NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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Parkway Plaza Limited Partnership
Attn: Richard Crossed
46 Prince Street, Suite 2003
Rochester, NY 14607

June 8, 2022

Re: Parkway Plaza Cleaners Site
Site ID No. *C835028*
Canandaigua, Ontario County
Remedial Work Plan & Decision Document

Dear Mr. Crossed:

The New York State Department of Environmental Conservation (Department) and the New York State Department of Health (NYSDOH) have reviewed the Remedial Action Work Plan (RAWP) for the Parkway Plaza Cleaners Site dated May 2021 and prepared by Day Engineering, P.C. on behalf of the Parkway Plaza Limited Partnership. The RAWP is hereby approved contingent upon the following:

1. Groundwater monitoring of emerging contaminants and soil cover verification / replacement are amended to the RAWP consistent with the site remedy.
2. A calendar schedule including the amendment and reporting deliverables is provided.

Please ensure that a copy of the approved RAWP including this letter cover and calendar schedule is compiled, provided to the Department, and placed in the document repository(ies) prior to the commencement of work. The draft plan should be removed.

Attached is a copy of the Department's Decision Document for the site. The remedy is to be implemented in accordance with this Decision Document. Please ensure that a copy of the Decision Document is placed in the document repository(ies).

Please contact the Department's Project Manager, Timothy Schneider, at 585-226-5480 or timothy.schneider@dec.ny.gov at your earliest convenience to discuss next steps. Please recall the Department requires seven days notice prior to the start of field work.

Sincerely,

Michael J Cruden

Michael Cruden
Director Remedial Bureau E
Division of Environmental Remediation

Enclosure

ec *w/attachments*:

Andrew Guglielmi
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REMEDIAL ACTION WORK PLAN

FORMER PARKWAY CLEANERS
EASTERN BOULEVARD
PARKWAY PLAZA
CITY OF CANANDAIGUA, ONTARIO COUNTY, NEW YORK
BCP SITE NUMBER C835028

Prepared For: Parkway Plaza Limited Partnership
46 Prince Street
Rochester, New York 14607

Prepared By: Day Engineering, P.C.
1563 Lyell Avenue
Rochester, New York 14606

Project No.: 5188R-15

Date: May 2021

REMEDIAL ACTION WORK PLAN

FORMER PARKWAY CLEANERS
EASTERN BOULEVARD
PARKWAY PLAZA
CITY OF CANANDAIGUA, ONTARIO COUNTY, NEW YORK
BCP SITE CODE #C835028

I, Nathan Simon certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Remedial Action Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Nathan E Simon, P.E.
NYS P.E. License #087172
Project Engineer
Day Engineering, P.C.
May 2021

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EXCUTIVE SUMMARY

Parkway Plaza Limited Partnership, LLP entered the New York State Brownfield Cleanup Program (BCP) to evaluate and remediate environmental impacts at the former Parkway Cleaners site in Canandaigua, New York (BCP Site #C835028 or the Site). The following sections summarize the findings and conclusions of the studies completed to date and remedial actions implemented and proposed to address environmental impacts. Based on the work completed, the nature and extent of contamination in all media has been identified.

Background

The 0.5-acre Site is a portion of the 12.78-acre Parkway Plaza, which is located on the south side of Routes 5 & 20 (85 Eastern Boulevard) in the City of Canandaigua, Ontario County, New York. Parkway Plaza was originally constructed in approximately 1957, and prior to its construction the property consisted of vacant undeveloped land. The former Parkway Cleaners (i.e., a tenant in Parkway Plaza) began operations at the Site sometime between 1962 and 1978, and perchloroethene (a/k/a tetrachloroethene, or PCE) was used as a drycleaning solvent at this location until approximately 1991.

The drycleaning equipment for the former Parkway Cleaners was located within an alcove portion of the building (i.e., located on the south side of the former Parkway Cleaners tenant space). An exterior sediment trap/sump connected to the sanitary sewer line was located immediately adjacent to the south side of the alcove. Drycleaning equipment apparently discharged wastewater into this sediment trap/sump, the walls, of which, were constructed of concrete block and this structure contained a soil bottom. This sediment trap/sump is the original "source area" of the PCE and associated breakdown products deemed the Contaminants of Concern (COC) at the Site.

Subsurface Conditions

The ground surface of the Site is predominately covered with asphalt pavement, concrete sidewalks or the slab-on-grade Parkway Plaza building. Heterogeneous fill consisting primarily of reworked soil intermixed with trace amounts of brick underlies the asphalt and concrete. Some organics and wood were observed near the bottom of the fill, which may be indicative of the top of the original ground surface prior to filling. The fill at the Site extends to an average depth of approximately 8 feet (ft.) below ground surface (bgs).

The indigenous soil beneath the fill generally consists of varved silt and silty clay containing partings or seams of silty sand (i.e., ranging in thickness between about 1/8-inch and 3 inches) that extends to an approximate depth of 13 ft. to 14 ft. bgs. Thereafter a 25^{+}-foot thick silty clay deposit extending to depths of 33.5 ft. to 49 ft. bgs was encountered above a sand and gravel deposit that contains some intermixed layers of silt. Test borings were advanced to a maximum depth of 57 ft. bgs during the studies completed at the Site without penetrating the entire thickness of the sand and gravel deposit or encountering bedrock. Based upon available information, shale/siltstone bedrock underlies the Site.

The depth to groundwater measured in "shallow" monitoring wells (i.e., monitoring wells installed above the silty clay layer) between February 2004 and January 2010 varied from about 1.85 ft. bgs

and 6.8 ft. bgs. Although groundwater flow patterns vary seasonally, groundwater flow measured in the "shallow" monitoring wells is predominately to the south/southwest.

Generally. the soil samples containing volatile organic compound (VOC) concentrations exceeding SCO were collected from test borings advanced within the alcove portion of the former Parkway Cleaners building or immediately south of the building (i.e., in proximity of the former sediment trap/sump).

Contaminants of Concern

The Contaminants of Concern for the impacted media (i.e., soil, soil vapor and groundwater), with maximum concentrations measured at the Site, and the location of the samples where these concentrations were measured, are listed below.

- tetrachloroethene (PCE)
  - maximum soil concentration: 2,830 ppm [TB-4(10')]
  - maximum groundwater concentration: 6,910 ppb (MW-TB-4)

- trichloroethene (TCE)
  - maximum soil concentration: 38.2 ppm [TB-4(10')]
  - maximum groundwater concentration: 3,450 ppb (MW-TB-4)

- cis-1,2-dichloroethene (cis-1,2-DCE)
  - maximum soil concentration: 16.7 ppm [TB-5(10')]
  - maximum groundwater concentration: 6,820 ppb (MW-TB-4)

- trans-1,2-dichloroethene (trans-1,2-DCE)
  - maximum soil concentration: 0.050 ppm [Secondary South Wall (5'-7')]
  - maximum groundwater concentration: 7 ppb (MW-103s)

- vinyl chloride (VC)
  - maximum soil concentration: 6.27 ppm [TB-5(10')]
  - maximum groundwater concentration: 1,240 ppb (MW-103s)

Soil Removal Interim Remedial Measure (IRM)

A soil removal IRM was completed in 2001 that consisted of the removal of 517 tons of soil impacted with COC from an area south and west of the alcove. Due to the presence of buried utility lines, excavation was not possible east of the alcove. This IRM also included the closure of the sediment trap/sump and removal of an approximate 100-gallon PCE storage tank from the roof above the former Parkway Cleaners.

Soil Quality

Confirmatory soil samples collected following the soil removal IRM indicate that soil impacted with select VOCs exceeding the Unrestricted Use and Protection of Groundwater SCO remained

in some locations, including beneath the former alcove area that was demolished in 2014 (i.e., subsequent to the IRM).

Groundwater Quality

Testing of groundwater samples collected during this study identified the presence of COC in select "shallow" monitoring wells. The concentrations measured in of some of the samples collected from the "shallow" monitoring wells exceeded standards, criteria and guidance (SCG) values. COC was not detected in the samples from the "deep" monitoring wells that were tested.

Indoor and Sub-Slab Vapor Quality and Mitigation

A sub-slab depressurization system (SSDS) was installed within the former Parkway Cleaners space in November 2019, and this system provides mitigation of soil vapor intrusion within this this space. Results of the post-installation vapor sampling event completed on January 23, 2020 indicated that concentrations of COC within the indoor air of the former Parkway Cleaners and within the indoor air and sub-slab soil vapor in adjacent tenant spaces did not exceed New York State Department of Health (NYSDOH) guidance values or result in a NYSDOH matrix recommendation beyond "no further action" required.

Potential Routes of Migration and Exposure

Based on the available data, COC migrating in a dissolved shallow groundwater plume is the primary route of exposure for the Site. The approximate 25^{+}-foot thick deposit of indigenous silty clay that underlies the Site and the surrounding area serves as an aquiclude to preclude the downward migration of COC. The other potential routes of exposure and migration for this Site include direct contact with soil and/or groundwater impacted with COC during ground intrusive activities. The vapor mitigation engineering control (i.e., SSDS) installed in 2019 has eliminated the potential vapor intrusion route of exposure for the former Parkway Cleaners space. Further, the testing of paired sub-slab vapor and indoor air samples collected from adjacent tenant spaces indicate that vapor intrusion route is not a potential route of exposure in these locations at this time.

Residual Contamination

The highest concentrations of COC in the soil and groundwater at the Site remain in proximity to the former source area below the concrete slab of the former alcove. In general, the COC concentrations measured in the groundwater downgradient of the source zone decreases prior to increasing in monitoring well MW-103s, which is located in proximity of the southeastern property boundary of the Site. This distribution suggests that the 2001 soil removal IRM reduced COC concentrations in the groundwater downgradient of the source area, however, residual source material and possible preferential flow continue to impact the shallow groundwater at the Site.

Areas of Concern (AOC)

Based on the extent of COC-impact identified in the groundwater, soil and soil vapor, the following three AOC are identified.

- AOC#1 – Includes the former alcove area, potentially the area to the east where buried utilities precluded soil removal during the IRM, an area between the existing building and the 2001 IRM excavation limits, an area south of 2001 secondary IRM excavation and soil below building footprint to a maximum depth of 18 ft. bgs.

- AOC#2 – Includes a localized area south of AOC#1 where COC concentrations in excess of the Protection of Groundwater were detected in two test borings at depths of predominately between about 16 and 32 ft. bgs.

- AOC#3 – Includes the on-site area in proximity of MW-103s that extends to a depth of about 13 ft. bgs.

Recommended Remedial Alternative The components of the recommended remedial alternative (i.e., Track 4 Restricted Commercial Use) to be implemented at the Site includes:

- A cover system consisting of asphalt pavement, building slabs and sidewalks is currently installed at the Site and will be maintained to allow for restricted commercial use of the Site;
- the AOC#1 source will be addressed by in-situ treatment/chemical reduction of groundwater (containment) by in-situ chemical reduction via injection of zero-valent iron within a targeted injection zone of 4 ft. and 18 ft. bgs to treat COC in groundwater;
- groundwater plume migration (AOC#1/AOC#3) will be addressed by in-situ treatment/biodegradation of groundwater (containment) by in-situ enhanced biodegradation to treat COC in groundwater through anaerobic reductive dechlorination via the injection of emulsified vegetable oil (EVO) between 4 ft. and 18 ft. bgs;
- the continued operation of the SSDS within the former Parkway Cleaners tenant space and testing as deemed necessary in adjacent tenant spaces to mitigate potential soil vapors from entering the existing build and the installation of a SSDS in new buildings, if warranted;
- implementation of engineering controls (e.g., maintenance of the cover system, continued operation of the SSDS, etc.);
- imposition of an institutional control in the form of environmental easement or deed restriction for the Site; and
- development and implementation of a Site Management Plan (SMP).

1.0 INTRODUCTION

This remedial action work plan (RAWP) includes an evaluation of potential remedial alternatives and describes the recommended remedial alternative proposed to mitigate and manage residual soil and groundwater impacts associated with a historic release of waste drycleaning fluid (tetrachloroethene or PCE) at the former Parkway Cleaners Site located in Canandaigua, New York (the Site). Refer to the Figure 1 for a project locus map.

The Site is comprised of approximately 0.5 acres of the 12.78-acre Parkway Plaza parcel, and it includes three tenant spaces within the Parkway Plaza addressed as 47 Eastern Boulevard, 51 Eastern Boulevard and 57 Eastern Boulevard. The tenant space at 47 Eastern Boulevard is currently operated as The Great Wall Restaurant, the tenant space at 51 Eastern Boulevard (i.e., the former Parkway Cleaners) is currently operated as SoFresh-N-SoClean laundromat (i.e., a coin-operated laundromat), and the tenant space at 57 Eastern Boulevard is currently operated by Sakura Japanese Steak House and Sushi Bar.

Parkway Plaza Limited Partnership LLC entered into a Brownfield Cleanup Agreement (BCA), with the New York State Department of Environmental Conservation (NYSDEC) on September 26, 2018 to evaluate and remediate the Site. The Site is currently identified as New York State (NYS) Brownfield Cleanup Program (BCP), Site No.C835028.

1.1 BACKGROUND

The Parkway Plaza commercial development, which includes, but is not limited to the Site, was originally constructed about 1957. Prior to its construction, the property consisted of vacant undeveloped land. The Site is bound to the east by Parkway Plaza and to the west by commercial property. The Site is bound to the north by Parkway Plaza parking lot with Eastern Boulevard (New York State Routes 5 & 20) and commercial properties beyond. The property to the south of the Site is in the process of being developed as a multi-tenant residential/commercial property under the BCP (i.e., Site No. C835025).

Reportedly, drycleaning using PCE was conducted at the Site between about the 1960's and 1991. The PCE used at the Site was stored in an approximate 100-gallon aboveground storage tank (AST), which was mounted on the roof of the former Parkway Cleaners tenant space. A valved pipe from the tank that extended to a former alcove located on the south side of the former Parkway Cleaners tenant space that housed drycleaning machines was used fill buckets with drycleaning fluid. These buckets were used to add drycleaning fluid into the drycleaning machines. PCE was not stored in other locations within the building. This AST was removed as part of an IRM conducted in 2001 when this Site entered the Voluntary Cleanup Program (VCP).

An exterior sediment trap/sump that was connected to the sanitary sewer line was located immediately adjacent to the south side of the alcove portion of the building. A hole in the concrete block wall of the alcove (i.e., located between the former location of the drycleaning equipment and the exterior sediment trap/sump) suggests that the drycleaning equipment discharged into this sediment trap/sump. The walls of the sediment trap/sump were constructed of concrete block and this structure contained a soil bottom. The studies completed to date determined that the sediment

trap/sump was a source area of the chlorinated volatile organic compound (VOC) impact within the subsurface at the Site.

