and comparison of results to the applicable Standards, Criteria and Guidance (SCG) values.
- Collecting three surface soil samples from the creek embankment and one from the southern lawn area.
- Pre-characterization of Site soils within an area of concern (AOC), with respect to landfill acceptance criteria in anticipation of excavation and off-site disposal within the remediation phase of the BCP.
- Evaluating potential soil vapor intrusion (SVI) within the West Building, soils along the western property line and below the former (East) building slab through the installation of three soil and four sub-slab vapor probes, in addition to the collection and analysis of an indoor (West Building) and outdoor air samples.

- Conducting an assessment of potential contaminant exposure pathways, based on the proposed redevelopment of the Site into a residential apartment and commercial complex.

- Performing a "Part 1" (resource characterization phase) Fish and Wildlife Resource Impact Analysis (FWRIA).

- Performance of field permeability (i.e., "slug") tests in three of the monitoring wells.

The initial field work, which included the soil boring and monitoring well installation programs and first round of groundwater sampling were completed in September 2013.

The second (confirmation) round of groundwater sampling and analysis was conducted in January 2016. The SVI evaluation was completed in February 2016.

4.2 Mapping Program

The following mapping efforts have been or are being performed at the site:

- Completion of a topographic survey by CNY Land Surveying. The topographic information is included on *Figures RI-1A* and *RI-1B* [Appendix 1]. Note that the survey reflects site features prior to the February 11, 2013 fire which destroyed the East building.

- Mapping of the remaining plumbing features of the former East Building as well as the lower level of the West Building; including sumps, catch basins, manholes, floor drains and wastewater collection chamber.

- Superimposition of approximate historic Cutlery process areas on the *Remedial Investigation Plan* [*Figures RI-1A/1B*]. These areas are based on historic Sanborn Maps reviewed as part of the Site's environmental history research efforts [Section 2.2] and formed the basis for several of the preliminary AOCs [Section 2.3]

Information that has been obtained from the mapping program is shown on *Figures RI-1A/1B* and is summarized in the following sections.

4.2.1 Site Topography & Drainage Patterns

The majority of the Site's ground surface slopes from the adjoining, up-gradient properties to the west downward to the east, toward Nine Mile Creek. The elevation of the Site ranges from 423 (NGVD 29[6]) at the western limit of the property (connection to North Street), to 400 at the bottom of the Nine Mile Creek embankment and approximate water surface elevation of the creek[7].

[6] NGVD 29 – National Geodetic Vertical Datum of 1929.
[7] As surveyed by TDK on January 12, 2006.

Overland drainage within the parking lot area is directed to several drainage structures/catch basins which connect to a relatively large (42-inch diameter) storm sewer which traverses the site. The storm sewer ultimately discharges to Nine Mile Creek across (east side of) Newport Road.

4.2.2 Former East Building

An approximately 56,000 square feet (sf) concrete slab-on-grade encompasses the former building's footprint. Drainage features noted within the slab are described below and shown on *Figures RI-1A / 1B*.

Floor Drains / Wastewater Collection Chamber

- Several grated floor drains (FD-1 - 5) lead to a wastewater collection chamber. The chamber collected process wastewater, which ultimately discharged to the municipal sanitary sewer system.

Catch Basins, Utility Trenches and Vaults

- A total of 9 catch basins are located throughout the former eastern building footprint (CB-1 through CB-9). Some discharge by gravity and others are equipped with sumps that appear to convey water to the collection area.

Utility Trenches, Vaults and Collection Chamber

- A utility trench (UT-1) and several vaults/collection chambers are present within the concrete slab on-grade.

4.2.3 West Building (Interior)

- Vaults and utility chases noted within the West Building are shown on *Figures RI-1A* and *1B*. These were evaluated as part of the *Soil Vapor Intrusion (SVI) Evaluation Program* [Section 4.6].

4.2.4 Exterior (Parking Lots)

- The catch basins and related stormwater conveyance network is shown on *Figures RI-1A / 1B*. Based on a closed-circuit television (CCTV) inspection program conducted in September 2013 by Jamko Technical Solutions, most of the structures are sediment-laden, precluding a comprehensive assessment.

- The inlet to the 42-inch diameter sewer, near the southern boundary of the Site, was partially blocked off using brick/mortar, during a 1993 municipal drainage improvements program[8].

- A 10-inch diameter sanitary sewer traverses the Site, at the location shown on *Figures RI-1A/1B*. Several laterals from adjacent residential lots to the west connect to the sewer.

4.3 Sampling and Analysis Program

4.3.1 Overview

A total of eighteen soil borings were advanced on the property (SB-1 through SB-18) in September 2013. Seven of the borings were converted into monitoring wells (MW-1 through MW-7). The locations of the borings/wells were determined based on the previously described initial Areas of Concern [Section 2.3] and are shown on the *Remedial Investigation Plan* [*Figures RI-1A/1B*, Appendix 1].

The locations of three surface soil samples along the creek embankment (SS-1 through SS-3), and one within the southern lawn area (SS-4), are also shown on *Figures RI-1A/1B*.

Field sampling (soil) was conducted by TDK personnel during the (2013) drilling program. Soil analysis and the initial round of groundwater sampling and analysis was performed by Life Science Laboratories, Inc. (LSL)[9] in September 2013. The confirmation round of groundwater sampling and analysis was conducted by Pace Analytical Services, Inc. (Pace)[10] in January 2016.

4.3.2 Soil Borings

- The drilling program was completed by NYEG Drilling, LLC in September 2013. A representative of TDK was on-site to observe the drilling program, collect soil samples and document the subsurface profile. The DEC's Project Manager was also on-site intermittently during the field work.

- Air monitoring was performed during the drilling program by Churchill Environmental in accordance with the approved Community Air Monitoring Program of the RIWP.

- The borings were advanced using a mobile drill rig equipped with hollow-stem augers, in addition to percussion soil sampler (i.e., Geoprobe) capabilities.

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[8] Ref: North St./Main St. Drainage Improvements Plan & Profile, File No. 63.54-02F, prepared by Barton & Loguidice, P.C., April 1993.

[9] New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) No. 10248.

[10] NYSDOH ELAP No. 11078.

- Soil samples were obtained during drilling at continuous (2-foot) intervals. Representative samples were field-screened for the presence of volatile organic compounds (VOC's) using a photo-ionization detection (PID) meter. Refer to Section 4.5 and the *Soil Boring Logs* [Appendix 2] for a summary of PID responses.

- Samples for laboratory analysis were obtained at depths based on PID responses and the groundwater surface elevations. The sample locations (depths) are indicated on the soil boring logs [Appendix 2].

- The borings were backfilled with drill cuttings covered with 6 to 12 inches of hydrated bentonite pellets and topped with a minimum 6 inches of sand. Pavement disturbances were restored using 6 inches of asphalt patch.

4.3.3 Groundwater Monitoring Wells

- The monitoring wells were installed to depths ranging from 10 to 18 feet below ground surface (bgs).

- The wells are comprised of 2-inch diameter (PVC), 10-slot (0.010-inch aperture opening) screens. The screened sections are surrounded by filter sand compatible with the screen size (No. 0) and extend above and below the groundwater surface. Bentonite (clay) seals are provided over the sand packs.