A soil removal IRM, which also included the removal of the 100-gallon PCE AST and the sediment trap/sump, was conducted at the Site between November 27, 2001 and December 4, 2001. Approximately 517 tons of contaminated soil was removed from two excavations completed as part of the soil removal IRM and subsequently disposed off-site. The primary excavation was approximately 25.5 feet (ft.) long by 10 ft. wide and it extended to depths ranging between about 22 ft. and 23 ft. below ground surface (bgs). The secondary excavation was approximately 21.5 ft. long by 7 ft. wide and it extended to a depth of approximately 11 ft. bgs. The location and orientation of the two excavations completed as part of the IRM is shown on Figure 2. The endpoint soil samples collected/tested from the completed excavations achieved the current Restricted Commercial Use soil cleanup objectives (SCO), however, the endpoint soil samples did not achieve the current Unrestricted Use and Protection of Groundwater SCO in all locations.

A vapor mitigation system was installed within the alcove of the former Parkway Cleaners building in 2004 and this system operated continuously until 2019 (i.e., with the exception of a period of time following the removal of the alcove in 2014) when it was replaced with a sub-slab depressurization system (SSDS) installed within the former Parkway Cleaners tenant space in 2019 (refer to Section 1.3).

Sub-slab and indoor air samples were collected from locations within the former Parkway Cleaners tenant space and the adjacent businesses located to the east and the west in 2007. These samples were tested for VOCs (including the contaminants of concern identified for the Site, refer to Section 3.1), and the test results did not identify concentrations that exceeded air guidance values established by the New York State Department of Health (NYSDOH). In 2019, a SSDS was installed in the former Parkway Cleaners tenant space. Subsequent indoor air testing within the former Parkway Cleaners and paired sub-slab/indoor air samples in the adjacent tenant spaces completed on January 23, 2020, did not identify VOC concentrations requiring further mitigation.

Despite the soil removal IRM, and subsequent groundwater treatment, a localized area of groundwater contamination remains in proximity of monitoring well MW-103s, which is located near the southern (downgradient) property line of the Site. In addition, analytical laboratory testing of soil and groundwater samples collected beneath the former alcove as part of supplemental studies completed in 2015 (i.e., following the demolition of the former alcove) identified concentrations of chlorinated VOCs in the soil above their respective Protection of Groundwater SCO and above the Technical and Operational Guidance Series (TOGs) 1.1.1 in the groundwater (refer to Section 1.2).

DAY prepared a report titled *Remedial Investigation/Recommended Remedial Alternative Report* dated March 2010, revised August 2012 and August 2014 (the RI/RRA report). The RI/RRA report summarizes studies conducted at the Site before the RI, the results of the RI, IRMs and pilot testing performed, and vapor mitigation/testing completed within in the former Parkway Cleaners tenant space and adjacent tenant spaces. The RI/RRA report included a recommended remedial alternative to address the residual accessible residual contaminant impact as evidenced in samples of groundwater collected/tested from monitoring well MW-103s. The recommended remedial alternative presented in the RI/RRA included biostimulation and the subsequent monitoring to

evaluate microbe populations (i.e., *Dehalococcoides* and *Dehalococcoides* functional groups) with a contingency for additional treatment, if needed (e.g., the injection of *Dehalococcoides* microbes).

The supplemental studies completed in May/June 2015 included the evaluation of subsurface conditions beneath the former alcove, and the collection and testing of soil and groundwater samples for VOCs. The work completed as part of the supplemental studies, and the relevant findings of this work, is discussed in Section 1.2. As described in Section 1.2, the supplemental studies identified a source area of chlorinated VOC impact in proximity of the former alcove. requiring remediation.

1.2 SUPPLEMENTAL STUDIES COMPLETED IN 2015

The fieldwork for the supplemental studies was completed between May 26, 2015 and May 28, 2015, and on June 11, 2015. This work included the collection of groundwater samples from existing on-site monitoring wells MP-1, MP-3, IP-1, IP-2, IP-3, MW-102s, and MW-103s, and off-site monitoring wells MW-69 and MW-204. The on-site monitoring well samples were collected by DAY representatives and the off-site monitoring well samples were collected by a representative of the NYSDEC. Spilt samples collected from monitoring wells MW-204 and MW-69, and the samples from the on-site monitoring wells were submitted to Spectrum Analytical, Inc. (Spectrum) for testing of halogenated VOC via Untitled States Environmental Protection Agency (USEPA) Method 8260. Samples from monitoring wells MP-3, IP-3, MW-103s, and MW-69 were also tested by Spectrum for Total Iron, Ferric Iron, Ferrous Iron, Manganese, Total Alkalinity, Chloride, Dissolved Organic Carbon (DOC), Sulfate, Sulfide, Nitrate, and Total Organic Carbon (TOC). The locations of the monitoring wells sampled on May 26, 2015 and May 27, 2015 are presented on Figure 2, and copies of the laboratory reports prepared by Spectrum and executed chain-of custody documentation for the samples collected from these monitoring wells are on file.

As part of the supplemental studies, test borings TB-1 through TB-6 were advanced via direct-push sampling methods using a Geoprobe System Model 6620 drill rig on May 28, 2015. Test borings TB-1 through TB-3 were advanced in proximity of existing monitoring wells MW-103s, IP-3, and MP-3, respectively and soil samples from these locations were tested by Spectrum for Total Iron and Fractional Organic Carbon (FOC). Test borings TB-4 through TB-6 were advanced within the footprint of the recently demolished alcove portion of the former Parkway Cleaners tenant space. The samples collected from test borings TB-4 through TB-6 were screened in the field using a PID equipped with a 10.6 eV bulb. PID measurements were made in each 0.25 ft. interval of the sample retained in the 5-foot long macro core acetate liner. The peak PID measurements made in each macro core sample and copies of the test boring logs are included in Appendix A. Based on the PID screening results, two soil samples from each test boring advanced within the former alcove were submitted to Spectrum for testing of halogenated VOCs and the results of this testing are summarized in Table 1.

Test boring TB-4 was completed as a groundwater monitoring well (i.e., designated TB-MW-4) and a groundwater sample was collected from this monitoring well on October 29, 2015 for testing (refer to Table 2 for test results). The locations of test borings TB-1 through TB-6 are shown on Figure 2. A copy of the installation log for the monitoring well installed in TB-MW-4 is included in Appendix A.

1.3 SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS)

The SSDS installed within the former Parkway Cleaners tenant space in 2019 (refer to Figure 3) provides mitigation of potential soil vapor intrusion within this this space. The SSDS consists of three suction points and approximately 110 linear ft. of interconnected 4-inch diameter perforated polyvinyl chloride (PVC) pipe installed within trenches backfilled with DER-10 acceptable material consisting of clean/washed New York State Department of Transportation (NYSDOT) #2 or CR2 gravel. A vapor barrier was installed above the backfill prior to placement of concrete to restore the floor in the area of the trenches. The sub-floor piping is connected to 4-inch and 6-inch smooth walled suction piping and piping laterals extending up to the roof-mounted ventilation fan. The ventilation fan manufactured by Fantech, Model REC 10XL, has a minimum design operation point of 100 cubic feet per minute at 3.7 inches of water column. The SSDS is equipped with a Radonaway Checkpoint LLA (model 28001-2) alarm that will sound if vacuum is not maintained and a Dwyer (model 2004) vacuum gauge. The SSDS became operational on November 19, 2019.

Procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan [Section 5.0 of the Interim Site Management Plan (ISMP) dated September 2019 (revised September 30, 2020)]. As built drawings for the SSDS, signed and sealed by a professional engineer, are included in Appendix I - Operations and Maintenance Manual of the ISMP.

The post-installation indoor air analytical laboratory results for samples collected on January 23, 2020, which are summarized on Figure 3a, indicate that concentrations of TO-15 VOC did not exceed NYSDOH guidance values. In addition, those locations in which paired samples were collected (i.e., locations 5, 6 and 7, refer to Figure 3a) did not result in a NYSDOH matrix recommendation beyond "no further action" required. The results from the January 23, 2020 post-installation indoor air test event demonstrated the SSDS is effective in mitigating potential soil vapor intrusion into the former Parkway Cleaners tenant space and contaminant concentrations were not measured at levels warranting further action this time in the two adjacent tenant spaces (i.e., Great Wall Restaurant and Sakura).

1.4 PURPOSE

The purpose of this RAWP is to describe remedial alternatives evaluated to address residual source zone material present in proximity of the former alcove, and contaminants of concern (COC) impacts identified in groundwater samples collected from monitoring well MW-103s; and to present the preferred remedial alternative and approach to address these impacts. Specifically, this RAWP includes an exposure assessment, identification of areas requiring treatment, remedial alternative analysis, proposed treatment methods for the remedial alternatives evaluated, identification of the preferred remedial option with a detailed discussion of the methods of treatment, and a discussion of subsequent monitoring to document the effectiveness of the implemented remedial measures and necessary institutional and engineering controls to mitigate potential exposure routes associated with the Site.

1.5 HEALTH AND SAFETY PLAN

A copy of the site-specific Health and Safety Plan (HASP), which includes the requirements for a Community Air Monitoring Program (CAMP), is included in Appendix B. These plans will be

implemented during completion of RAWP activities, which have the potential to encounter/release COC.

1.6 APPLICABLE PROJECT STANDARDS, CRITERIA AND GUIDANCE

Based on the contaminants identified at the Site, the existing and foreseeable future development scenarios, the location of the Site and NYSDEC requirements, the applicable Standards, Criteria and Guidance (SCG) values that will be used for this project are outlined below:

- Guidelines referenced in NYSDEC document titled "DER-10 Technical Guidance for Site Investigation and Remediation", dated May 2010 (DER-10).

- Guidelines referenced in the NYSDOH document titled "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006 (NYSDOH Guidance Document).

- Bureau of Toxic Substance Assessment NYSDOH Tetrachloroethene (PERC) In Indoor and Outdoor Air, September 2013 Fact Sheet.

- Bureau of Toxic Substance Assessment NYSDOH Trichloroethene (TCE) In Indoor and Outdoor Air, August 2015 Fact Sheet.

- NYSDEC Technical and Operational Series (TOGS) 1.1.1 document tilted "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations", updated 1998, 1999, 2000 and 2004.

- Protection of Groundwater Soil Cleanup Objectives (SCO), restricted commercial SCO, and other guidance as set forth in 6 NYCRR Part 375-4 Environmental Restoration Program dated December 14, 2006.

- A United States Environmental Protection Agency (USEPA) Underground Injection Control (UIC) Program requirements for Class V injection wells.

2.0 SUBSURFACE AND ENVIRONMENTAL CONDITIONS

This section presents a summary of subsurface and environmental conditions based upon the findings of the studies conducted to date at the Site.

Subsurface Conditions

The ground surface of the Site is predominately covered with asphalt pavement, concrete sidewalks or the slab-on-grade Parkway Plaza that housed the former Parkway Cleaners tenant space. Heterogeneous fill consisting primarily of reworked soil intermixed with trace amounts of brick underlies the asphalt and concrete. Some organics and wood were observed near the bottom of the fill, which may be indicative of the top of the former original ground surface prior to filling. The fill at the Site extends to an average depth of approximately 8 ft. bgs.

The indigenous soil beneath the fill generally consists of alternating layers of varved silt, silty sand and silt and silty clay containing partings or seams of silty sand (i.e., ranging in thickness between about 1/8-inch and 3 inches) that extend to an approximate depth of 13 ft. to 14 ft. bgs. Thereafter a 25+-foot thick silty clay deposit extending to depths of 33.5 ft. to 49 ft. bgs was encountered above a sand and gravel deposit that contains some intermixed varves/layers of silt. Test borings were advanced to a maximum depth of 57 ft. bgs during the studies completed at the Site without penetrating the entire thickness of the sand and gravel deposit or encountering bedrock. Based upon available information, shale/siltstone bedrock underlies the Site.

The test borings advanced in the former alcove of the Parkway Cleaners tenant space in 2015 (i.e., test borings TB-4 through TB-6) encountered an approximate 0.3 ft. thick concrete slab at the ground surface. A silt deposit containing varves of fine sand and, in some locations, silty clay was encountered beneath the concrete slab to a depth of approximately 12 ft. bgs (TB-4) to 14.5 ft. bgs (TB-6). Generally, the fine sand and silty clay deposits ranged in thickness from less than 1/4-inch to about ½-inch. A peat deposit was encountered in test boring TB-5 between about 8.5 ft. and 9.0 ft. bgs and in test boring TB-6 between about 12.0 ft. and 14.5 ft. bgs. A silty clay or clayey silt deposit was encountered below the silt deposit described above, and it extended to the bottom of the test borings (i.e., 20 ft. bgs). Frequent shells and shell fragments were evident in the interface between the silt and silty clay/clayey silt.

Geologic cross sections depicting subsurface conditions at the Site are included as Figures 4 through 6. The location/orientation of these cross sections are shown on Figure 2.

Groundwater Conditions

The depth to groundwater at the Site varies seasonally, but groundwater is typically encountered beginning at depths of about 3 ft. to 5 ft. bgs in the “shallow” monitoring wells (i.e., monitoring wells installed above the silty clay deposit described above) and about 5 ft. to 9 ft. bgs in the “deep” monitoring wells (i.e., installed within the sand and gravel deposit below the silty clay). An average hydraulic conductivity of 6.14×10^{-5} cm/sec was measured in the “shallow” monitoring wells tested and an average hydraulic conductivity of 1.56×10^{-4} cm/sec was measured in the “deep” monitoring well tested. These values are consistent with published values for silty clay to silty sand as referenced in Groundwater by R. Allan Freeze & John A. Cherry, 1979. Based upon

measurements made at various times during this study, the average horizontal hydraulic gradient between the "shallow" monitoring wells ranged between about 0.01 ft./ft. and 0.02 ft./ft. Using the range of calculated hydraulic conductivities and average horizontal gradients, and an estimated porosity of 0.28, the "shallow" groundwater flow at the Site was calculated to range between about 0.006 ft./day and 0.012 ft./day. More permeable material, such as fill above the native soil used within utility trenches, and/or interbedded fine sand could result in more rapid transport of the groundwater and dissolved constituents.

Although groundwater flow patterns vary seasonally, groundwater flow measured in the "shallow" monitoring wells is generally to the south/southwest. Groundwater contour maps developed at various times during this study for the "shallow" monitoring wells are included as Figure 7a (a typical 'high' groundwater condition) and 7b (a typical 'low' groundwater condition). The groundwater measured in the "deep" monitoring wells during the RI generally indicated that flow was the north and northeast. [Note: Due to limited impact observed in the "deep" groundwater zone and the significant confining layer above the deep groundwater zone additional study was not warranted to characterize this zone.]

Soil Quality

Prior to the IRM soil removal conducted in 2001, PID readings in excess of 1,000 ppm were measured on soil samples collected in proximity of the former alcove and sediment trap/sump, which were located south of the former Parkway Cleaners tenant space. Peak PID readings were generally less than 10 ppm or not detected on soil samples collected from test borings positioned 10^{+} ft. from the former alcove area.