- The monitoring wells are "flush-mount" installations, with each well head protected by a traffic-rated curb box and bolted cover. Disturbed ground, pavement or concrete surrounding the wells heads were restored using concrete collars.

- Compression caps with locks were provided for the tops of the monitoring well riser pipes. Each monitoring well was developed using a submersible (12-volt DC) pump. The purged water was contained in 55-gallon drums for subsequent off-site disposal in accordance with the *Investigation-Derived Waste* (*IDW*) management program, as described in the RIWP.

- The PVC rims of the wells were surveyed relative to the Site topographic survey datum for generation of groundwater contour maps.

Refer to the *Soil Boring Logs* [Appendix 2] and *Monitoring Well Construction Detail* [Appendix 3] for additional information.

The monitoring wells were sampled on September 30, 2013 (LSL) and January 20, 2016 (Pace). The monitoring program also included depth to water measurements from the PVC well rims, from which groundwater contours were derived [*Figures RI-1A / 1B*].

4.3.4 Decontamination and Investigation-Derived Wastes

All augers, rods, split-spoon samplers, mixing pans and field sampling equipment were decontaminated according to the procedures specified in the *Decontamination Program* included in the RIWP. IDW such as drill cuttings, spent decontamination and equipment rinse waters, monitoring well purge waters and used personal protective equipment (PPE) or sampling equipment were managed in accordance with the *IDW Management Program*.

4.3.5 Analytical Program

The analytical program included laboratory analysis of the following:

Soil: Twenty-six samples total; including two matrix spike (MS), two matrix spike duplicates (MSDs) and three field duplicates.

Groundwater:

1st (Sept. 2013) Round: Twelve total; includes one MS, one MSD, two field duplicates (one filtered metals) and one trip blank.

2nd (Jan. 2016) Round: Eleven total; includes one MS, one MSD, one field duplicate and one trip blank.

Refer to the *Summary of Sample Locations, Parameters and Rationale* table [*Table RI-1* on *Figures RI-1A/1B*] for a summary of sample locations and depths.

4.3.6 Analytical Methods/Parameters

The analytical parameter lists included the following:

- Full list volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), plus tentatively identified compounds (TICs) per EPA Methods 8260[11] and 8270[12].
- Target analytical list (TAL) metals per EPA Methods 6010[13], 7471[14] and 9012[15].
- PCBs per EPA Method 8082[16].

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[11] EPA Method 8260: *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).*

[12] EPA Method 8270: *Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).*

[13] EPA Method 6010: *Inductively Coupled Plasma – Atomic Emission Spectrometry*.

[14] EPA Method 7471: *Mercury in Solid or Semi-Solid Waste*.

[15] EPA Method 9012: *Total and Amenable Cyanide (Automated Colorimetric, with Off-Line Distillation).*

4.3.7 Sample Rationale

Sample locations and analytical parameters are summarized below. This information has been modified from the RIWP, where appropriate to reflect subsurface information obtained during the RI.

MW-1: In vicinity of old "auto garage" (VOCs, SVOC's, Metals). Also serves as an up-gradient well for groundwater contouring purposes. PCB analysis was performed for comparison to down-gradient wells MW-5 and MW-7.

SB-2/MW-2: In vicinity of former "transformer house" (PCBs). VOC's levels in groundwater were assessed with respect to potential exposure pathways.

SB-3/MW-3: Pursuant to the 2008 screening level site investigation. Potential contaminants include VOCs, based on elevated PID levels reported during the 2008 preliminary investigation, and SVOC's, Metals and PCB's due to unknown fill materials.

SB-4/MW-4: Down-gradient from former plating/cleaning areas (VOCs/Metals) and adjacent to coal storage area (SVOCs).

MW-5: Down-gradient from former grinding department, polishing/finishing area and "oil house". Assessment of groundwater conditions adjacent to Nine Mile Creek (VOCs, SVOCs, Metals, PCBs).

MW-6: Located within suspected AOC area (former "lagoon"), which likely received grinding wastewater discharge (Metals). VOCs and SVOC's added to analysis due to potentially undocumented historic on-site disposal practices.

SB-7: Located within former "lagoon" area, which likely received grinding wastewater discharge (Metals). VOCs, SVOCs and PCBs added to soils analysis due to the potential for undocumented discharges.

MW-7: Down-gradient from former grinding department (Metals), "oil house" (SVOCs) and wastewater collection chamber (VOCs, SVOCs, Metals). Assessment of groundwater conditions adjacent to Nine Mile Creek. PCB analysis was also performed, in consideration of the proximity of the creek.

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[16] EPA Method 8082: *Polychlorinated Biphenyls (PCBs) by Gas Chromatography*.

SB-8: Within likely historic fill zone and potential facility drain discharge area. Full parameter list (VOCs, SVOCs, Metals, PCB's) due to wide variance of potential historic fill materials.

SB-9: Located within likely historic fill zone and potential facility drain discharge area. Full parameter list (VOCs, SVOCs, Metals, PCBs) due to wide range of potential waste streams and/or fill materials.

SB-10: Within likely historic fill zone and potential facility drain discharge area. Full parameter list (VOCs, SVOCs, Metals, PCBs) due to wide variance of potential historic fill materials.

SB-11: Located within or adjacent to, and down-gradient from former polishing & finishing areas (VOCs).

SB-12: Within or adjacent to former "oil house" and tempering areas (VOCs and Metals). Analysis for SVOC's was originally proposed, but removed and added to nearby boring SB-13 based on field-screening of soil recoveries during drilling operations.

SB-13: Spray paint booth area (VOCs). Analysis for SVOC's was also added (see SB-12).

SB-14: Adjacent to former process water collection area (SVOCs and Metals). Analysis for VOC's in lieu of SVOC's was originally proposed. However, visual observations of dark staining in combination with low PID readings suggested the presence of SVOCs to be more likely. Accordingly, VOC analysis was performed at nearby boring SB-15.

SB-15: Adjacent to and down-gradient from former process water collection chamber. VOC analysis was substituted for SVOCs, and SVOC analysis added to SB-14, based on field observations (refer to SB-14).

SB-16: Lagoon area which likely received wastewater discharged from the Cutlery's grinding process (Metals). VOCs, SVOCs and PCBs added to analysis due to the potential for undocumented discharges.

SB-17: Up-gradient (background) soil boring (VOCs, SVOCs, Metals, PCBs).

SB-18: Near former loading dock. Full parameter list (VOCs, SVOCs, Metals, PCBs) due to potential contaminants associated with historic receiving operations.

SS-1: Suspected area of air discharge from grinding operations and discharge pipe(s) (VOC's, SVOCs, Metals).

SS-2: Suspected area of air discharge from grinding operations and discharge pipe(s) (VOC's, SVOCs, Metals).

SS-3: Outfall of stormwater pipe from catch basin which is located in proximity of former wastewater collection chamber (VOCs, SVOCs, Metals and PCBs).

SS-4: Within lawn area between remaining/former (West/East) buildings (VOCs, SVOCs, Metals, PCBs).