Soil samples tested as part of the RI did not contain concentrations of SVOCs or PCBs that exceeded their respective SCG values. Some soil samples tested for Target Analyte List (TAL) metals contained concentrations of beryllium, chromium, iron, nickel and zinc, but the concentrations did not exceed the Unrestricted Use SCO. Soil samples tested during the RI did contain concentrations of VOCs that exceeded their respective SCG values. With the exception of soil samples PPTB-2 (13'-16') and PPTB-7 (28'-32'), which were collected from locations approximately 25 ft. south of the former Parkway Cleaners tenant space, the soil samples containing VOC concentrations exceeding SCG were measured in proximity of the former alcove area, and within the IRM soil removal area.

During the supplemental studies completed in 2015, test borings TB-4 through TB-6 (i.e., advanced beneath the former alcove) contained elevated PID readings at discrete depths (i.e., generally corresponding to locations where lenses of 'more permeable' soil was encountered). Two soil samples from each of the test borings advanced in the former alcove area were tested for halogenated VOC (i.e., a sample exhibiting the most-apparent impact as evidenced by PID readings, chemical odors, etc.), and a sample collected from a depth closely below the apparently impacted zone. The peak PID readings and PCE concentrations measured in these samples are presented in the table on the next page.

Test Location	Sample Designation	Peak PID Reading (ppm)	PCE Concentration (ppm)
TB-4	TB-4 (10')	4,100	2,830
	TB-4 (13')	58.0	31.7
TB-5	TB-5 (8')	711	1,210
	TB-5 (10')	8.6	2.48
TB-6	TB-6 (16')	1,227	2,490
	TB-6 (18')	19.3	324

As shown, the vertical extent of halogenated VOC impact (i.e., as evidenced by the peak PID readings and the concentrations of PCE measured by the analytical laboratory) appears to be limited, presumably due to the varved nature of the overburden deposits in this area. Furthermore, a significant concentration discrepancy was also observed between soil and groundwater concentrations that is likely attributable to the varved nature of the overburden deposits. For example, the PCE concentration in soil sample TB-4 (10') is orders of magnitude greater than the PCE concentration measured in the groundwater sample collected from the same location (i.e., the groundwater sample collected from monitoring well MW-TB-4 had a PCE concentration of 6.9 ppm). Similarly, the PCE soil concentration in TB-5 is also orders of magnitude greater than the PCE concentration measured in the groundwater sample collected from MP-3 (i.e., 0.07 ppm), which is the nearest downgradient groundwater monitoring point in proximity of TB-5. These discrepancies suggest the heterogeneity of the subsurface soil results in a limited vertical extent (e.g., thickness) of VOC-impact and associated groundwater impact. As such, the thin layers of highly impacted soil surrounded by less impacted thicker deposits result in a significant dilution of the highly impacted soil layer into the groundwater.

A summary of the VOCs detected in the soil samples collected from the test borings advanced during the supplemental studies completed in 2015 is presented on Table 1. The VOCs detected in select soil samples are also depicted on the geologic cross sections presented as Figure 4 and Figure 6.

Groundwater Quality

A summary of the VOC detected in the groundwater samples collected from the "shallow" monitoring wells sampled during previous studies is presented as Table 2 *Historic Summary of Detected Volatile Organic Compounds: Groundwater Samples.*

Test locations within, and in proximity of, the former alcove are the only locations where PCE was detected during the most-recent groundwater monitoring events (PCE and to a lesser extent, TCE is the "parent compound" associated with the drycleaning fluid previously used at the Site). Samples collected from all of the other monitoring wells only contained breakdown compounds of PCE/TCE (i.e., "daughter compounds" including dichloroethane and vinyl chloride).

The 2015 groundwater results (i.e., the most-recent sampling event) indicated a potential increasing trend in the concentration of daughter compounds in samples collected from monitoring well MW-103s, which is located downgradient and near the southern Site property boundary. However, samples collected from monitoring wells within the central portion of the Site, located upgradient of MW-103s and downgradient of the residual source area in the former alcove area

(e.g., monitoring wells IP-1, IP-2 and IP-3), contained significantly lower VOC concentrations (i.e., ranging between "non-detect" concentrations and detected concentrations measured below TOGs 1.1.1 standards presented in 6 NYCRR Part 703). The lower concentrations of VOC in the central portion of the Site are likely related to a combination of the IRM remediation effort, and the subsequent bioaugmentation and chemical oxidation pilot testing conducted to further remediate groundwater and evaluate potential remedial options. The VOC detected in monitoring well MW-103s suggest that preferential flow could have occurred along buried utilities and/or through the fill material or that a secondary source area is present at the Site that was not addressed during previous remediation.

3.0 EXPOSURE ASSESSMENT

A summary of the exposure assessment that was conducted as part of the RI to evaluate the potential human and wildlife exposure to contaminants identified at the Site, and the conceptual site model for the Site are presented in this section.

3.1 CONTAMINANTS OF CONCERN

Based upon the historic operations at the former Parkway Cleaners and the testing completed during the RI and supplemental studies, the COC identified for the impacted media at this Site (i.e., soil, soil vapor and groundwater) include the following halogenated VOC.

- tetrachloroethene (PCE)
- trichloroethene (TCE)
- cis-1,2-dichloroethene (cis-1,2-DCE)
- trans-1,2-dichloroethene (trans-1,2-DCE)
- vinyl chloride (VC)

These COC are related to the former use of PCE in the drycleaning operations that were conducted at the former Parkway Cleaners in the past. PCE was detected in select samples that were collected in proximity of the source area near the former alcove of the former Parkway Cleaners where the drycleaning machines were located. The remaining COC are breakdown products of PCE. During recent sampling events, the most often detected COC were the breakdown products cis-1,2-DCE and VC.

3.2 QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

A qualitative human health exposure assessment was conducted in accordance with the guidelines referenced in the document title "New York State Department of Health Qualitative Human Health Exposure Assessment" that is included as Appendix 3B of DER-10. The purpose of the qualitative human health exposure assessment was to identify the exposure setting and exposure pathways, and evaluate contaminant fate and transport in relation to human health exposure for both on-site and off-site receptors.

An exposure pathway is comprised of the following components:

- A contaminant source;
- Contaminant release and transport mechanisms;
- A point of exposure;
- A route of exposure; and,
- A receptor population.

Contaminant Sources

On-Site
On-going point sources of contamination are not present at the Site, however, the environmental media listed below are identified as potential sources of COC at the Site:

- VOCs, primarily consisting of PCE; TCE; cis-1,2-DCE; trans-1,2-DCE; and, VC present in groundwater (refer to Table 2) at concentrations above TOGS 1.1.1 Standards and Guidance values.

- VOCs, primarily consisting of PCE, TCE, cis-1,2-DCE, and VC, that are present in soil at concentrations exceeding Protection of Groundwater SCO (refer to Table 1 and Table 3).

Off-Site

On-going point sources of off-site contamination are not present. The environmental media listed below are identified as potential sources of COC off the Site:

- VOCs, primarily consisting of cis-1,2-DCE and VC are present in groundwater at concentrations above TOGs 1.1.1. Standards and Guidance Values (refer to Table 2).

Contaminant Release and Transport Mechanisms

On-Site

Release and transport mechanisms for known or suspected COC include:

- migrating in a dissolved groundwater plume;
- volatilization from groundwater or soil to soil vapor;
- migrating as a vapor in the unsaturated soil zone; and
- volatilization to air if impacted media are disturbed.

Off-Site

Release and transport mechanisms for known or suspected COC include:

- migrating in a dissolved groundwater plume;
- volatilization from groundwater to soil vapor;
- migrating as a vapor in the unsaturated soil zone; and
- volatilization to air if impacted media are disturbed.

Point of Exposure

On-Site

Based on installed engineering controls and indoor air investigations completed to date, indoor air of the on-site tenant spaces in proximity of the Site is no longer identified as a potential point of exposure. As discussed in the SSDS Construction Completion Report, indoor air testing completed in the tenant spaces within the on-site building has shown that sub-slab depressurization is effective in mitigating soil vapor concerns in the former Parkway Cleaners tenant space. In addition, paired indoor air and sub-slab sampling in the adjacent tenant spaces indicated that no further action is warranted at this time. Further, groundwater is not used for potable consumption or other purposes at, or in the vicinity of, the Site.

Potential future points of exposure include the following:

- Areas of future intrusive work or excavations that come into contact with contaminated soil, fill or groundwater.
- Indoor air of future buildings constructed over soil or groundwater containing COC at concentrations above SCG.
- Indoor air of existing buildings should Site conditions change and testing indicates that the potential for exposure exists.
- Future groundwater wells used for drinking water if placed in areas of contaminated groundwater. (Note: Groundwater is not a source of drinking water on or in the vicinity of the Site).

Off-Site

Indoor air of future off-site buildings is identified as a potential point of exposure. Groundwater is not used for potable consumption or other purposes in the vicinity of the Site.

Potential future points of off-site exposure include the following:

- Areas of future intrusive work or excavations that come into contact with groundwater containing concentrations of COC that exceed SCG.
- Indoor air of future buildings constructed over groundwater containing concentrations of COC that exceed SCG.
- Future groundwater wells used for drinking water if placed in areas of contaminated groundwater. (Note: Groundwater is not a source of drinking water in the vicinity of the Site).

Route of Exposure

On-Site

Under current site conditions and use, inhalation due to vapor migration does not exist as a route of exposure. If contaminated subsurface soil, fill material, or groundwater is disturbed or used in the future, or new buildings are to be constructed, then potential routes of exposure may include inhalation, ingestion, dermal contact, eye contact, and puncture/injection.

Off-Site

Under current site conditions and use, inhalation due to vapor migration does not exist as a route of exposure. If contaminated groundwater is disturbed or used in the future, or new buildings are to be constructed, then potential routes of exposure may include inhalation, ingestion, dermal contact, eye contact, and puncture/injection.

Receptor Population

On-Site

The possible receptor population may include:

- Occupants of future buildings constructed over areas of groundwater containing COC at concentrations above SCG on the Site.
- Workers that may disturb contaminated soil or groundwater, as part of their work in the future.
- Future population that may use groundwater that originates from the Site for drinking water, etc.

Off-Site

The possible off-site receptor population may include:

- Occupants of future buildings constructed over off-site areas of groundwater containing COC at concentrations above SCG.
- Workers that may disturb contaminated groundwater, as part of their work in the future. Future population that may use groundwater that originates from the Site for drinking water, etc.

Summary of Findings: On-Site

Based on the fact that groundwater is not being used as a source of drinking water at on or in the vicinity of the Site, ingestion of groundwater originating from the Site that contains COC is currently not considered a potential exposure pathway. Further with consideration to the existing engineering controls (i.e., sub-slab depressurization and site cover system) at the Site, inhalation,

ingestion, dermal contact, eye contact, and puncture/injection of COC are not currently considered potential exposure pathways. As such, no complete exposure pathway currently exists in relation to the contaminants that have been detected at the Site. However, the findings of this human health exposure assessment have identified the following potential exposure pathways:

- Future workers could be exposed to COC present in subsurface soil or groundwater at concentrations exceeding SCG. These exposures could occur during construction activities, while assessing buried utility confined spaces, etc.
- Future potential use of groundwater could pose a potential exposure pathway to COC that are present in groundwater at concentrations exceeding SCG.
- Occupants of future buildings that are constructed in the vicinity of residual COC impact to the soil or groundwater could be exposed through vapor intrusion due to volatilization into future structures unless properly addressed/remediated.

The findings of this human health exposure assessment have been used in the selection of the recommended remedial alternative program for the Site as identified in Section 4.70 of this report.

Summary of Findings: Off-Site

Based on the fact that groundwater not being used as a source of drinking water in the vicinity of the Site, ingestion of groundwater originating from the Site that contains COC is currently not considered a potential exposure pathway. Further the absence of structures over the off-site groundwater impacted with concentrations of COC above TOGS 1.1.1 Standards and Guidance values, inhalation, ingestion, dermal contact, eye contact, and puncture/injection of COC are not currently considered potential exposure pathways. As such, no complete exposure pathway currently exists in relation to the contaminants that have been detected off the Site. However, the findings of this human health exposure assessment have identified the following potential exposure pathways:

- Future workers could be exposed to COC present in groundwater at concentrations exceeding SCG. These exposures could occur during construction activities, while assessing buried utility confined spaces, etc.
- Future potential use of groundwater could pose a potential exposure pathway to COC that are present in off-site groundwater at concentrations exceeding SCG.
- Occupants of future off-site buildings that are constructed in the vicinity of residual COC impacted groundwater could be exposed through vapor intrusion due to volatilization into future structures unless properly addressed/remediated.

The findings of this human health exposure assessment have been used in the selection of the recommended remedial alternative program for the Site as identified in Section 4.70 of this report.

3.3 FISH AND WILDLIFE RESOURCES IMPACT ANALYSIS

A copy of a completed FWRIA Decision Key is included as Table 4 based on the site investigations completed to date. The Site contains soil and groundwater impacted with concentrations of COC that exceed SCG, however, the data generated during the RI and supplemental studies completed

in 2015 does not demonstrate that migration of COC is impacting surface water or sediments within the nearest surface water body, which are located approximately 825 ft. (0.15 miles) south of the Site. Also, the Site is not within or near an area with rare plants, rare animals and/or significant natural communities. Therefore, it is concluded that a FWRIA is not needed since the data indicates that the COC identified for this Site are not migrating into, or otherwise impacting, any on-site or off-site habitats of endangered, threatened or special concern species, or other fish and wildlife resources.

3.4 CONCEPTUAL SITE MODEL (CSM)

The Site consists of an approximate 0.5-acre portion of the 12.78-arce Parkway Plaza parcel. The plaza is improved with a large single-story slab-on-grade building housing various tenant spaces and several out buildings. The buildings within Parkway Plaza are slab-on-grade construction. The exterior portion of the Parkway Plaza is improved with asphalt paved parking lots/roads and concrete sidewalks with limited landscaped areas. The Site is serviced by a public water supply system and a public sewer system.

The Site was vacant land until the construction of Parkway Plaza in 1957. The former Parkway Cleaners began operations sometime between 1962 and 1978, and perchloroethene (a/k/a tetrachloroethene, or PCE) was used as a drycleaning solvent at this location until approximately 1991. The Site is currently used for commercial purposes and current tenants include a laundromat and restaurants located adjacent to the east and west of the laundromat.

This CSM addresses the following:

- Potential Sources of Site-Related Constituents
- Potential Current and Future Exposure Pathways
- Extent of groundwater contamination on-Site
- Potential Human and Environmental Receptors

3.4.1 Potential Sources of Site-Related Constituents

COC associated with operations conducted within the former Parkway Cleaners tenant space has been attributable detected in soil and shallow groundwater samples collected at the Site since 1998. Operations at the Site have not used chlorinated VOC (i.e., the source of the COC) since at least 1992.