4.4 Hydrogeology

The borings were advanced to depths ranging from 10 to 20 feet. In general, the upper soil profile consisted of a fill layer comprised of varying amounts of silt, gravel and sand, with intermittent building materials comprised of brick and wood fragments. The fill varies in thickness from 4 to 12 feet across the site.

Soils below the fill appeared to be segregated into three general zones, as described below. Note that due to extensive historic site disturbance, the specific boundary between the fill and native soils was not clearly evident at all of the boring locations. Refer to the Soil Profile [*Figure SP-1*, Appendix 1] and *Soil Boring Logs* [Appendix 2] for additional information.

Western Zone

A relatively hard[17] mixture of silt and weathered shale, commonly referred to as "till" was encountered below the fill in "up-gradient" borings SB-1, SB-3 and SB-17, at depths of 6, 10 and 10 feet, respectively. A silt and clay layer was also present from depths of 4 to 10 feet (elevations 418 – 424) between the fill zone and top of till in SB-17.

Central Zone

An upper silt and clay layer, which varied in thickness from 2 to 7 feet was encountered below the fill throughout the central zone of the site. The silt/clay occurred at elevations ranging from approximately 399 to 408.

Below the silt/clay layer, a white/gray sand and gravel unit ranging in thickness from 1 to 4 feet (elevation 396 – 400) was encountered.

The "till" unit was again encountered below the sand and gravel (elevations 396 to 398) in borings located at the northern and southern limits of this zone (SB-10 and SB-18).

[17] Based on blow counts (i.e., N-Values per ASTM 1586 – Standard Penetration Test) and/or relative difficulty in advancing augers.

Eastern Zone

The (white/gray) sand and gravel unit was encountered directly below the fill in the majority of borings, below and adjacent to the former (East) building footprint. The vertical extent of the layer increased from 4 to 8 feet proceeding from west to east, and the range of elevations in which this unit was encountered expanded from 390 to 399. Soils within three of the borings within these elevations had a relatively finer component (e.g., silt and fine sand) within the sand and gravel zone.

The creek's water surface elevation (~ 400) is approximately the same elevation as the upper limit of the sand and gravel layer.

A lower silt and clay layer was encountered in two of the borings along the embankment (SB-5 and 11), at elevations ranging from 388 to 393.

Groundwater Depths and Flow Direction

Depths to groundwater measurements obtained during the September 30, 2013 and January 20, 2016 sampling events were converted into elevations and groundwater contour maps were generated.

The September 30, 2013 and January 20, 2016 contours are shown on *Figures RI-1A* and *RI-1B*, respectively [Appendix 1]. Relative water surface elevations in the monitoring wells indicate an easterly groundwater flow direction, toward Nine Mile Creek.

The embankment monitoring wells, and well MW-2 include screened sections that extend through the (saturated) sand and gravel layer, indicating that the wells are suitably constructed to monitor groundwater migrating through the relatively coarser soils.

Monitoring wells MW-1 and MW-3 were seated in the "till" layer and screened throughout the till and overlying fill layers.

4.5 Field-Screening for Contamination

- In addition to visual observations, soils samples obtained during drilling were field-screened for the presence of VOC's using a calibrated photo-ionization (PID) meter. The PID responses are indicated on the boring logs. The highest responses at each boring are summarized in the Table below. Where no PID response was obtained (i.e., no reading above 0 ppm), the reading at the approximate groundwater depth is reported.

Boring Number	Sample Depth Range (feet)	PID Response (ppm)	Comment
SB-1	6 to 8	0	--
SB-2	10 to 12	0.2	--
SB-3	6 to 8	2.2	Black Soils, Possible Staining
SB-4	4 to 6	0	--
SB-5	6 to 8	0	--
SB-6	0 to 2	0.4	--
SB-7	12 to 14	0.7	--
SB-8	6 to 8	0	Black Soils, Possible Staining
SB-9	10 to 12	7.7	--
SB-10	10 to 12	1.5	--
SB-11	6 to 8	0.8	--
SB-12	8 to 10	0	--
SB-13	6 to 8	0.4	Black Soils, Possible Staining
SB-14	6 to 8	0.6	Black Soils (Staining)
SB-15	7 to 9	0.5	Dark Gray Soils, Possible Staining
SB-16	6 to 8	0	--
SB-17	6 to 8	0	--
SB-18	10 to 12	0	--

No obvious visual or olfactory indications of non-aqueous phase liquid (NAPL), or "grossly contaminated media" as defined by the DEC[18] were noted in the soil borings.

4.6 Soil Vapor Intrusion Evaluation Program

In accordance with the RIWP, a supplemental *Soil Vapor Intrusion (SVI) Evaluation Work Plan* was developed based on the analytical data from the soil and groundwater sampling and analysis programs. The work plan also incorporated evaluation of SVI with respect to adjacent residential properties and potential future residential and/or commercial development of the northern and eastern areas of the Site.

[18] 6 NYCRR Subpart 375-1: *General Remedial Program Requirements*.

The work plan was submitted to the DEC and New York State Department of Health (DOH) and was approved by the DEC on January 25, 2016[19]. A copy of the *SVI Evaluation Work Plan* is provided in Appendix 5.

4.6.1 Scope of Work

The SVI program included the following general elements:

- Conducting a preliminary visual walkover survey of the West Building's interior, including screening the indoor air for the presence of volatile organic compounds (VOCs) using a photo-ionization detection (PID) meter.

- Installation of four sub-slab vapor probes, two within the West Building and two below the former, East Building's slab. The sub-slab probes are designated as SSP-1 through SSP-1 on *Figures RI-1A* and *RI-1B*, Appendix 1.

- Installation of three soil vapor probes in the parking lot, along the western site boundary. The soil vapor probes are designated as SVP-1 through SVP-3 on *Figures RI-1A* and *RI-1B*.

- Obtaining air samples from the soil and sub-slab vapor probes, in addition to one indoor and one outdoor (background) air samples for VOC analysis per EPA Method TO-15[20].

- Evaluation of the analytical results in consideration of the guidelines and decision matrices contained within the NYSDOH *[Final] Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006.

4.6.2 Findings

Preliminary Screening Program

On September 13, 2013 a visual walkover survey of the West Building's interior was performed by a representative of TDK. The evaluation included identification of pertinent features such as utility perforations, vaults, visible cracks in the building slab, etc., and preliminary screening of the indoor air for the presence of VOCs at these locations and throughout the building using a photo-ionization detection (PID) meter.

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[19] DEC letter dated January 25, 2016.

[20] *Determination of Volatile Organic Compounds (VOCs) In Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS).*

- Miscellaneous cardboard, plastic and glass debris was encountered throughout the building. No obvious storage of paint-related materials, solvents, petroleum or other potential sources of VOCs was noted.

- Locations of utility vaults, which were identified and evaluated during the preliminary screening program are shown on *Figures RI-1A* and *RI-1B* [Appendix 1].

- No PID responses above 0 parts per million (ppm) were obtained at any location.