A soil removal IRM completed in 2001 removed a source area of COC impact, but some contamination could not be removed due to the proximity of the impacted soil to the building and buried utility lines. As such, some contamination remains at the Site (e.g., beneath an alcove attached to the south of the tenant space and in proximity of a natural gas supply line east of the alcove). When this alcove was demolished in 2014, additional studies were completed that identified a residual source area of soil and groundwater contamination in this area (i.e., within test borings TB-4, TB-5, and TB-6 and a monitoring well installed in test boring TB-4). The vertical COC distribution in the former alcove area appears limited to relatively thin lenses of soil (i.e., estimated total cumulative thickness of 1.5 ft.). This impacted soil is a significant contributor to groundwater impact resulting in concentrations measured above SCG. In addition, there appears

to be several secondary sources of COC contamination in overburden groundwater cross gradient of the primary plume area (e.g., test boring, PPTB-2 and IRM excavation documentation sample Secondary South wall). These secondary source areas have significantly lower COC concentrations than those measured beneath the former alcove.

With the exception of increased concentrations of cis-1,2-DCE and vinyl chloride detected in the most-recent groundwater samples collected from monitoring well MW-103s, located in proximity of the southern property boundary, the types and concentrations of COC measured in the groundwater samples were generally similar throughout the studies completed at the Site. It is possible that the increasing concentrations of cis-1,2-DCE and vinyl chloride in recent groundwater samples from MW-103s could be the result of naturally occurring bioremediation and/or preferential migration.

3.4.2 Potential Current and Future Exposure Pathways

Potential release mechanisms and migration pathways for Site-related constituents include one or more of the following:

- Volatilization from impacted soil and/or groundwater into the soil vapor that collects beneath the floor slab within the tenant spaces of the existing building at the Site and potentially discharges into the indoor air. Note: Based on the indoor air and sub-slab vapor sampling work completed subsequent to the installation of a SSDS within the former Parkway Cleaners in 2019, this pathway is not currently being identified as a concern.
- Direct contact with soil/fill material that is disturbed at the Site. Note: The currently installed cover system mitigates this pathway unless the subsurface is disturbed. In that case the protocols identified in the Site specific ISMP would be followed, to address potential exposures during subsurface work. As such this pathway is not being identified as a concern.
- Migration horizontally and vertically through the overburden soil, or groundwater.

3.4.3 Extent of Soil Contamination

COC impacts exceeding Protection of Groundwater SCO were identified in 13 of the 46 soil samples collected during the RI (i.e., subsequent to the soil removal IRM completed in 2001) and supplemental studies. The highest concentrations of COC in the soil are located in vicinity of the former alcove above the silty clay layer (i.e., specifically in the area of test borings TB-4, TB-5, and TB-6, which are located immediately south of the on-site building). The lowest concentrations of COC were detected on along the western property boundary. Based on observations during advancement of test borings and COC concentrations measured in groundwater and soil samples collected along the northern property boundary, it is assumed that COC in soil are below the Protection of Groundwater SCO in this area of the Site. Based on observations during advancement of test borings and COC concentrations measured in groundwater and soil samples collected along the southern property boundary (i.e., MW-103s), it is assumed that COC in soil are present at concentrations above the Protection of Groundwater SCO in this portion of the Site.

The results of the supplemental studies completed in 2015 suggest that the majority of COC impact is confined to thin seams of soil in the former alcove area. Based on the PID measurements from

test borings TB-4 through TB-6 and subsequent analytical laboratory testing, highly impacted soil partings to seams ranging in thickness between ¼ and 3-inches exist throughout the impacted zone with an estimated cumulative thickness of 1.5 ft. For the purposes of this RAWP. The mass of VOCs present in the former source area was estimated using the following assumptions:

- The greatest COC concentrations measured in test boring TB-4 through TB-6 are representative of the highly impacted soil seams.
- The residual source area is 500 ft^2 extending from 4 ft. bgs to 18 ft. bgs.
- The highly impacted soil seams are present throughout the residual source area (i.e., 500 ft^2 extending to a depth of 14 ft. with a cumulative thickness of 1.5 ft.)
- The lower COC concentrations measured in test borings TB-4 through TB-6 are representative of the remaining soil in the former alcove residual source area.

Based on the above assumptions it is estimated that approximately 44 Kilogram (Kg) of COC are contained in the highly impacted soil seams and less than 1 Kg of COC are in the remaining soil beneath the former alcove (i.e., between depths of about 4 ft. bgs and 18 ft. bgs).

Soil impacts slightly exceeding the Protection of Groundwater SCO were measured in test borings PPTB-2 (13'-16') and PPTB-7 (28'-32'). To estimate the mass of the soil impact present in the area downgradient of this area the following assumptions were made:

- The average total COC concentrations measured in test boring PPTB-2 (13'-16') and PPTB-7 (28'-32') are representative of impact in proximity of this area.
- The residual source area is 425 ft^2 extending from 16 ft. bgs to 32 ft. bgs.
- Based on the above assumptions it is estimated that less than 1 Kg of COC are contained in this area.

3.4.4 Extent of Groundwater Contamination On-Site

COC impacts exceeding TOGS standards were identified in 13 of the 16 "shallow" groundwater monitoring wells during at least one monitoring event since groundwater testing of overburden groundwater samples was initiated. COC impacts exceeding TOGS standards were identified in 10 of the 16 monitoring wells tested during the two most-recent sampling events completed for that well. The highest concentrations of COC in the overburden groundwater are located in vicinity of the former alcove, specifically in the area of test boring/monitoring well TB-4 (i.e., immediately south of the on-site building). The lowest concentrations of COC were detected on the property boundaries in the north portion of the Site (i.e., MW-2.1), the southeast portion of the Site (i.e., MW-4), the western portion of the Site (i.e., MW-201 and IP-1). Higher concentrations of COC were detected near the southeast property boundary (i.e., MW-103s).

Although groundwater flow patterns vary seasonally, groundwater flow measured in the "shallow" monitoring wells is generally to the south/southwest. [Note: COC were not detected in the samples from the "deep" monitoring wells that were tested.]

Note: The discrepancy between groundwater concentrations and soil concentrations measured at the TB-MW-4 test location suggests significant dilution within the water column is occurring. This observation supports the conceptual model suggesting that the majority of VOC impact is

confined to thin soil seams with limited cumulative surface area resulting in sufficiently lower groundwater VOC concentrations than saturated soil concentrations in the former alcove area.

3.4.5 Extent of Soil Vapor Contamination On-Site

Both on-site soil and groundwater contain COC concentrations exceeding applicable SCG and have the potential to impact soil vapor. Site sub-grade infrastructure and soil heterogeneity contribute to the potential for COC to migrate below the adjacent building slab where it could accumulate and further migrate and impact the indoor air of nearby tenant spaces. This route of exposure could be more significant if groundwater concentrations of COC increase during remedial actions, especially if a DCE and/or VC stall condition is observed.

A SSDS was installed within the former Parkway Cleaners space in November 2019 to provide mitigation of potential soil vapor intrusion within this space. Results of the post-installation vapor sampling event for samples collected on January 23, 2020 indicate that concentrations of COC did not exceed NYSDOH guidance values. In addition, those locations in which coupled samples were collected (i.e., adjacent tenant spaces to the former Parkway Cleaners space) did not result in a NYSDOH matrix recommendation beyond "no further action" required.

3.5 POTENTIAL CURRENT HUMAN AND ENVIRONMENTAL RECEPTORS

The Site is covered with a building, asphalt paving and concrete sidewalks. Although access to the exterior portion of the Site is not restricted, direct contact of human receptors to exposed environmental media (e.g., soil) containing Site-related constituents is unlikely. There is a potential that off-site migration of Site-related constituents could impact environmental and/or human receptors via the groundwater and/or soil vapor. Potential impacts from on-site soil vapor in the former Parkway Cleaners tenant space have been addressed by the SSDS.

4.0 REMEDIAL ALNERATIVES ANALYSIS

In order to evaluate the effectiveness of remedial alternatives for this Site, the following threshold criteria and primary balancing criteria were developed in accordance with the provisions set forth in DER-10. The threshold criteria (protection of human health and the environment, and compliance with SCG) must be satisfied in order for an alternative to be considered for selection. The subsequent primary balancing criteria are used to compare the positive and negative aspects of each remedial alternative that meets the threshold criteria.

Protection of Human Health and the Environment: This criterion is an evaluation of the remedy's ability to protect public health and the environment, and assesses how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, engineering controls or institutional controls. The remedy's ability to achieve each of the RAO is evaluated.

Compliance with Standards, Criteria and Guidance Values (SCG): Compliance with SCG values addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Long-Term Effectiveness and Permanence: This criterion evaluates the long-term effectiveness of the remedy after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated:

- Whether residual contamination will pose significant threats, exposure pathways, or risks to the community and environment;
- The adequacy of the engineering and institutional controls intended to limit the risk;
- The reliability of these controls; and,
- The ability of the remedy to continue to meet RAO in the future.

Reduction of Toxicity, Mobility and Volume: The remedy's ability to reduce the toxicity, mobility or volume of site contamination is evaluated. Preference is given to remedies that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the Site.

Short-Term Impacts and Effectiveness: The potential short-term adverse impacts and risks of the remedy upon the community, the workers and the environment during its construction and/or its implementation are evaluated. This includes identification of short-term adverse impacts and health risks, the effectiveness of any engineering controls, and the length of time needed to achieve the remedial objectives.

Implementability: The technical and administrative feasibility of implementing the remedy is evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. Administrative feasibility includes the availability of the necessary personnel and material, the evaluation of potential difficulties in obtaining specific operating approvals, access for construction, etc.

Land Use: This criterion is intended to evaluate the remedial alternatives in relation to the planned future use of the Site.

Cost Effectiveness: Capital, operation, maintenance and monitoring costs are estimated for the remedy and presented on a present worth basis. A remedy is cost effective if its costs are proportional to its overall effectiveness.

Green Remediation: This criterion is intended to evaluate the environmental effects and potential environmental footprint of the remedial alternatives. Green remediation focuses on maximizing the net environmental benefit of cleanup, while persevering remedy effectiveness and protection of human health and the environment.

Community Acceptance: This criterion is intended to select a remedial alternative that is acceptable to the community. Fact sheets will be provided to the public when various milestones associated with the project have been reached, which in part gives notice of the availability of the project documents for review at a public document repository as the project progresses. As such, community acceptance is not evaluated or discussed in this report.

4.1 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAO) are medium-specific objectives for the protection of human health and the environment. RAO for this RAWP are as follows:

Groundwater

RAO for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater.

RAO for Environmental Protection

- To the extent practicable, restore groundwater aquifer to pre-disposal/pre-release conditions,
- Prevent the discharge of contaminants to surface water.
- Prevent degradation of off-site groundwater quality.

Soil

RAO for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of, or exposure from, contaminants volatilizing from contaminants in soil.

RAO for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAO for Public Health Protection

- Mitigate impacts to public health and on-site receptors resulting from existing, or potential, soil vapor intrusion into the on-site building or soil vapor migration off-site.

4.2 OTHER FACTORS FOR CONSIDERATION

For this project, the following additional considerations were evaluated during the development of remedial alternatives:

- Eliminate or mitigate threats to public health and the environment.
- Address source areas of contamination using the following hierarchy in order of preference:
  - Removal and/or treatment;
  - Containment;
  - Elimination of exposure; and
  - Treatment of source at point of exposure.
- Protect groundwater using the following hierarchy in order of preference:
  - Source removal, treatment, or control;
  - Restoration of groundwater quality to meet applicable SCG values to the extent practicable; and
  - Plume containment/stabilization.

Impacted subsurface soil remains at the Site above applicable SCG, however, removal and/or treatment of all such contamination is not feasible due to accessibility (e.g., impacted soil is located below and/or in immediate proximity to the on-site building and buried utility lines). Accessible impacted source soil was removed to the extent feasible as part of the 2001 soil removal IRM. Remaining soil above SCG will be contained to the extent possible via engineering controls (i.e., cover system), with established institutional controls to eliminate exposures (i.e., ISMP excavation work plan) if intrusive work is conducted at the Site that have the potential to encounter impacted media.

Impacted groundwater remains at the Site above applicable SCG. It is also recognized that following groundwater remediation, the inaccessible saturated soil will back diffuse COC into the groundwater over time, likely resulting in COC exceedances of TOGS values in locations in proximity to the former alcove. As such, restoration of groundwater quality to the extent practicable and/or plume containment/stabilization are reasonable objectives considering the Site access restrictions. Multiple injections of remedial reagents to prevent plume migration off-site may be necessary. The need for supplemental reagent injections will be determined following effectiveness monitoring and consultation with the NYSDEC as warranted.

In the event that significant Site redevelopment or building demolitions occurs, or if the subsurface is otherwise made accessible further investigation and remediation may be warranted. The nature and extent of contamination in areas where access was previously limited will be investigated

pursuant to a plan approved by the NYSDEC. Based on the investigation results and NYSDEC determination of the need for a remedy, a revised RAWP would be developed for the final remedy for the Site, including removal and/or treatment of source areas to the extent feasible.

4.3 REMEDIATION BOUNDARIES

The following is a summary of impacted quantities of soil, groundwater and soil vapor for each defined AOC used to develop and evaluate remedial alternatives for the Site.

4.3.1 Areas of Concern

Based on the extent of COC impacts identified in the groundwater, soil and soil vapor, the following three AOC were identified.

- AOC#1 – Includes the former alcove area, potentially the area to the east where buried utilities precluded soil removal during the IRM, an area between the existing building and the 2001 IRM excavation limits, an area south of 2001 secondary IRM excavation and soil below building footprint to a maximum depth of 18 ft. bgs. It is estimated that AOC#1 has an approximate area of 500 ft^2, refer to Figure 8. COC exceeding SCG have been identified in various locations/depths within AOC#1.

- AOC#2 – Includes the area of the Site south of AOC#1 limits including PPTB-2 and PPTB-7 locations between a minimum depth of about 16 ft. bgs extending to a maximum depth of about 32 ft. bgs. It is estimated that AOC#2 has an approximate area of 425 ft^2, refer to Figure 8. Concentrations of COC that slightly exceed SCG have been measured in soil in AOC#2.

- AOC#3 – Includes the on-site area in proximity of MW-103s that extends to a maximum depth of about 13 ft. bgs. It is estimated that AOC#3 has an approximate area of 1,750 ft^2 in proximity to the southern site boundary, refer to Figure 9, Figure 9a, and Figure 9b. The COC in the shallow groundwater within AOC#3 exceed TOGs groundwater standards.

4.3.2 Surface Soil

Complete exposure pathways do not currently exist for human exposure to surface soil. Thus, maintaining the existing cover system at the Site to meet DER-10 specifications (i.e., impermeable covers) would achieve the established RAO for surface soil. As a result, engineering controls for surface soil will be retained throughout the screening process and included in each alternative, except the alternative in which the Site is remediated to unrestricted use. Screening of additional technology types and process options for surface soils is thereby not necessary. The unrestricted use alternative assumes that surface soil containing a constituent above its applicable standard would be excavated and disposed off-site in accordance with applicable regulations. For the purposes of the unrestricted use alternative, it was assumed that 750 ft^2 of surface soil would have to be removed to a depth of 2 ft. bgs and replaced with imported material meeting DER-10 specifications. The 750 ft^2 surface soil removal area would include test locations PPTB-11, PPTB-12, PPTB-12, and PPTB-10 containing evidence of fill that may exceed Protection of Groundwater

SCO (i.e., cinders noted in boring logs) or documented impact exceeding unrestricted use SCO (i.e., PPTB-10, PCE concentration).

4.3.3 Subsurface Soil/Fill Material

Using the information collected during the RI and supplemental studies, it is estimated that approximately 5,040 cubic feet (assumes a treatment area of approximately 500 ft^2 by 14 ft. of impacted zone with a porosity of 0.28) of subsurface soil needs to be addressed to meet the restricted commercial use, Track 4 SCG in AOC#1. Refer to Figures 10, 10a and 10b for the remedial elements to be implemented to meet the restricted commercial use alternative (i.e., the preferred alternative). Cross sections along lines A-A', B-B', and C-C' (refer to Figure 2 for line locations) are presented as Figure 4, Figure 5, and Figure 6. Impacted intervals within each AOC are depicted on these cross sections.

For the purposes of the unrestricted use alternative, it is estimated that approximately 7,200 cubic feet (assumes a treatment area of 500 ft^2 by 20 of impacted zone with a porosity of 0.28) of subsurface soil needs to be addressed in AOC#1. The unrestricted use alternative assumes an approximately 4,900 cubic feet comprising AOC#2 (assumes an area of 425 ft^2 immediately south of the 2001 IRM excavations encompassing PPTB-2 and PPTB-7 with a treatment interval of 16 ft. bgs to 32 ft. bgs and a porosity of 0.28) would need to be addressed. Lastly, the unrestricted use alternative assumes an approximately 12,600 cubic feet (assumes a treatment area of 1,750 ft^2 with a treatment interval of 3-13 ft. bgs and a porosity of 0.28) of soil needs to be addressed in the AOC#3 area. The unrestricted use remedial alternative components and AOC footprints are depicted on Figure 11, Figure11a, and Figure11b.

4.3.4 Groundwater

Using the information collected during the RI and supplemental studies, it is estimated that approximately 65,551 gallons of shallow (i.e., defined as saturated zone between approximately 3- 20 ft. bgs) overburden groundwater within an assumed area of 2,675 ft^2, an average saturated overburden thickness of 11.7 ft. and a porosity of 0.28 needs to be addressed to meet TOGS. Of the estimated 65,551 gallons of impacted overburden groundwater, it is estimated that about 1,570 gallons of shallow overburden groundwater (assumes 500 ft^2 with a saturated thickness of 1.5 ft. and a porosity of 0.28) comprise the groundwater within AOC#1 soil seams with the greatest impact measured at the Site, and approximately 13,090 gallons of overburden groundwater (assumes 500 ft^2 with a saturated thickness of 12.5 ft. and a porosity of 0.28) comprise AOC#1 groundwater. The remaining approximate 36,650 gallons of shallow overburden groundwater (assumes 1,750 ft^2 with a saturated thickness of 10 ft. and a porosity of 0.28) comprise the AOC#3 area. Lastly, it is estimated that approximately 14,241 gallons of overburden groundwater in proximity of PPTB-2 and PPTB-7 (assumes a 425 ft^2 plume with a saturated thickness of 16 ft. and a porosity of 0.28) within AOC#2 exceed TOGs standards and guidance values, assuming the groundwater concentration is 10% of the measured soil concentrations in PPTB-2 and PPTB-7. The restricted commercial use alternative components to address the groundwater impact in these AOCs are shown on Figure 10, Figure 10a and Figure 10b. Cross sections along B-B' and C-C' (i.e., within AOC3# and AOC#1, respectively) with proposed injection locations are presented on Figure 5a and Figure 6a.

4.3.5 Soil Vapor

A complete exposure pathway does not exist for soil vapor. Thus, maintaining the existing engineering control (i.e., sub-slab depressurization) at the Site would achieve the established RAO for soil vapor. As such, soil vapor mitigation via the existing SSDS will be included in the Track 4 Restricted Commercial Use Alternative. The unrestricted use alternative assumes that soil and overburden groundwater containing a constituent above its applicable SCG would be treated in accordance with applicable regulations. Screening of additional technology types and process options for soil vapor is thereby not necessary in that case.

4.4 DEVELOPMENT OF ALTERNATIVES

This section identifies potential remedial alternatives that were considered to address the environmental conditions at the Site as described in this document. The remedial alternatives evaluated are summarized below.

4.4.1 No Further Action Alternative

The No Further Action Alternative is included as a procedural requirement and as a baseline to evaluate other alternatives. Under this alternative, no further remedial or monitoring activities would occur and no environmental easement would be recorded. The soil/fill at the Site would remain virtually as is and change in use would not be limited except by existing land use controls such as zoning. No remediation of groundwater impacts or mitigation of soil vapor would be completed.

4.4.2 Track 4 Restricted Commercial Use Alternative

The Track 4 Restricted Commercial Use Alternative includes the continued use of the current cover system at the Site (i.e., buildings, concrete slabs, asphalt pavement, etc.), the in-situ treatment of groundwater in AOC#1 and AOC#3, the continued mitigation of potential soil vapor impacts within the former Parkway Cleaners tenant space and possibly within adjacent tenant spaces if deemed necessary, and the implementation of appropriate engineering and institutional controls to address AOC#1 and AOC#2 and future changes that may occur at the Site.

4.4.3 Track 1 Unrestricted Use Alternative

Under the Track 1 Unrestricted Use Alternative, the portion of the Parkway Plaza building housing the former Parkway Cleaners and the adjacent tenant spaces would be demolished and all fill at the Site and any contaminated layers of native soils would be excavated and disposed of at appropriately permitted off-site waste disposal facilities. Following removal and disposal of impacted soil, clean backfill would be placed to fill the excavated areas and the building would be reconstructed.

4.5 DETAILED EVALUATION OF ALTERNATIVES

This section evaluates the remedial alternatives identified in Section 4.4 with respect to the evaluation criteria provided in DER-10 to gauge each of the alternative's overall feasibility and acceptability. The detailed evaluation of each alternative presented in this section includes comparison to the following nine criteria:

- Protection of Human Health and the Environment
- Compliance with SCG values
- Long-term Effectiveness and Permanence
- Reduction of Toxicity, Mobility and Volume
- Short-Term Impacts and Effectiveness
- Implementability
- Land Use
- Cost
- Sustainability/Green Remediation

As presented in DER-10, another criterion to be considered when evaluating potential remedial alternatives is community acceptance. The community acceptance assessment will be completed by the NYSDEC after the community comments on the proposed remedial action plan (PRAP) are received, and therefore, the community acceptance assessment is not discussed further in this RAWP.

4.5.1 No Further Action Alternative

Under this alternative, the Site would remain in its current condition and would utilize natural attenuation to reduce concentrations of COC in soil and groundwater. However, no monitoring would be completed to evaluate the effectiveness of natural degradation. It is anticipated that the current cover would remain in-place and maintained to meet DER-10 cover system specifications.

Protection of Human Health and the Environment: This would not be an effective or an independent means of achieving the RAO. The No Further Action Alternative does not include any additional remedial measures to address COC. However, to the extent that the existing Site features and conditions (i.e., cover system) are already protective of human health and the environment, and remain intact, aspects of the RAO would be achieved. Specifically, the existing cover system in the form of established concrete/asphalt and building structures prevents direct contact with or ingestion of soil by site workers and prevents exposures due to windblown dust. However, this alternative would not be protective of soil containing constituents exceeding applicable SCO that become exposed or activities involving subsurface intrusive work (i.e., excavation, construction, etc.) in the future, until natural attenuation processes reduce the COC to acceptable concentrations. The lack of groundwater treatment and the absence of indoor air testing and mitigation of soil vapors would not be protective to inhabitants of the current tenant spaces or future buildings.

Compliance with SCG: Removal and/or treatment are not included as part of this remedial alternative, and the RAO that relate to chemical-specific SCG would not be obtained. Active

remedial measures would not be conducted under this alternative and, as such, action-specific and location-specific SCG would not be applicable.

Long-Term Effectiveness: There is no remedial technology being implemented; therefore, the environmental and exposure risks at Site will remain the same for the foreseeable future. However, the concentrations of COC in the soil, groundwater and soil vapor will persist longer than other alternatives. As such, the risks of future exposures to contaminants can increase if the use of the Site changes, the Site is modified, or subsurface intrusive work is conducted. Further, without treatment groundwater containing COC in excess of SCG will migrate away from the Site.

Reduction of Toxicity, Mobility or Volume: With the exception of natural attenuation processes, there will be no change in the contaminant characteristics of the soil, soil vapor or groundwater by implementing the No Further Action Alternative.

Short-Term Effectiveness: This alternative will not provide any benefits in the short term. However, since there are no additional remediation technologies being implemented, there are no significant short-term risks to the community or environment related to remedial activities. If future activities at the Site compromise the integrity of the existing cover system, or untreated groundwater is encountered, human exposure to contaminated soil and groundwater could occur.

Implementability: This alternative is easy to implement since this alternative makes no modifications to the existing conditions at the Site.

Land Use: It is anticipated that regulatory agencies will not accept the No Further Action Alternative for existing or future land use of the Site or surrounding areas.

Cost: This alternative is the lowest cost alternative evaluated for soil with a total present worth of $0.00 (refer to Table 5).

Sustainability and Green Remediation Evaluation: This alternative will not use electricity over the life of the remedy, generate greenhouse gasses or use heavy equipment. Thus, there would be no direct emissions or fuel use. However, this alternative is also not sustainable.

Summary: Although the No Further Action Alternative would be the least expensive alternative; it would represent the greatest risk to public health and the environment. This alternative offers the lowest level of compliance with SCG. This alternative does not limit the exposure to the existing onsite contamination and, therefore, RAO for the Site would not be achieved. This alternative has a limited environmental footprint since the use of heavy equipment would be avoided and a remediation system/alternative would not be implemented. However, for the reasons stated herein, this alternative is impractical.

4.5.2 Track 4 Restricted Commercial Use Alternative

This alternative includes institutional controls (e.g., environmental easement, etc.) to restrict Site use and the implementation of a SMP. The SMP will provide procedures for handling, characterizing, transporting and disposing of subsurface soil in the event that ground intrusive work is performed at the Site. Under this alternative an engineering control meeting DER-10

specifications (i.e., covering the Site with impermeable materials, a minimum 1-foot thick layer of DER-10 approved material, etc.) will be installed/maintained to provide a barrier to the impacted soil/fill identified in the RI and supplemental studies that contain one or more constituents exceeding their applicable Restricted Commercial Use SCO. This alternative assumes the entire Site requires a cover system which equates to an estimated approximate cumulative area of 21,780 ft^2 (refer to Figures 10, 10b, and 10c). [Note: This alternative assumes that the existing cover materials (i.e., the building and asphalt parking lot) would be considered DER-10 compliant for the intended use of the property.]

Institutional controls would be relied upon to achieve RAO for 'deeper' overburden soil in AOC#2 (i.e., in proximity to PPTB-2 and PPTB-7) and residual soil exceeding SCGs in AOC#1.

The concentrations of COC in the overburden groundwater in AOC#1 would be addressed by chemical reduction and bioremediation to remove dissolved contaminants, which would contain/inhibit migration of the COC identified within the groundwater during the RI and supplemental studies (refer to Figures 10, 10a, and 10b). AOC#2 groundwater will be addressed by institutional controls (i.e., environmental easement, site management plan, etc.) to eliminate/mange potential exposure routes that may be encountered in the future. [Note: Testing of samples collected from 'deep" groundwater monitoring wells did not measure COC concentrations above SCG indicating that AOC#2 groundwater is localized and not migrating off-site.] AOC#3 "shallow" groundwater area would be addressed by amending the subsurface with EVO to promote bioremediation of COC (refer to Figures 10, 10a, and 10b). Groundwater quality will be monitored in accordance with a NYSDEC-approved plan and it is anticipated that remediation of the overburden media coupled with natural attenuation would result in the overburden groundwater COC concentrations reducing to acceptable levels at the Site property line.

Current and future property owners would be required to complete and submit annual certification to the NYSDEC that administrative controls and remedial components that were put in place as part of the Site remedy, are still in place, have not been altered, and are still effective.

Protection of Public Health and the Environment: This alternative provides sufficient protection to both public health and the environment by maintaining a barrier to soil/fill impacted with constituents exceeding the Restricted Commercial Use SCO. This alternative also provides sufficient protection to both public health and the environment by addressing the most contaminated overburden groundwater area (i.e., AOC#1), the lower level impacts identified at the southern property line (i.e., AOC#3) and limiting access to groundwater with site management options (AOC#2). In addition, the SMP to be prepared would address exposures to construction workers performing intrusive activities at the Site. The SMP would identify requirements for use of personal protective equipment, and proper management of impacted soil/fill and groundwater that is encountered. This alternative would achieve the Site RAO.

Compliance with SCG: This alternative would not satisfy applicable SCG within the soil/fill in all locations or initially within the groundwater. Groundwater containing the greatest concentrations of COC (i.e., AOC#1 and AOC#3) would be addressed by chemical reduction and/or bioremediation. However, bioremediation would require time to establish a robust self-sustaining microbe population and chemical specific SCG are unlikely to be achieved within a short time

frame. AOC#2 is below the treatment interval (i.e., in proximity of PPTB-7) and would remain untreated and concentrations above the applicable SCG are anticipated to remain. However, the treatment proposed under this alternative should reduce impacts in AOC#2 over time as COC concentrations decrease in AOC#1 which is assumed to be the source of AOC#2. Exposure to COC remaining in the soil/fill would be prevented by the installation/maintenance of a DER-10 compliant engineering control (i.e., cover system, etc.) that provides a barrier to the impacted surface soil that contains constituents exceeding the Restricted Commercial Use SCO. Compliance with action-specific SCG would be accomplished by following a NYSDEC-approved remedial action plan and site-specific HASP. Workers and work activities that occur during implementation of this alternative would comply with Occupational Safety and Health Administration (OSHA) requirements for training, safety equipment and procedures, monitoring and reporting. Prior to completing injection work, an EPA Underground Injection Control Permit Application would be completed. Measures would be taken as appropriate to control levels of airborne particulates during ground intrusive activities. Location-specific SCG would be maintained by conducting work in accordance with local codes and ordinances.

Long Term Effectiveness: It is anticipated that COC above SCG will remain in the soil/fill posing threats, providing exposure pathways and risks to the community and environment if the soil cover is breached, however, significant threats, exposure pathways and risk to the community and environment will be managed through engineering and institutional controls. The proposed engineering control (i.e., soil cover system) and institutional controls (e.g., site use restrictions) are reliable controls that will limit the human and environmental risks associated with subsurface soil/fill and will remain an effective long-term solution by creating a barrier to impacted soil/fill. Targeted bioremediation and chemical reduction is an effective remedial measure to reduce the concentrations of COC in the overburden groundwater in AOC#1 and AOC#3. It is anticipated that over time as groundwater treatment proceeds COC concentrations in the soil/fill will also decrease. A properly maintained cover system, coupled with future groundwater treatment, will meet the RAOs. In addition, the SMP and easements would limit the property uses and provide procedures and guidance for ground intrusive activities.