Probe Installations

The soil vapor and sub-slab probes were installed on February 2, 2016 by Parratt-Wolff, Inc. A representative of TDK was on-site to observe and document the installation program. The locations of the probes are shown on *Figures RI-1A* and *RI-1B*. The installation methodologies are summarized below:

Sub-Slab Probes

- Each sample point was advanced by "hammer-drilling" an approximately ¾-inch diameter hole through the concrete slab. The holes were extended approximately 2 inches into the underlying material.

- An approximately ¼-inch diameter polyethylene tube was inserted into each sample point, with the open end positioned below the slab. The annular space below the slab was filled with clean sand and within the slab using hydrated bentonite (clay).

- Refer to the *Typical Sub-Slab Vapor Probe Detail* [*Figure SVI-1*] within the *SVI Evaluation Work Plan* [Appendix 5] for additional information.

Soil Vapor Wells (Probes)

- SVP-1 and SVP-2 were installed to a depth of 3 feet and SVP-3 was installed to a depth of 8 feet.

- As per the NYSDOH's request, SVP-2 was positioned in relatively close proximity to a sanitary sewer lateral, which extends from a neighboring (uphill) property onto the BCP site.

- The probes were advanced using direct-push, "geo-probe" drilling methods. A 1¼-inch diameter rod with an expendable anchor point was advanced to the target depth at each probe location. A 6-inch long by approximately ½-inch diameter stainless steel woven screen was inserted at the bottom of each probe, with an approximately ¼-inch diameter polyethylene tube extended to the ground surface.

- A sand filter pack was installed around, and extended approximately 6 inches above each screen. The remaining annular space was sealed using bentonite (clay).

- A "flush-mount" protective well head, consisting of a curb box and bolted cover was installed over each soil vapor probe. Disturbed pavement around the well heads was restored using asphalt cold patch or concrete mix.

- Refer to the *Typical Soil Vapor Probe Detail* [*Figure SVI-2*] within the *SVI Evaluation Work Plan* [Appendix 5] for additional information.

4.6.3 Sampling Program

The soil vapor and sub-slab probes were sampled on February 9 and 10, 2016 by Centek Laboratories, LLC (Centek). Indoor and outdoor samples were collected concurrently with the probes, in addition to quality assurance/quality control (QA/QC) samples (i.e., duplicate and trip blanks) consistent with the Category B deliverables reporting package.

The field sampling program consisted of the following:

- All soil and sub-slab vapor monitoring points were leak tested by placing an inverted dome over the well point, which was filled with helium gas while vapor was drawn from inside the well point and fed to a portable (Restek) tracer gas detector. All vapor points "passed" the leak tests and were subsequently used to collect subsurface vapor samples.

- Samples were collected from the soil vapor and sub-slab probes and indoor/outdoor locations using 1 liter "summa" canisters equipped with inlet control valves set for continuous sampling over 2-hour (soil vapor) and 24-hour (sub-slab and indoor/outdoor air) periods. At the sample event conclusion, the canister valves were closed and the canisters returned to Centek's laboratory in the Town of Dewitt, NY for VOC analysis per EPA Method TO-15.Groundwater was encountered in soil vapor probe No. 2 (adjacent to sanitary lateral). As such, vapor samples were not able to be collected and notification was provided to the NYSDOH.

4.7 Waste Characterization Program

4.7.1 Subsurface Soils Adjacent to Wastewater Collection Area

In anticipation of a focused remediation effort consisting of the excavation and off-site disposal of contaminated soils, a pre-characterization sampling and analysis program was performed as part of the DEC-approved work plan. A composite sample of soil from borings SB-14 and 15, which are located within an anticipated remediation zone (i.e., AOC-1 – Section 8.2), was obtained and submitted to LSL for analysis in accordance with typical municipal solid waste (MSW) landfill criteria. The following analysis was performed:

- VOCs, SVOCs, Metals and Pesticides/Herbicides by toxicity characteristic leaching procedure (TCLP)*
- PCB's
- Paint Filter
- Reactivity
- Ignitability/Flashpoint

* RCRA Parameter List (40 CFR Part 261)

The analytical results are provided in Appendix 6. The data provided indicates the soil to be a non-hazardous waste.

4.7.2 Trench Drains

On February 5, 2016 Environmental Products and Services of Vermont, Inc. (EPS) obtained waste characterization samples of liquid and solid materials from the following locations, consistent with the DEC-approved work plan:

- Trench drains
- Wastewater collection chamber
- Utility trenches
- Recessed floor area
- Former fire brick oven area

Samples were submitted to Pace Analytical Services (Pace) for VOC, SVOC, metals and pesticides analysis, and included analysis of solids by TCLP. The analytical program also included PCBs and corrosivity (pH), and a bulk sample from the fire brick oven areas was sampled for asbestos.

Results are provided in Appendix 6. The data indicates the solid and liquid materials within the trench drains, utility trenches and wastewater collection chamber to be non-hazardous wastes.

Solids from the former fire brick ovens and recessed floor area contained PCB's at levels exceeding the NYS threshold for classification as hazardous waste[21]. Debris from the fire

[21] 6 NYCRR Part 371: *Identification and Listing of Hazardous Wastes.*

brick ovens also had an asbestos (chrysotile) content of 15%, thereby requiring handling and disposal as an asbestos-containing material (ACM) per New York State Department of Labor (NYSDOL) Industrial Code Rule 56[22].

4.8 Management of Investigation-Derived Wastes

Investigation-Derived Wastes (IDW) generated during the drilling, groundwater sampling and field permeability testing programs were contained and managed in accordance with the *IDW Management Program* included within the Remedial Investigation Work Plan (RIWP). Off-site disposal will be performed in conjunction with the remedial action.

4.9 Deviations

The RI included the following deviations from the approved RIWP:

- Pump-out and removal of sediment from drainage structures, within the Site's parking lot was proposed as part of the RI program. Based on the analytical results and observations made during a closed-circuit television (CCTV) inspection program, the anticipated Remedial Action (RA) program will include filling the drainage pipe in-place using a low –strength concrete (i.e., flowable-fill) or similar slurry.

- Soil analytical parameters for four out of the eighteen total soil borings were modified, based on field-screening observations, recovery in drilling spoons and in consultation with the DEC's Project Manager. The borings are located in the same general area of the Site and the total number of samples analyzed remained unchanged. Refer to Section 4.3.7 for additional information.

- Nine 5 to 55-gallon waste containers within a storage shed near the northern area of the former East building were characterized for disposal in conjunction with the *IDW Management Program*. Off-site disposal of the containers and cleaning of the floor drains will be performed in conjunction with the remedial action.

5.0 NATURE AND EXTENT OF CONTAMINATION

The analytical data is provided in the laboratory reports [Appendix 8] and further summarized in the *Analytical Data Summary Tables* [Appendix 4] and *Figures RI-1A/1B* [Appendix 1]. The paragraphs below summarize the sources of contamination, subsurface soil conditions, groundwater and surface water quality.

5.1 Standards, Criteria and Guidance

The analytical results were evaluated in consideration of the following standards, criteria and guidance (SCG) documents:

[22] 12 NYCRR Part 56: *Asbestos*.