Reduction in Toxicity, Volume and Mobility: This alternative will not decrease the toxicity and volume of the contaminants in the surface soil and while diffusion from soils to groundwater will reduce the volume of COCs the anticipated reduction is anticipated to be limited. Chemical reduction and bioremediation would decrease the volume of the contaminants in the groundwater in AOC#1 and AOC#3. A temporary increase in toxicity may occur due to the accumulation of DCE and VC as a result of a bioremediation stall. The bioremediation stall condition will be monitored and, if identified, addressed as necessary to promote complete COC breakdown to ethane. The mobility of the contaminants within the soil/fill may be reduced by eliminating windblown migration and limiting rain and surface water infiltration. However overall, the toxicity and mobility of the contaminants in soil/fill are not anticipated to change for the foreseeable future. Ground intrusive activities will be conducted in compliance with Site SMP. The mobility of COC within the groundwater not addressed by chemical reduction and/or bioremediation will be unaffected since groundwater flow rates and patterns would not be affected.

Short Term Effectiveness: This alternative would provide significant benefits in the short term since an exposure pathway would continue to be eliminated. Further, this alternative would provide benefits in the short term since chemical reduction would begin upon contact. Relatively low risks

to remedial workers would be incurred during maintenance and repair of the engineering control and in-situ injections but will be managed through the proper use of PPE and work practices. Air monitoring would be performed during the subsurface work (e.g., drilling and injection of amendments) conducted under this alternative to determine the need for additional engineering controls, and/or to confirm that dust and VOC vapors are within acceptable levels, as specified in a site-specific HASP.

Implementability: Bioremediation and chemical reduction are technically feasible and proven technologies. This alternative is implementable using available qualified contractors with the oversight of qualified field personnel to perform the work. The time to implement this alternative is several weeks, or longer. Months to years would be required to establish a sustainable, robust microbe population capable of remediating the mass flux of COC in the treatment area.

Land Use: It is anticipated that regulatory agencies would accept this alternative for existing and future land use since it would be consistent with current zoning and surrounding land use, and the general public that uses the adjacent properties would not be affected.

Cost: As shown on Table 5, the cost to implement this alternative has an estimated present worth cost of about $360,500 (refer to Table 5).

Sustainability and Green Remediation Evaluation: This alternative will use minimal electricity over the life of remedy and generate limited greenhouse gasses. Heavy equipment used on the Site would primarily consist of a direct push injection rig resulting in limited emissions and fuel use. This alternative is sustainable with proper monitoring and maintenance to maintain the integrity of the remediation and engineering control.

Summary: This alternative provides protection of human health and the environment, includes elements of green remediation, and it is sustainable. The risk of exposure to soil contamination is low since there will be limited complete pathways through which the public and future workers at the Site may be exposed, and those pathways would be controlled through the institutional and engineering controls. Some locations will not initially achieve the chemical specific SCG, but reduction in contaminant levels with time following treatments and/or via additional treatment should reduce COC concentrations to below chemical specific SCG. This alternative will prevent the migration of COCs away from the Site. This alternative would remediate the Site in a faster timeframe than the No Further Action Alternative, but not to the degree of the Track 1 Unrestricted Use Alternative. This alternative would be more costly than the No Further Action Alternative, but less costly than the Track 1 Unrestricted Use Alternative. This alternative would be greener than the Track 1 Unrestricted Use Alternative. This alternative would remediate the Site in a faster timeframe than the No Further Action Alternative, but likely not as fast as the Track 1 Unrestricted Use Alternative.

The Track 4 Restricted Commercial Use Alternative is the preferred alternative and it would include the following:

- The maintenance and improvement (e.g., filling of cracks in the asphalt pavement) of the existing impervious cover;
- the in-situ treatment of AOC#1, which has approximate area of 500 ft^2 with a saturated

thickness of 12.5 ft., via the injection of a combination of chemical amendments (zero valent iron to promote chemical reduction) and biological amendments (electron donors to promote microbe growth);

- AOC#2, which has an assumed area of about 425 ft^2 that extends between about 16 ft. bgs and 32 ft. bgs would not be directly treated, but this area would be addressed by a combination of institutional and engineering controls;
- the in-situ treatment of AOC3#, which is an approximate 1,750 ft^2 area of impacted groundwater assumes with a saturated thickness of 10 ft., with biological amendments to promote microbe growth;
- mitigation of potential soil vapor impacts with the former parkway Cleaners tenant space with the continued operation of a SSDS, and as needed testing of soil vapor/indoor air impacts within adjacent tenant spaces to assess the need for mitigation;
- the placement of an environmental easement on the Site; and
- the development of a SMP for the Site.

4.5.3 Track 1 Unrestricted Use Alternative

Under this alternative fill, unsaturated soil and saturated soil that contain constituents at concentrations exceeding their Unrestricted Use SCO would be excavated and disposed off-site. As such, approximately 93,625 cubic feet of fill material from an approximate area of 2,675 ft^2 extending to a maximum depth of 35 ft. bgs would be removed. Approximately 6,800 cubic feet of soil/fill removed would require characterization testing and appropriate handling, prior to being used as re-used as backfill material in the excavation. The approximate excavation limits under this alternative are presented on Figures 11, 11a and 11b. It is assumed that dewatering, shoring, air monitoring, vapor control, confirmatory sampling, etc. would be necessary measures to complete the excavation. This alternative also includes the treatment of groundwater via in-situ chemical oxidation to eliminate residual COC impacts. Prior to such treatment, a treatability study will be required to determine components of the treatment program (e.g., injection point spacing, chemical consumption rates, etc.). For estimating purposes, it is assumed that 41 injection points extending to approximately 35 ft. bgs will be required and that a total of approximately 10,550 pounds of potassium permanganate will be injected into these points (refer to Figures 11, 11b, and 11c). This alternative is the most aggressive and expensive remedial alternative.

Protection of Human Health and the Environment: This alternative provides sufficient protection to both public health and the environment by physically removing the threat of exposure associated with impacted soil/fill and groundwater. Implementation of this alternative would meet the soil and groundwater RAO related to protecting human health and the environment.

Compliance with SCG: This alternative would satisfy the SCG by addressing the surface and subsurface soil/fill in which existing data indicates that constituent concentrations exceed the Unrestricted Use SCO. This alternative would also satisfy chemical specific SCG by treating groundwater via chemical oxidation. Action specific SCG that apply to this alternative are associated with the excavation and disposal of impacted soil, monitoring requirements and health and safety requirements. Compliance with action-specific SCG will be accomplished by following a NYSDEC-approved remedial action work plan and site-specific HASP. Also, licensed waste transporters and properly permitted disposal facilities would be used to ensure compliance. Lastly,

remedial activities would be designed and conducted in accordance with local codes and ordinances.

Long-Term Effectiveness and Permanence: The Track 1 Unrestricted Use Alternative will be an effective long-term solution with the complete removal of contaminated surface and subsurface soil/fill at the Site, and the treatment of groundwater. Residual contamination, significant threats and risks to the community and environment would be eliminated. This alternative would not rely on engineering or institutional controls to limit risk, and it would meet RAOs.

Reduction in Toxicity, Volume and Mobility: This alternative will remove soil/fill containing COC above SCG, and the treatment of groundwater would significantly decrease the toxicity and volume of contaminants in the subsurface. The mobility of constituents in the groundwater would not be affected by the chemical oxidation, since groundwater flow rates would not be affected. This removal and the degradation of COC in the groundwater to non-hazardous forms is a permanent remedy. Soil/fill with contaminants above Unrestricted Use SCO would not remain on the Site and long-term groundwater monitoring would confirm the effectiveness of this remedy.

Short-Term Effectiveness: This alternative would provide significant benefits in the short term by direct removal of contaminated soil/fill. Potential human exposure, adverse environmental impacts and nuisance conditions at the Site may occur during the implementation of this remedial alternative, which is anticipated to take months or more to complete. Implementation of procedures outlined in the HASP and CAMP should serve to protect site workers and the public during implementation of this alternative.

Implementability: This alternative is implementable using available and qualified contractors under the supervision and oversight of qualified field personnel to excavate and dispose the contaminated surface soil, conduct backfill activities, perform site restoration activities, and complete in-situ treatment of the groundwater. However, this alternative would include soil excavation and in-situ groundwater treatment below the existing building and in proximity to utilities, making this alternative difficult and impractical to implement unless these structures are removed. The timeframe to complete this remedial alternative is months or more.

Land Use: Once the work was completed, uninterrupted use of the Site would be possible. It is anticipated that regulatory agencies would accept this alternative for existing and future land use since it would be consistent with current and anticipated zoning and surrounding land use. The general public that uses the adjacent properties would be affected by increased truck traffic and noise during the work, but would not be affected once the work was completed.

Cost: The cost to implement Track 1 Unrestricted Use Alternative is presented on Table 5. As shown, the total estimated with a present worth cost of this alternative is about $1,084,150.

Sustainability and Green Remediation Evaluation: This alternative will use minimal electricity over the life of remedy. However, heavy equipment used on the Site to implement this remedy that would likely consist of an excavator, loader, bulldozer, drill rigs and dump trucks would result in significant emissions, fuel use and greenhouse gasses. This alternative is sustainable.

Summary: This alternative is the most expensive remedial alternative evaluated, and it would restore the Site to unrestricted use and thus be protective to public health and the environment. This alternative is sustainable, and it provides more protection to human health and the environment than the No Further Action Alternative and the Track 4 Restricted Commercial Use Alternative. The Track 1 Unrestricted Use Alternative is the least green alternative. A SMP would not be required for this alternative.

The Track 1 Unrestricted Use Alternative would include the following:

- The demolition of the portion of the Parkway Plaza containing the former Parkway Cleaners and adjacent tenant spaces;
- the excavation of approximately 93,625 cubic feet of soil/fill from an approximate area of 2,675 ft^2 extending to a maximum depth of 35 ft. bgs;
- the testing and reuse of 6,800 cubic feet of the soil removed as backfill and the testing and off-site disposal of the remaining soil;
- the backfilling of the remaining approximate 87,325 cubic feet of the excavated soil with imported material meeting DER-10 requirements;
- the injection of about 10,550 pounds of potassium permanganate to treat residual groundwater impacts; and
- the reconstruction of the portion of the Parkway Plaza that was demolished.

4.6 COMPARATIVE ANALYSIS OF ALTERNATIVES

This section presents the comparative analysis for each alternative. This comparative analysis identifies the advantages and disadvantages of each alternative relative to one another for the criteria evaluated. The threshold criteria for protection of human health and the environment, and compliance with SCG, must be met by any selected alternative. Tradeoffs among the remaining primary balancing criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, and volume; short-term effectiveness; implementability; land use; cost; and sustainability and green remediation) aid in determining the most appropriate remedial action to address the RAO identified for the Site. [Note: State and community acceptance will be addressed following regulatory review and a public comment period after a remedy has been recommended.]

Protection of Human Health and the Environment

To an extent, current conditions at the Site are already protective of human health and the environment. For example, the existing cover system at the Site in the form of established concrete, asphalt pavement and building structures, prevents direct contact with or ingestion of soil, while not using groundwater from the Site, prevents direct contact with or ingestion of groundwater by Site workers, and limits exposures associated with wind-blown dust. The sub-slab depressurization vapor mitigation system installed within the building at the Site precludes exposure to soil vapor constituents.

The No Further Action Alternative would not be protective of human health and the environment beyond those items identified above. The No Further Action Alternative has the potential to increase the risk of human exposure to contaminated media by allowing the Site to be used in an unrestricted manner. Also, future activity at the Site (i.e., construction, etc.) could compromise the

integrity of the existing cover system and vapor mitigation system. In addition, the lack of institutional controls could allow future activities at the Site to use impacted groundwater for process water, and potentially consumption, which could increase human exposure.

The Track 4 Restricted Commercial Use Alternative includes elements that would result in overall protection of human health and the environment by eliminating exposure pathways, either by controlling, removing, treating or containing impacted media. This alternative will also limit exposure pathways associated with intrusive activities through institutional controls and implementation of a SMP.

Track 1 Unrestricted Use Alternative would not include institutional controls since the remedial activities would result in unrestricted use of the Site. Of the alternatives evaluated, this alternative would be the most protective of human health and environment due to the extensive remediation that would be implemented.

Compliance with SCG

The No Further Action Alternative does not meet the soil/groundwater SCG for the Site. Action-specific and location-specific SCG are not applicable for this alternative because implementation of additional active remedial measures are not included in this alternative.

Potential for exceedances of chemical-specific SCG would exist for the Track 4 Restricted Use Alternative, since this alternative relies on engineering controls, institutional controls, and the distribution of remedial amendments. However, such exceedances associated with these alternatives do not necessarily equate to a risk to human health and the environment since institutional controls (e.g., SMP, environmental easement, etc.) would also be implemented. This alternative would have potentially applicable location-specific SCG (local codes, ordinances, etc.) that would be met during the design and implementation. Health and safety-related SCG satisfied by following a site-specific HASP during remedy implementation.

The Track 1 Unrestricted Use Alternative should meet the soil and groundwater chemical specific SCG for the Site. This would have potentially applicable location-specific SCG (local codes, ordinances, etc.) that would be met during the design and implementation of the remedial actions. Appropriate procedures would be followed to comply with SCG related to handling and disposal of impacted media (i.e., transportation, disposal, permitting, manifesting and disposal facilities) and air emissions.

Long-Term Effectiveness

The No Further Action Alternative would result in the lowest level of long-term effectiveness since contamination would remain at the Site with viable exposure pathways in the absence of institutional and engineering controls, and relying on natural attenuation processes to treat impacted media without monitoring or administrative means to evaluate its progress.

Track 4 Restricted Use Alternative would result in moderate long-term effectiveness since some residual contamination may remain, however, reliable engineering and institutional controls would be implemented to reduce exposure pathways and RAO may be achieved with adequate time.

The Track 1 Unrestricted Use Alternative would provide the highest level of long-term effectiveness and permanence by remediating the soil and overburden groundwater to unrestricted use SCO in a relatively short time period.

Reduction of Toxicity, Mobility and Volume

The No Further Action Alternative will result in a low level reduction of toxicity, mobility and volume since remediation would occur only as unconfirmed, and undocumented natural attenuation.

The bioremediation, physical removal, chemical reduction, capping components completed as part of the Track 4 Restricted Commercial Use Alternative would result in a moderate reduction of mobility, and/or volume of constituents in the saturated zone; however, during the bioremediation process, the toxicity of the contaminants may be temporarily increased (e.g., degradation to vinyl chloride) before ultimately being reduced when the degradation process is complete.

The Track 1 Unrestricted Use Alternative, site-wide excavation and chemical oxidation would result in the greatest reduction of toxicity, mobility and volume by removing and permanently destroying the contaminants in their respective media.