Soil:

- New York Codes, Rules and Regulations, Title 6 (6NYCRR), Chapter IV, Subpart 375-6: *Remedial Program Soil Cleanup Objectives*, and DEC *CP-51 / Soil Cleanup Guidance*, Issued October 21, 2010.

Groundwater:

- DEC Technical and Operational Guidance Series (TOGS) A*mbient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, June 1998.
- 6NYCRR Part 703: *Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations*.

Soil Vapor:

- NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006.
- NYSDOH *Trichloroethene (TCE) In Indoor and Outdoor Air – August 2015 Fact Sheet*.

Waste Characterization Analysis:

- DEC 6NYCRR Part 371, *Identification and Listing of Hazardous Wastes*.

Remedial Investigation:

- DEC DER-10 *Technical Guidance for Site Investigation and Remediation*, May 2010.

5.2 Sources of Contamination

The Cutlery's historic operations have included heat treating and tempering, rust-proofing, degreasing and parts cleaning, grinding and barreling. Over the decades these processes have occurred in various, scattered locations throughout the site, primarily within the East building footprint. Refer to *Figures RI-1A/1B* [Appendix 1]. The preliminary AOCs [Section 2.3] and the analytical program rationale [Section 4.3.7] were developed in consideration of these process areas.

5.3 Analytical Data Summary (Soil and Groundwater)

As indicated in Section 3.0, the intended development in the western area of the Site consists of conversion of the existing building into a mixture of residential apartments and commercial occupancy, with the residential component occupying the majority of the building. Future residential or commercial occupancy of the balance of the Site is also being contemplated.

Accordingly, the *Analytical Data Summary Tables* [Appendix 4] include comparison of the results to Unrestricted Use (UNR), Restricted-Residential (RR) and Commercial (COMM) Soil

Cleanup Objectives (SCOs). *Figure RI-1A* [Appendix 1] identifies constituents which exceeded the DEC's Part 375 Unrestricted Use (UNR) Soil Cleanup Objectives (SCOs) and *Figure RI-1B* indicates constituents exceeding the Restricted-Residential (RR) SCOs. A summary of the analytical results is provided in Sections 5.3.1 and 5.3.2.

5.3.1 Surface Soils

Analytical results for the surface soils are described below. Refer to *Analytical Data Summary Tables 1 – 4* [Appendix 4] and *Figures RI-1A* and *RI-1B* [Appendix 1] for specific analytical information.

West Parcel (Future Mixed Residential and Commercial Occupancy)

- No VOCs exceeding any of the SCOs for UNR SCOs were reported.
- Only one SVOC (benzo(a)pyrene) at 1.2 ppm marginally exceeded the UNR and RR SCOs of 1 ppm. It should be noted that this compound was detected below the Practical Quantitation Limit (PQL) and is therefore reported as an estimated concentration.
- Several metals (e.g., arsenic, chromium, copper, lead) were reported at concentrations exceeding UNR SCO's. All can be described as marginal exceedances (i.e., order of magnitude or less). None exceeded RR SCOs.
- No PCB exceedances were reported.

East Parcel (Potential Future Residential and/or Commercial Occupancy)

- No VOCs exceeding RR SCOs were detected.
- Several SVOCs (benzo(a)pyrene, benzo(a)anthracene, benzo(b)flouranthene, chysene) were detected at concentrations which exceeded RR SCOs in surface soils along the creek embankment (SS-1, SS-2) and a sample taken directly below a drainage outfall (SS-3).
- Metals (e.g., arsenic, chromium and copper) were reported at levels which exceed RR SCO's in the surface soils along the embankment.
- No PCBs were reported at levels exceeding the RR SCOs. A trace detection (Aroclor 1254 at 0.348 ppm) exceeded the UNR SCO in surface soil sample SS-3, located below a pipe outfall, within an AOC that is anticipated to be excavated and removed.

5.3.2 Subsurface Soils

Analytical results for the subsurface soils are described below. Refer to *Analytical Data Summary Tables 5 – 8* [Appendix 4] and *Figures RI-1A* and *RI-1B* [Appendix 1] for specific analytical information.

West Parcel (Future Mixed Residential and Commercial Occupancy)

- Two volatile organic compounds (VOCs), acetone and 2-butanone (MEK) exceeded the Unrestricted Use (UNR) SCOs near the northeastern corner of the building (SB-8). Acetone also exceeded the UNR SCO within an initial AOC identified during a preliminary screening investigation (SB-3). No VOC's exceeding Restricted-Residential (RR) SCOs were reported.

- No semi-volatile organic compounds (SVOCs) exceeding SCOs were reported for the soil borings.

- Several metals were reported at concentrations exceeding UNR SCO's. Only one metal, mercury at 1.8 ppm marginally exceeded the RR standard.

- No PCB exceedances were reported.

East Parcel (Potential Future Residential and/or Commercial Occupancy)

- No VOCs or SVOCs exceeding SCOs were detected.

- Four metals (arsenic, cadmium, trivalent chromium and copper) were reported at levels which exceed RR and COMM SCO's in subsurface soils adjacent to the wastewater collection chamber. Cadmium exceeded the RR SCO in SB-16, located below the northern area of the slab.

- No PCB detections exceeding SCOs were reported in the subsurface soils.

5.3.3 Groundwater

Two rounds of groundwater sampling and analysis (September 30, 2013 and January 20, 2016) were performed. Results are summarized below. Refer to *Analytical Data Summary Tables 9 - 12* [Appendix 4] and *Figures RI-1A* and *RI-1B* [Appendix 1] for additional information.

September 30, 2013

- No observations of non-aqueous phase liquid (NAPL), or "free product" were reported.

- The only well in which VOC concentrations exceeded the SCOs was MW-5, with a trace level of benzene (1.52 ug/l[23]) slightly exceeding the groundwater standard of 1 ug/l.

[23] ug/l – micrograms per liter, or parts per billion (ppb).

- Only one SVOC, benzo(a)pyrene was reported at trace levels (0.46 ug/l to 1.9 ug/l) which exceed the "non-detect" groundwater standard.

- Due to elevated turbidity, analysis of both filtered and unfiltered metals was performed. For the unfiltered metals, the reported concentrations of several compounds, including arsenic, chromium, copper, lead and mercury exceeded groundwater standards.

- The concentrations for the filtered samples were considerably lower and in most cases did not exceed groundwater standards. Exceptions included iron, sodium and manganese.

- Dissolved (unfiltered) metals levels in the wells positioned along the embankment did not exceed groundwater standards for any of the constituents of concern (e.g., arsenic chromium, copper, lead and mercury).

- Although elevated chromium levels were reported, the hexavalent form was "non-detect".

- One of the PCB Aroclors (1254) was detected in monitoring well MW-7, which is positioned adjacent to the wastewater collection chamber. The reported concentration of 0.317 ug/l exceeds the groundwater standard of 0.09 ug/l.

January 20, 2016

- No observations of non-aqueous phase liquid (NAPL), or "free product" were reported. PID responses at the well heads were all 0 ppm with the exception of MW-2, where a response of 0.2 ppm was obtained.

- No VOC, SVOC or PCB detections exceeding groundwater standards were reported.

- The only metals which exceeded groundwater standards were antimony, iron, manganese and sodium. Metals which had previously been found at elevated levels and/or associated with historic facility operations (e.g., lead, chromium and copper) were at trace levels (below groundwater standards) or not detected.

- Turbidity levels were lower for the second round, with the 50 NTU threshold for filtering exceeded in only one of the wells (MW-1).

5.4 Analytical Data Summary (Soil Vapor)

Laboratory analysis of the soil vapor and air samples was performed by Centek Laboratories, LLC (Centek). A copy of Centek's report is provided in Appendix 8. The analytical data is summarized in *Table 13* [Appendix 4]. The data indicates the following:

West Parcel

- The sub-slab probe (SSP-1/2) and indoor air (IA) results for the West building were evaluated in consideration of the New York State Department of Health's (DOH's) guidance document[24] and the current guideline of 2 mcg/m^3 for trichloroethene (TCE)[25]. TCE was reported in the SSP-1, SSP-2 and IA samples at concentrations of 25, 12 and 3 mcg/m^3, respectively, which exceed the DOH guideline.

- Tetrachloroethene (PCE) and methylene chloride, which are also regulated by the DOH, were detected in SSP-1, SSP-2 and IA at concentrations below (i.e., compliant with) DOH guidelines.

- PCE was reported in soil vapor probe SVP-1 at 140 mcg/m^3, which exceeds the DOH guideline of 100 mcg/m^3. No other exceedances of DOH guidelines were reported.

East Parcel

- TCE was reported at 250 mcg/m^3 in SSP-3, which is located below the south area of the former building slab. The reported concentration of TCE in SSP-4 (4 mcg/m^3), also marginally exceeded the DOH guideline.

- No other exceedances of regulated constituents were reported in the two sub-slab samples or the soil vapor (SVP-3) sample.

5.5 Data Validation

Environmental Standards, Inc. (ESI) performed a third party review of the Category B analytical data generated by two State-certified laboratories during this investigation. The analytical data report aspects were reviewed within the context of the DEC's Data Usability Summary Report (DUSR) based on the following:

- Quality Assurance Review
- Analytical Results
- Organic Support Documentation
- Inorganic Support Documentation
- Case Narrative and Chain-of-Custody Record

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[24] NYSDOH *[Final] Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006.

[25] NYSDOH *Trichloroethene (TCE) In Indoor and Outdoor Air – August 2015 Fact Sheet*.

In summary, the DUSRs cited several qualifications to the data. However, based on subsequent discussions with ESI, it is our understanding that these qualifiers do not impact the conclusions and recommendations presented in this report. Although no pertinent data was rejected, ESI cautions that when reviewing the analytical results, the user must also understand the qualifiers cited. The full DUSRs are provided in Appendix 9.

6.0 CONTAMINANT FATE AND TRANSPORT

Site constituents of concern are primarily metals. As previously indicated, a few volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) which marginally exceed Soil Cleanup Objectives (SCOs) are also present, and trace PCB detections were reported near the wastewater collection chamber.

6.1 Groundwater Flow Direction

Static water level measurements were obtained from the groundwater monitoring wells during both sampling events (September 30, 2013 and January 20, 2016). The water levels were converted into elevations based on the Site survey datum and groundwater contour maps were generated [*Figures RI-1A* and *RI-1B*, Appendix 1]. The data for both events indicate a flow direction to the east, toward Nine Mile Creek.

6.2 Potential Routes of Migration

Based on the groundwater flow direction, soil profile and mapping program, potential routes of contaminant migration are discussed in the following sections. Refer to *Figures RI-1A* and *RI-1B* and the *Soil Profile [Figure SP-1]* in Appendix 1 for additional information.

6.2.1 Utility Pathways

A comparison of the mapped utility invert and groundwater surface elevations was made, with respect to the potential for the utilities and/or their respective trenches to intercept and divert groundwater flow. The available information indicates the following:

- The sanitary sewer which traverses the western area of the Site could potentially intercept groundwater from up-gradient (i.e., up-slope) areas and divert flow to the north. However, the bulk of historic industrial activity occurred in the eastern area of the Site, down-gradient from the sanitary sewer and contaminant levels in the up-gradient wells/borings (MW-1 and SB-17) were relatively low.

- The storm sewer conveyance system within the parking lot was filled with sediment and accordingly, detailed elevation information was not obtained. However, similar to the sanitary sewer, the bulk of historic industrial activity appears to have occurred

down-gradient[26] from the storm sewer system. In addition, as the storm sewer received parking lot runoff, it would be expected to be a less likely receptor of significant contamination associated with industrial activities.

- Based on the historic information [Section 2.2] a water service line(s) extends from Genesee Street to the central area of the Site, and several water lines extend under the existing and former building footprints. Based on their typical burial depths (5 to 6 feet), these lines could potentially intercept groundwater flow. However, the lines appear to terminate within the former building footprint, where subsurface conditions have been characterized through the soil boring and analytical program.

6.2.2 Field Permeability Tests

- Field permeability (i.e., "slug") tests were performed in two down-gradient monitoring wells (MW-5 and MW-7) and one up-gradient well (MW-3). Results were assessed using the Bouwer and Rice[27] method.

- The calculated hydraulic conductivities were consistent with coarse-grained soils, which were encountered within the saturated zone in the down-gradient monitoring wells (MW-5 and MW-7) positioned along the Nine Mile Creek and the relatively coarse-grained fill material encountered in the upper 8 feet of MW-3.

- The coarse-grained soils are favorable for the movement of groundwater and the groundwater flow direction indicates that the monitoring wells are suitably positioned to evaluate groundwater conditions along the down-gradient perimeter of the Site. The trace or non-detect levels of constituents of concern that were reported for the recent (January 2016) sampling event indicate limited overall residual contamination and further support the limited mobility of metals.

6.3 Contaminant Characteristics

Groundwater flow direction across the Site is toward the east. Constituents of concern are primarily metals, however low levels of SVOCs, PCBs and VOCs were also reported. Information relative to persistence of these contaminants is summarized below.

Metals

- Typically, most metals are relatively more likely to adhere to soils through adsorption, rather than readily dissolving into groundwater[28]. This is supported by the analytical

[26] With respect to the groundwater flow direction.

[27] *The Bouwer and Rice Slug Test – An Update*, by Herman Bouwer, published in Vol. 27 No. 3 – GROUNDWATER, May-June 1989.

[28] EPA Ground Water Issue: *Behavior of Metals in Soils*, October 1992.

results, which indicated relatively higher levels in unfiltered groundwater samples having high turbidity and low levels in the filtered results and for samples with low turbidity.

SVOCs

- Molecular weights of the SVOCs which were detected on the Site are considered relatively high (228 to 276) and the vapor pressures are low. These factors indicate a low potential for volatilization.

- The octanol-carbon partition coefficient (Koc) values for the high molecular weight SVOCs are also high, indicating a chemical tendency to sorb to organic bearing soils. As such, they are relatively less likely to dissolve into either downward percolating water or flowing groundwater than lower molecular weight compounds[29].