Short-Term Impacts and Effectiveness

The No Further Action Alternative will not increase the short-term impacts or risks to human health or the environment. The bioremediation, engineering controls, monitoring and chemical reduction alternatives completed as part of the Track 4 Restricted Commercial Use Alternative have some short-term risks (e.g., workers could come in contact with remediation amendments or contaminated media, etc.) that would be controlled with implementation of a site-specific HASP and implementation of air monitoring during intrusive activities. The excavation and chemical oxidation completed as part of the Track 1 Unrestricted Use Alternative present higher short-term impacts since the volume of material handled under these alternatives is greater than the other alternatives.

It is anticipated that the amount of time needed to implement the alternatives would be: immediate for No Further Action Alternative; several months to years for the Track 4 Restricted Use Alternative; and six months to many years for the Track 1 Unrestricted Use Alternative. Also, it is anticipated that the timeframe to measure the effectiveness of the Track 4 Restricted Commercial Use Alternative would be more than one year.

Implementability

Each of the alternatives could be implemented; although the degree of difficulty varies depending on the alternative. The No Further Action Alternative is the easiest to implement. The Track 4 Restricted Commercial Use Alternative includes in-situ alternatives that will involve some disturbance to the active facility operations, and they are considered moderately difficult to implement. This alternative also includes institutional controls which would limit Site and

groundwater use in an effort to prevent complete exposure pathways. The Track 1 Unrestricted Use Alternative would be considerably more difficult to implement and would likely include relocation of facility operations; complete demolition of Site buildings and rebuilding; and/or removing and rebuilding of walls, floors, ceilings and underground utilities.

Land Use

With the exception of No Further Action Alternative, each of the presented alternatives include some degree of control that would alter land use to be protective of human health and the environment. In addition to controls, each alternative would have a varying degree of impact on land use. The Track 4 Restricted Commercial Use Alternative would result in restricted use of the Site, while the Track 1 Unrestricted Use Alternative would have the least restrictive use of the Site by removing soil and overburden groundwater impacts to levels that meet SCGs.

Cost

A summary of the costs for each alternative is presented in Table 5. A detailed breakdown of each evaluated alternative is presented as Tables C-1 through C-3 in Appendix C. Note: The present worth is based on a 5% discount rate over the estimated life of the project.

Sustainability and Green Remediation

The No Further Action Alternative is the 'greenest' remedial alternative; however, it is also not sustainable. The bioremediation, monitoring and chemical reduction completed as part of the Track 4 Restricted Commercial Use Alternative is sustainable and moderately green resulting in limited greenhouse gas generation, electric use, emissions and fuel usage. The Track 1 Unrestricted Use Alternative is the most aggressive remedial alternative and it is sustainable, but also requires significant use of heavy equipment resulting in significant greenhouse gas generation, emissions and/or fuel usage and is therefore the least green remedial alternative.

4.7 RECOMMENDED REMEDIAL PROGRAM

The Track 4 Restricted Commercial Use Alternative is the recommended remedial alternative for the Site. This remedial alternative includes maintaining the engineering control meeting DER-10 specifications to provide a barrier to impacted surface soil that contains one or more constituents exceeding their applicable Restricted Commercial Use SCO. In addition, a SMP would be completed for the Site that outlines the necessary procedures, requirements and responses when completing intrusive activities at the Site that have the potential to disturb potentially environmentally-impacted material. Inspection, maintenance and documentation of the engineering controls and other remedial components would be specified in the Site-specific SMP.

Under the recommended remedial program, the greatest COC impacts identified at the Site (i.e., AOC#1) are addressed through the implementation in-situ chemical reduction and bioremediation, which is also anticipated to reduce the COC concentrations in the downgradient overburden groundwater through source zone remediation. The COC in AOC#2 appear to be localized, fairly inaccessible, and not migrating off-site. As such, COC in AOC#2 would be addressed through

institutional controls. The COC in AOC#3 would be remediated by the injection of bioremediation amendments (i.e., electron donors and nutrients) into the overburden groundwater to promote bioremediation of the COC.

Throughout the remedial process, groundwater samples will be collected/analyzed to monitor and document current conditions, remedial progress and the effectiveness of the remedy. In the event that post-remediation groundwater sampling (i.e., annual monitoring after final bioremediation injections) indicates further remediation of overburden groundwater is necessary, a supplemental remedial work plan for additional groundwater control would be provided.

The recommended remedial program also assumes that the existing vapor mitigation engineering controls will be maintained and periodically evaluated to document compliance with applicable SCG.

The recommended remedial program should achieve the threshold criteria and obtain the established RAO for the Site. Based on the cost, effectiveness, SCG compliance and/or implementation concerns associated with other remedial programs, the recommended remedial program is the most feasible alternative that will cost-effectively achieve the best balance of the NYSDEC evaluation criteria.

5.0 REMEDIAL DESIGN

This section describes the scope of work that will be undertaken to meet the project objectives presented in Section 1.4 of this RAWP, and to implement the recommended remedial alternative. This work will be completed in accordance with applicable provisions and guidance outlined in NYSDEC DER-10, and will include communication with the NYSDEC and submittal of status reports as deemed necessary. This Site will be cleaned up to meet Part 375 Track 4 requirements.

Remedial Engineer

The Remedial Engineer for this project will be Nathan Simon, P.E., a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for the design and implementation of the remedial program described in this section for the former Parkway Cleaners Site (NYSDEC BCA Index No. C835028). The Remedial Engineer will certify in the Final Engineering Report (FER) that the remedial activities were observed by qualified environmental professionals under his supervision and the remedial requirements set forth in this RAWP and other relevant provisions of ECL 27-1419 have been achieved in compliance with the RAWP.

The Remedial Engineer will coordinate the work of subcontractors and vendors involved in the remedial construction, including drilling activities, purchase and placement of amendments, removal and disposal of waste materials generated during remedial construction and subsequent testing, air monitoring, emergency spill response services, and other conditions that may arise during the remedial activities described in this RAWP. The Remedial Engineer will be responsible for all appropriate communication with the NYSDEC and NYSDOH. Further, the Remedial Engineer will review all pre-remedial plans submitted by subcontractors and vendors for compliance with this RAWP and certify this compliance in the FER.

The Remedial Engineer evaluated data generated during the RI and Supplemental RI studies to identify the remedial boundaries depicted on Figure 10. Thereafter, working with a remedial vendor, the Remedial Engineer determined the injection intervals presented on Figure 5a and Figure 6a to address the impacts identified within the remedial boundaries depicted. The Remedial Engineer then collaborated with a remedial vendor to determine the mass of remedial amendments necessary to obtain Part 375 Track 4 requirements (refer to Appendix D).

Overview of Remedial Actions

Remedial activities will be conducted in locations south of the former Parkway Cleaners (Figure 2). The Site is currently unsecured; however, access to the remediation area during construction activities will be limited to DAY staff associated with the project, subcontractor workers, and pertinent agencies involved with the project. The public will not be permitted to enter the work area during the implementation of remedial activities.

The remedial activities will include in-situ injection of biological and abiotic dechlorination remedial reagent for AOC#1 [i.e., emulsified vegetable oil (EVO and zero valent iron (ZVI)] and an in-situ bioremediation for AOC#3 [i.e., EOS Pro and BAC-9^{TM}]. The ZVI reactions rely on abiotic reductive reactions between micro-scale zero valent iron and chlorinated solvents that destroy the contaminant with no intermediate by products (i.e., cis-1,2 DCE, VC, etc.). In-situ

bioremediation is a technology where electron donor sources are introduced to the subsurface to promote the growth of specific microbes that respire chlorinated VOCs within the saturated soil and groundwater thereby reducing contaminant concentrations by sequential dechlorination.

The remedial design presented herein assumes that AOC#1 and AOC#3 will require treatment (i.e., the residual source zone material and downgradient saturated zone contamination) to mitigate potential off-site migration of contaminants and obtain a certificate of completion from the NYSDEC. AOC#2 will be addressed through institutional and engineering controls to mitigate possible exposure routes. AOC#1 is located south the former Parkway Cleaners tenant space and it consists of an approximate 500 ft^2 area. AOC#2 is located south of AOC#1 and consists of an approximate 425 ft^2 area. AOC#3 is located in proximity of monitoring well MW-103s and it consists of an approximate 1,750 ft^2 area. Refer to Figures 10, 10a, and 10b for the locations of AOC#1, AOC#2 and AOC#3. Refer to Figure 5a, and Figure 6a for the targeted treatment intervals for each AOC.

The remediation described in this RAWP is intended as the final remedy for the Site. It is anticipated that no further action beyond the potential supplemental injection of bioremediation amendment and implementation of a site-specific SMP would be required. Validated data indicating the achievement of SCG for COC or clear indication remedial methods are effective in addressing sources/plume migration will be necessary to conclude the remedial action and implement long term site management. If the building is removed from the Site in the future, a final investigation of the soil and groundwater conditions under the building footprint would be performed to determine if additional remedial work is warranted.

5.1 SITE PREPARATION, MOBILIZATION AND CONTROLS

Site preparation activities will be implemented as warranted and during various phases of the remedial fieldwork at the Site. These activities may include, but not be limited to, the following:

- Site controls to ensure the safety of Site workers and the public.
- Provisions necessary to monitor and implement dust and vapor suppression controls as described in the HASP will be on-site, prior to, and during intrusive activities.
- Prior to completing intrusive work, a utility stakeout will be requested from Dig Safely New York for identification and clearance of buried Site utilities.
- A USEPA Class V UIC Inventory form will be completed and provided to the NYSDEC.

5.2 AOC#1 REMEDIATION

To address AOC#1, reductive and biological dechlorination will be promoted within AOC#1 (i.e., within and in proximity to the former alcove portion of the tenant space currently occupied by SoFresh-N-SoClean Laundromat). The objective of this work is to reduce the COC concentrations in monitoring wells TB-MW-4, MP-3 and MP-4, and prevent further migration of COC.

EVO/ZVI Amendment

The proposed AOC#1 amendment is EVO and ZVI, which are injectable liquid materials specifically designed for abiotic reduction and anaerobic biodegradation of chlorinated compounds including the COC. EVO and ZVI consist of micro scale ZVI, surfactant, food grade vegetable oil and water. ZVI will reduce chlorinated solvents abiotically by reducing PCE to dichloroacetylene, TCE to chloroacetylene, DCE to acetylene and VC and to ethylene. [Note: dichloroacetylene, chloroacetylene and acetylene are further reduced to ethylene.] Anaerobic bioremediation of chlorinated solvent contamination requires hydrogen as an electron donor and a halogenated organic compound (e.g., PCE) as an electron acceptor to sequentially dechlorinate the halogenated organic compound (e.g., TCE to DCE, DCE to VC, and VC to ethane). In general, the injected bioremediation electron donor is fermented by naturally occurring subsurface microbes yielding hydrogen, which is subsequently used by the *Dehalococcoides* microbes to dechlorinate chlorinated solvents via anaerobic respiration. Refer to Appendix D for EVO and ZVI amendment specifications sheets.

Bioaugmentation, the application of specific microbes to accelerate reductive dechlorination processes in the aquifer, may be necessary should native dechlorinating species not be present, poorly distributed or are present at low population densities and not sufficiently active to achieve remediation goals. Thus, during ZVI and EVO injection, BAC-9^{TM}, an enriched bioaugmentation culture capable of degrading chlorinated solvents to innocuous compounds efficiently via halo respiration, will be mixed with the EVO as a component of AOC#1 remedial reagent amendments as a supplement to enhance microbe populations. BAC-9^{TM} is shipped in 20-liter pressurized soda kegs and can be injected directly. Refer to Appendix D for BAC-9 vender specification sheet. In addition, CoBupH$_{mg}$, a slow release colloidal buffer that can be mixed with EVO to maintain optimal aquifer pH will also be a component of AOC#1 reagent amendment. CoBupH$_{mg}$ is shipped in 5-gallon pails. Refer to Appendix D for CoBupH$_{mg}$ vendor specification sheets.

5.3 AOC#2 REMEDIATION

The proposed AOC#2 mitigation measures are institutional controls. Currently available data indicates that COC above soil SCG are present in AOC#2, but COC were not measured above SCG in the 'deep' overburden groundwater downgradient of AOC#2. As such, the impacts associated with AOC#2 will be managed through institutional controls (i.e., environmental easement) to mitigate the potential routes of exposure. A site-specific SMP will provide the necessary requirements when conducting intrusive subsurface activities. The SMP will also provide a summary of the necessary documents to show compliance with the SMP.

5.4 AOC#3 REMEDIATION

To address AOC#3, bioremediation/bioaugmentation will be completed. The objective of this work is to reduce the COC concentrations in monitoring well MW-103s.

Bioremediation Amendment

Anaerobic bioremediation of chlorinated solvent contamination requires hydrogen as an electron donor and a halogenated organic compound (e.g., PCE) as an electron acceptor to sequentially

dechlorinate the halogenated organic compounds to ethane. For this portion of the project, EVO based substrate (i.e., EOS Pro) will be used as the electron donor. In addition to EOS Pro, a microbe culture (i.e., bioaugmentation) will be part of the bioremediation amendment.

EOS Pro is an injectable liquid blend of rapidly-biodegradable substrates intended to quickly stimulate microbial activity and slow release substrates intended to promote long-term biological activity. The EOS Pro material will be delivered to the Site as a concentrated emulsion that can be diluted with water in the field to prepare a suspension for injection. It is anticipated that 12:1 water to EVO dilution will be necessary to form the desired amendment viscosity. Refer to Appendix D for EOS Pro vender specification sheets.

Note: Depending on the field conditions encountered at the time of injection, EOS Pro may be diluted with additional hot tap water to facilitate the injection process. It is currently anticipated that the final EOS Pro solution will be between 10 and 50 parts water to 1-part EVO. Independent of the EVO solution's final water content the mass of substrate per injection point will remain the same.

Bioaugmentation in AOC#3 may be necessary should native dechlorinating species not be present, poorly distributed or are present at low population densities and not sufficiently active to achieve remediation goals. During EVO injection, BAC-9^{TM} will be mixed with the EVO as a component of AOC#3 remedial reagent amendments. Refer to Appendix D for BAC-9 vender specification sheet. In addition, CoBupH$_{mg}$, a slow release colloidal buffer that can be mixed with EVO to maintain optimal aquifer pH will also be a component of AOC#3 reagent amendment. Refer to Appendix D for CoBupH$_{mg}$ vendor specification sheets.

5.5 INJECTION SEQUENCE AND PROCESSES

The injection process for AOC#1 and AOC#3 will be completed over consecutive days, and it is anticipated that up to ten days may be required to complete the injections into AOC#1 and AOC#3. It is anticipated that injections will be completed in both AOC#1 and AOC#3 each day during the injection process (i.e., rather than completing injections in one area prior to moving to the second area). Depending on the field conditions encountered, one or more injection point may be completed in one area (i.e., AOC#1) before moving to the second area (AOC#3) and completing injections. This process should allow the subsurface in the initial injection area to equilibrate in regards to pressure and fluid level and provide time for the injection seal to set up thereby minimizing daylighting and streamlining the injection process.