VOCs

- VOC's have a relatively high potential for biodegradation based on their low Koc values, high solubilities and high vapor pressures. The absent or trace levels of these constituents in down-gradient wells and borings, in combination with the SVI analytical results [Section 5.4] further suggests biodegradation and/or relatively low source levels.

PCBs

- PCBs are generally stable compounds in the environment and are nearly insoluble in water. The specific source(s) of the detections found along the embankment were not identified, however a comparison of the trace levels detected in the soil and groundwater with the relatively higher levels in the nearby fire brick oven pits [Section 4.7.2] and drains does not suggest that significant releases have occurred.

6.4 Potential Migration Pathways – Soil Vapors

- Potential migration pathways for soil vapors include cracks or openings in building floor slabs, utilities and/or coarse-grained backfill in their respective trenches.

- The ground surface elevations at the adjoining residences to the west range from approximately 10 to 20 feet higher than ground/slab elevations throughout the Site. In addition, based on their relative vapor densities the VOC constituents which are currently regulated by the NYSDOH (e.g., methylene chloride, trichloroethene and tetrachloroethene) are heavier than air. Although these factors would appear to suggest that migration of the constituents of concern from the Site to the residences is unlikely, as a precautionary measure an expanded soil vapor monitoring program will be performed.

- The additional investigation will include the installation of soil vapor monitoring points

[29] US Department of Health and Human Services: *Toxicological Profile for Polycyclic Aromatic Hydrocarbons*, August 1995.

near the west and south property lines. Results will be provided within an addendum to this RI report.

7.0 FISH & WILDLIFE RESOURCE IMPACT ANALYSIS

Nine Mile Creek borders the eastern property line of the Site and is a DEC Class C(T)[30] stream and is therefore a corridor for fish and marine wildlife movement. The majority of the property slopes downward from the west to the east, toward the creek. Accordingly, the RI has included a Part 1 (Resource Characterization Phase) Fish and Wildlife Resource Impact Analysis (FWRIA). The objective of the FWRIA was to identify fish and wildlife resources in the vicinity of the Site and to provide recommendations pertinent to the RI.

The FWRIA was completed by Lu Engineers (Lu) and is provided in Appendix 7. The report concluded that in consideration of the planned remediation effort along the Nine Mile Creek embankment, no further ecological evaluation of the Site would be recommended if the results of the confirmation sampling and analysis program indicates constituent levels that are below (i.e., compliant with) State standards.

8.0 QUALITATIVE EXPOSURE ASSESSMENT

8.1 Future Use of the Site

West Parcel

Current redevelopment plans call for the West building to be converted into a mixed residential (apartments) and commercial facility, with an approximately 80% - 20% split of residential and commercial components, respectively.

- During the construction phase of the project, the estimated maximum occupancy of the Site is approximately 25 people, consisting primarily of contractor and project architect and/or engineer personnel.
- Following development, the site will be comprised of approximately 25 apartment units and a small commercial facility.

East Parcel

Development plans for the East Parcel have not yet been finalized. Potential future residential or commercial occupancy is under consideration.

[30] Class C(T): Fresh Surface Waters with "Best Usage" of Fishing (Trout Waters) per *10 NYCRR Part 701: Classifications – Surface Waters and Groundwaters*.

8.2 Current Areas of Concern

Based on the field and analytical data obtained during the RI program, the initial (preliminary) Areas of Concern (AOC) have been eliminated, with the exception of the wastewater collection chamber and adjacent floor drain areas.

The current AOCs are as follows:

- AOC-1: Subsurface soils, at depths of approximately 5 to 8 feet adjacent to the wastewater collection chamber.
- AOC-2.1: Surface soils (i.e., to depths of 1 ft) along the creek embankment.
- AOC-2.2: Surface soils in the south lawn area.
- AOC-3.1: Soil Vapor Intrusion (SVI) Area – West Parcel
- AOC-3.2: Soil Vapor Intrusion (SVI) Area – East Parcel

Locations of the AOCs are shown on *Figures RI-1A* and *RI-1B* [Appendix 1].

8.3 Public Exposure Assessment

An Exposure Assessment (EA) was performed to assess the potential for exposure of future Site occupants, contractors and the general public to residual constituents of concern. The EA generally conforms to guidance provided by the New York State Department of Health[31].

An EA considers the following five pathway elements:

(1) Source areas (e.g., AOCs).

(2) Constituent release and transport (migration) pathways.

(3) Points of exposure where contacts can occur.

(4) Route(s) of exposure (e.g., inhalation or ingestion).

(5) A receptor population.

An exposure pathway is complete when all five elements are present and documented, and can be eliminated if any one of the five elements does not exist in the past, present or future condition. A potential exposure pathway exists if any one of the five elements comprising an exposure pathway is not documented.

The table below identifies completed or potentially completed exposure pathways to Site constituents of concern. These include potential dermal contact or inhalation of windblown soils, or VOCs released from disturbed soils during subsurface excavation activities and/or from

[31] Appendix 3B of Final DER-10: *New York State Department of Health Qualitative Human Health Exposure Assessment*.

surface soils. The selected remedy, including a Site Management Plan (SMP) will be proposed to eliminate or manage these pathways.

Site Conceptual Exposure Scenarios

Potentially Exposed Population	Exposure Route, Medium and Exposure Point	Pathway Complete?		Reason for Selection or Non-Selection / Comments
		Current[1]	Future	
Onsite Resident or Commercial Worker	Inhalation of volatiles from surface or subsurface soils	No	Yes	VOCs exceeding NYSDOH guidelines identified in SVI evaluation.
	Inhalation of volatiles from groundwater.	No	Potential	No or low level VOCs found in groundwater.
	Dermal contact / ingestion of groundwater	No	No	Municipal water supply. Future groundwater use restrictions in SMP.
	Dermal contact with surficial soils	No	No	Remedy to include clean soil cap.
	Dermal contact with subsurface soils	No	No	New Site development governed by SMP.
Onsite Construction Worker	Inhalation of volatiles from subsurface soils	No	Yes	VOCs exceeding NYSDOH guidelines identified in SVI evaluation. Future intrusive work to be governed by SMP.
	Inhalation of volatiles from groundwater	Potential	Potential	Low level or no VOCs in groundwater. Future intrusive work to be governed by SMP.
	Dermal contact / ingestion of groundwater	Potential	Potential	Low level constituents in groundwater. Future intrusive work to be governed by SMP.
	Dermal contact with surficial soils	Potential	Potential	Remedial action to remove contaminated surface soils within AOCs. Future intrusive work to be governed by SMP.
	Dermal contact with subsurface soils	Potential	Potential	Future intrusive work to be governed by SMP.
Offsite Resident or Commercial Worker	Inhalation of volatiles from subsurface soils	Potential	Potential	VOCs exceeding NYSDOH guidelines identified in SVI evaluation. Residences positioned up-gradient from Site.
	Inhalation of volatiles from groundwater	Potential	Potential	Groundwater 4 to 7 feet below ground surface. Majority of Site to be paved or under concrete "cap". Low VOC levels in groundwater.
	Dermal contact / ingestion of groundwater	Potential	Potential	Municipal water supply.
	Dermal contact with surficial soils	Potential	Potential	
	Dermal contact with subsurface soils	Potential	Potential	

Offsite Construction Worker	Inhalation of volatiles from subsurface soils	Potential	Potential	VOCs exceeding NYSDOH guidelines identified in SVI evaluation.
	Inhalation of volatiles from groundwater	No	No	Subsurface investigation showed low level or no VOCs in groundwater.
	Dermal contact / ingestion of groundwater	Potential	Potential	No indication of contaminant migration to adjacent properties to north, south or west. Relatively low constituent levels northeast area of Site. Public water service area.
	Dermal contact with surficial soils	No	No	Residential lawn areas are up-gradient from known former industrial process areas.
	Dermal contact with subsurface soils	Potential	Potential	No indication of contaminant migration to north, south or west.Relatively low constituent levels northeast area of Site.
General Public	Inhalation of windblown surface soil.	Potential	No	Remedy will include clean soil cap and SMP.
	Inhalation of nuisance odors	No	Potential	Potential short term impacts during remedial excavation activity.
	Dermal contact with surface soils	No	No	Remedy to include clean soil cap, SMP.
	Ingestion of surface water or dermal contact with surface water (i.e., fishing/swimming in Nine Mile Creek)	Potential	Potential	
Trespassers	Inhalation of windblown surface soil.	Potential	No	Remedy to include clean soil cap, SMP.
	Dermal contact with surface soils	Potential	No	Remedy to include clean soil cap, SMP.

NA Not Applicable SMP Site Management Plan

[1] No current on-Site residents or construction workers

8.4 Land Use Limitations

The EA results indicate that land use restrictions may be warranted for this Site, such as an easement(s) restricting groundwater use or prohibition of certain Site uses (e.g., farming, public recreational facilities). The Site is located in an area that is served by public water.

Administrative controls should be implemented to govern the disturbance of subsurface soils and management of groundwater through a Site Management Plan, as required under the Brownfield Cleanup Program.

9.0 SUMMARY

A summary of the RI results, with respect to the soil, groundwater and soil vapor mediums in relation to the West and East Parcels is provided below:

9.1 Soils

West Parcel

- Restricted-Residential (RR) SCOs were exceeded for only one semi-volatile organic compound (SVOC) within Area of Concern (AOC) 2.2 (south lawn area) and one metal compound (mercury) in a subsurface soil sample adjacent to the northeastern corner of the West building (SB-8; 6 to 8 ft).

- Unrestricted Use (UNR) SCOs were exceeded only for acetone at SB-3 and SB-10. Exceedances including acetone, 2-butanone, chromium, copper, lead and mercury were reported in SB-8 (6 to 8 ft). At the surface soil sample SS-4, exceedances of benzo(b)flouranthene (detected below the practical quantitation limit), copper, lead and mercury were included.

East Parcel

- Constituents exceeding RR SCOs found in soils within the East parcel included several SVOCs (e.benzo[a]anthracene, benzo[a]pyrene, benzo[b]flouranthene, chrysene) and metals (e.g., arsenic, cadmium, chromium and copper). The exceedances occurred in both surface soils (AOC-2.1) and soils at depths of approximately 6 to 8 feet (AOC-1).

- When compared to UNR SCOs, several other compounds exceeded their respective standards. These included benzo(k)flouranthene, lead and trace levels of PCBs within AOC-1.

9.2 Groundwater

Two rounds of groundwater sampling and analysis were performed (September 2013 and January 2016). No observations of non-aqueous phase liquid (NAPL), or "free product" were reported in either sampling event.

September 2013

- Due to relatively high turbidity, both filtered and unfiltered samples were analyzed for metals. For the unfiltered samples, groundwater standards were exceeded for several metals. The results for the filtered samples were substantially lower that the unfiltered samples and in most cases did not exceed groundwater standards, further supporting the tendency of metals to adhere to soils.

- Only trace concentrations (i.e., less than 1 to 2 parts per billion) of one volatile organic compound (VOC), one SVOC and one polychlorinated biphenyl (PCB), marginally exceeded their respective groundwater standards.

January 2016

- The second round of groundwater sampling and analysis indicated substantially lower

turbidity and accordingly, non-filtered metals levels throughout the Site. Groundwater standards were not exceeded for any of the constituents of concern (e.g., lead, chromium and copper).

- No VOC, SVOC or PCB detections exceeding groundwater standards were reported.

9.3 Soil Vapor

West Parcel

- Although low or "non-detect" VOC levels were reported in the soil and groundwater in the vicinity of the West building, the soil vapor intrusion (SVI) evaluation indicated the presence of VOC's at concentrations which exceed NYSDOH criteria.

East Parcel

- The SVI evaluation also identified an area below the southern area of the former building slab, where VOC's were present (AOC 3-2). Similarly to AOC 3-1, no VOC detections were reported in the nearby soil and groundwater samples, suggesting that the residual vapor phase contamination is trapped in the subsurface between the concrete surface and the underlying groundwater table.

10.0 CONCLUSIONS

Soil contamination is not widespread on the Site. SCO exceedances in the soil are primarily metals, which generally tend to adhere to soils and have a relatively low potential for volatility and/or migration through groundwater. As such, focused excavation and removal efforts would appear likely to be an effective method of addressing residual soil contamination.

Based on the most recent (January 2016) analytical results, groundwater quality meets regulatory standards across the Site with respect to all constituents of concern. In addition, the Site and surrounding properties are served by public water. Based on these factors, no specific remediation of groundwater is warranted.

The findings from the Fish & Wildlife Resource Impact Analysis (FWRIA) further support the above conclusions, based on the recommendation that as long as confirmation sampling and analysis following the remediation of the upland Areas of Concern (AOC) produce results that are compliant with applicable Standards, no further ecological evaluation is warranted.

With regard to the detections of volatile organic compound (VOC) soil vapors, the primary contaminants of concern that were identified included trichloroethylene (TCE), and perchloroethylene (PCE). Based on the proposed residential and commercial occupancy of the West Building, a remedial action program addressing soil vapors within this Area of Concern (AOC-3.1) is under consideration by Camillus Mills.

11.0 RECOMMENDATIONS

Our recommendations to proceed with the balance of the BCP program are described as follows:

- An Alternatives Analysis Report (AAR), should be developed to facilitate selection of a remedy, consistent with DEC criteria[32], with respect to reduction of constituent levels within AOCs 1, 2-1 and 2-2 to the applicable Standards, Criteria and Guidance (SCG).

- A Remedial Action Work Plan (RAWP) should be developed with respect to implementing the selected alternative.

- The proposed remedy should include management of construction activities involving ground disturbance on the Site through development and implementation of a Site Management Plan (SMP).

- The AAR should include a recommended action(s) with respect to the soil vapor AOC-3.1 on the West Parcel. As development plans for the East Parcel have not yet been proposed, it is anticipated that soil vapor AOC-3.2 would be addressed within the SMP.

- An expanded soil vapor evaluation program for the Site areas in the vicinity of the West Building should be developed and implemented.

[32] 6 NYCRR Part 375-1.8: *Remedial Program*.