AOC #1

It is anticipated that EVO and ZVI will be introduced into the subsurface at the locations identified on Figure 5a. [Note: Injection locations in AOC#1 were limited in the eastern direction due to the presence of multiple compressed gas service lines.] To the extent possible, each injection point will be advanced to a maximum depth of 18 ft. bgs (the eastern most injection points in proximity to the primary 2001 IRM excavation) and a minimum depth of 14 ft. bgs (the western most injection points in proximity to the secondary 2001 IRM excavation) via direct-push methodologies, refer to Figure 4 for a cross section presenting targeted injection intervals along line A-A'. To complete the injections, a disposable point on the end of the drill rods will be withdrawn as the ZVI and EVO is injected under pressure throughout the targeted injection zone

(i.e., between about 4 ft. and 18 ft. bgs). Injection pressures up to 200 pounds per square inch will be utilized to distribute the remedial reagents in the subsurface. The actual injection pressures required will be determined in the field, with the goal of slowly injecting the remedial reagents material at pressures required to achieve the maximum radius of influence without promoting surfacing of the remedial reagents. As the reagents fill the pore space within the saturated zone, the hydraulic conductivity and flow of remedial reagents may be reduced. If field conditions allow, a water chase will be used to aid in the distribution of the remedial reagents via the recovery of some of the permeability loss created by the injection process. Once injection in a specific location is complete the injection point will be sealed with bentonite and the borehole will be patched with concrete and/or asphalt depending on the location of the injection point.

During the injection process, field personnel will regularly record the time, injection pressure, volume injected into each point, water levels in adjacent wells, visual or field observations (e.g., conductivity, turbidity, substrate in adjacent wells, etc.) and other relevant observations. [Note: In the event that the targeted mass of reagent cannot be delivered to the subsurface using direct push technology, alternative drilling (i.e., rotary drilled wells) and injection methods may need to be implemented. The NYSDEC will be consulted prior to implementing alternative methods.]

To determine the mass of remedial amendment required, the theoretical amendment mass to stoichiometrically treat the measured target contaminant concentrations was calculated and compared with the volume of remedial amendment necessary to satisfy the absorptive capacity demand of the subsurface (refer to *substrate requirement based on oil entrapment by aquifer material* on vendor design summary in Appendix D). The substrate requirement to stoichiometrically treat the theoretical mass is based on hydrogen demand and carbon loss assumed for VOC concentrations measured in groundwater samples collected from monitoring well TB-4 (i.e., 6.91 mg/L PCE, 3.45 mg/L TCE, 6.82 mg/L of cis-1,2-DCE and 0.61 mg/L of vinyl chloride). The oil entrapment calculation assumed a soil loading of 0.2% by weight over the treatment area and interval. The required amendment to satisfy the oil entrapment requirement was greater than then required amendment to satisfy the stoichiometric ratio of the measured contaminant concentrations.

Based on the above considerations, the absorptive capacity of the soil is recommended as the amendment injection quantity for remediation of AOC#1. As such, the target treatment zone within AOC#1 will receive a calculated dose of 4,400 pounds of remedial reagent (i.e., EVO and ZVI). Thus assuming 12 injections points, the targeted amount of remedial reagent to be injected in each injection point is approximately 367 pounds. Refer to EOS Remediation design summary in Appendix D for input parameters and volume estimates.

Note: Soil containing COC concentrations exceeding Restricted Commercial Use and Protection of Groundwater SCO will remain on-site and managed through engineering and institutional controls. In general, these soils are immediately adjacent and below the building slab and are inaccessible. If the building is removed in the future, additional investigation and remediation may be warranted to address this currently inaccessible soil.

AOC#3

EVO will be introduced into AOC#3 in the injection locations identified on Figure 5a. Each injection point will be advanced to a targeted depth of 13 ft. bgs via direct-push methodologies refer to Figure 5 for cross section presenting targeted injection interval along line B-B'. To complete the injection, a disposable point will be used on the end of the drill rods, and following the advancement of the injection points to the targeted depth the drill rods will be withdrawn as the EVO is injected under pressure throughout the targeted injection zone (i.e., between about 13 ft. and 3 ft. bgs). Injection pressures up to 200 pounds per square inch may be utilized to distribute the EVO in the subsurface. The injection pressures required will be determined in the field, but the goal will be to slowly inject the target mass of EVO material at the pressure required to achieve the maximum radius of influence without promoting surfacing of EVO. As the EVO fills the pore spaces of the saturated zone, the hydraulic conductivity and flow of water/EVO may be reduced. If field conditions allow, a water chase to aid in EVO subsurface distribution and recover some of permeability loss created by the EVO injection. Once injection in a specific location is complete the injection point will be sealed with bentonite and the borehole will be patched with concrete and/or asphalt depending on the location of the injection point.

During the injection process, field personnel will regularly record the time, injection pressure, volume injected into each point, water levels in adjacent wells, visual or field observations (e.g., conductivity, turbidity, substrate in adjacent wells, etc.) and other relevant observations. [Note: In the event that the targeted mass of amendment can not be delivered to the subsurface using direct push technology, alternative drilling (i.e., rotary drilled wells) and injection methods may need to be implemented. The NYSDEC will be consulted prior to implementing alternative methods.]

Based on VOC concentrations measured in groundwater samples collected from monitoring well MW-103s (i.e., 2.137 mg/L of cis-1,2-DCE and 1.24 mg/L of vinyl chloride), AOC#3 will receive a calculated dose of 3,780 pounds of EVO. Assuming 18 injections points, the targeted amount of amendment to be injected in each injection point is approximately 210 pounds.

5.6 SOIL VAPOR INTRUSION MONITORING

As presented in Section 1.3, an active SSDS has been installed and verified to be operating as intended at the Site. Subsequent to SSDS startup, soil vapor intrusion samples collected from the former Parkway Cleaners tenant space and the two adjacent tenant spaces indicated that no further action was required. However, an anaerobic bioremediation stall has the potential to generate greater concentrations of COC, specifically, DCE and VC, in the sub-slab vapor. This potential condition will be monitored by measuring soil gas concentrations immediately adjacent to the Sakura restaurant's southern exterior wall, refer to Figure 3a for proposed soil gas monitoring point. This soil gas monitoring point will be used to evaluate the soil vapor in proximity of the Sakura restaurant. In the event this soil gas monitoring indicates that COC concentrations are at levels warranting further investigation/remediation based on a comparison between measured values and the NYSDOH Guidance Document Matrix values, the NYSDEC and NYSDOH will be contacted. Subsequently, additional paired sub-slab and indoor air samples will be collected from within the Sakura restaurant in proximity to former sample location 6, refer to Figure 3a, and tested to assess potential impacts. The results of the paired testing will be reviewed and discussed with the NYSDEC and NYSDOH to determine the appropriate action (e.g., conduct further vapor

evaluation, install vapor mitigation engineering controls in adjacent tenant spaces, etc.). If warranted, based on the Sakura Restaurant coupled (sub-slab and indoor air) soil vapor intrusion sampling results, indoor air samples may be collected from the So-Fresh So-Clean tenant space to document SSDS effectiveness and/or coupled samples from the Great Wall Restaurant to evaluate soil vapor intrusion conditions in these spaces during remedial activities described herein. Indoor air and sub-slab samples will be collected in accordance with the NYSDOH Guidance Document and the ISMP developed for the Site and tested for TO-15 VOCs by an ELAP certified analytical laboratory.

The permanent soil gas point (i.e., designated SG-1 on Figure 3a) will be installed below an asphalt covered area and constructed in general accordance with the DOH Guidance Document for sub-slab vapor point and the standard operating procedure for a vapor pin. Specifically, a 1.5-inch diameter hole will be advanced at least 1.75-inches into the asphalt using a hammer drill. A 5/8-inch diameter hole will be advanced through the asphalt and approximately 1-inch into the underlying soil to form a void. [Note: A drilling guide will be used for these holes.] A Vapor Pin sampling device assembly will be installed in the concrete slab using a dead blow hammer, and a stainless-steel secure cover will be installed above the Vapor Pin to secure the sample location.

Prior to collecting soil gas vapor samples, a tracer gas evaluation will be conducted to serve as a quality assurance/quality control measure verifying the integrity of the soil vapor probe seal. This tracer gas procedure will be used to verify seal integrity prior to the initial sampling event. When the results of the initial sampling indicate that the probe seal is adequate, annual tracer gas testing will be completed to evaluate probe integrity.

Laboratory grade helium will be used as the tracer gas. The methodology used to conduct the tracer test is described below.

- A helium enriched atmosphere will be created above the vapor point.
- The soil vapor probe will be purged by removing one to three vapor probe volumes at rate not to exceed 0.2 liters per minute.
- Following purging, the helium enriched atmosphere immediately above and within the vapor probe will be measured. The vapor probe will be considered a viable location if a helium concentration less than 10% of the helium enriched atmosphere is measured. If the tracer gas criteria are not met, the ground surface around the Vapor Pin will be sealed or a new Vapor Pin will be installed and re-tested until an acceptable helium tracer test is completed.

Following confirmation that a viable seal has been created, a baseline sample, prior to any remediation amendments are injected into the subsurface will be collected from soil gas monitoring point SG-1 to establish baseline conditions. The vapor sample will be collected over a 2-hr sampling interval using a laboratory supplied regulator. The vapor sample will be submitted to analytical laboratory and tested for VOCs via method TO-15. Additional vapor samples will be collected during routine groundwater monitoring events to assess soil gas vapors as the remediation at the Site progresses.

6.0 POST-REMEDIATION MONITORING

Validation of performance of the remedial activities implemented is required to determine the effectiveness of the treatment in attaining remedial objectives and operation endpoints. Ongoing monitoring of key contaminant and biogeochemical characteristics of the Site is critical to evaluating the effectiveness of the remedial approach to meet remedial objectives. Typical lag times to stimulate measurable increases in the rate of degrading of chlorinated ethenes may be on the order of 12 months or more. In the event that effectiveness monitoring indicates that applicable Site RAO, SCG and/or SCO are not being achieved, additional injection events may be necessary. The specific amendment, loading rates, and installation will be provided in a supplemental work plan.

6.1 GROUNDWATER MONITORING

Three groundwater sampling monitoring events will be implemented over the over the first year following the remedial reagent injection (i.e., at 6-month, 9 month and 12-month intervals) using existing monitoring wells that are installed with well screens sealed within shallow water-bearing zone that underlies the Site. The parameters listed below are recommended for the following reasons:

- Field Parameters - temperature, pH, specific conductance, oxygen reduction potential (ORP) and dissolved oxygen to confirm anaerobic subsurface conditions are being maintained.
- Halogenated Volatile Organic Compounds - To monitor for a reduction in COC indicating favorable reducing conditions have been achieved.
- Total Organic Carbon - This is a contingency measure that will be implemented if it is suspected that bioremediation amendments have not reached a specific targeted location. The results of this evaluation will determine the substrate strength at the test location. Note: Existing TOC data will be used as baseline data to which future sample event results will be compared to. It is anticipated that levels of TOC will initially rise with amendment injection and then decline over time as microbial growth and activity increases and substrate is consumed.
- *Dehalococcoides* and *Dehalococcoides* functional groups - This is a contingency measure that will be implemented if it is suspected that the favorable reducing conditions have been achieved, but the VOC concentrations are not reducing. The results of this evaluation will aid in the determination if additional bioaugmentation (or other alternative remedial measures) may be warranted.

Note: If substantial biomass in the well samples, and/or apparent reductions in hydraulic conductivity are observed, well surging may be required to address bio-clogging on the well screen and/or sand pack. Based on this evaluation it will be determined if the well can be restored/replaced or if biofouling of the soils within the treatment area soils are responsible for the observations of permeability loss.

To evaluate the on-going effectiveness of the remedial efforts conducted at the Site, the following existing monitoring wells will be sampled and tested after the remedy implementation for the field and analytical laboratory parameters presented above (refer to Figure 2 for locations):

- **TB-MW-4 and MP-4**: Monitoring wells installed in the former alcove source area and within source area excavations completed in 2004 that will be evaluated to assess migration of remedial amendment and anaerobic groundwater conditions in AOC#1 and monitor for potential bioremediation stalls. These wells will be evaluated for field parameters and tested for halogenated VOCs, and potentially TOC, *Dehalococcoides* and *Dehalococcoides* functional groups to track the effectiveness of remedial reagent injections.
- **MW-102s**: A monitoring well installed adjacent to the original "source" area that will be evaluated to assess migration of biostimulation amendment. Unless additional evaluation is warranted this well will only be evaluated for field parameters.
- **MW-3s and IP-3**: Monitoring wells installed in the central portion of the Site upgradient AOC#3 and downgradient of AOC#1. These wells will be evaluated for field parameters and tested for halogenated VOCs, and potentially TOC, *Dehalococcoides* and *Dehalococcoides* functional groups to track the effectiveness of bioremediation.
- **MW-103s**: The monitoring well containing recently increased concentrations of cis-1,2-DCE and vinyl chloride and is located within in AOC#3. This well will be evaluated for field parameters and tested for halogenated VOCs, TOC and potentially *Dehalococcoides* and *Dehalococcoides* functional groups to track the effectiveness of bioremediation.

Monitoring well sampling activities will be recorded in a field book and on groundwater sampling logs and reported as described in Section 8.0. Other observations (e.g., well integrity, etc.) will be noted on the well sampling logs. The well sampling logs will serve as the inspection form for the groundwater monitoring well network. The aspects of the groundwater monitoring program are described below.

Static water levels will be measured to a monitoring point of known elevation using a Heron Model HO1.L oil/water interface probe or similar instrument.

The groundwater samples evaluated for field parameters and submitted for analytical laboratory testing will be collected using dedicated bailers. Groundwater samples collected for analytical laboratory testing will be submitted to a NYSDOH ELAP-certified analytical laboratory and analyzed for halogenated VOCs using USEPA Method 8260 and TOC using USEPA Method 415.1. The analytical laboratory results for the groundwater samples will be compared to TOGS 1.1.1 to evaluate the effectiveness of the remedial program. As a BCP volunteer the remedial party is obligated to prevent off-site migration of COC. It is possible that post-remedial groundwater concentrations in the source area may exceed TOGS 1.1.1 standards or guidance values, however, if asymptotic conditions are achieved in monitoring well MW-103s the Site RAOs for on-site groundwater will be satisfied.

In addition, each of the groundwater samples collected for the evaluation of field parameters will be tested for pH, specific conductivity, temperature, and ORP using a Horiba U-22 meter or equivalent. Dissolved oxygen will be measured using the down-hole YSI, Incorporated Model

550A, or similar. These multiple lines of converging contaminant, hydrogeologic, geochemical and microbial data will be used to assess the changes in contaminant concentration and mass over time, changes in groundwater geochemistry and contaminant biodegradation rates.

Site-specific QA/QC samples (i.e., field blanks, field duplicate samples, matrix spike/matrix spike (MS/MSD) duplicate samples) will not be collected or analyzed as part of the routine groundwater sampling events. Samples collected to confirm that treatment is complete (e.g., final project close out) will include the collection of QA/QC samples and the preparation of a DUSR by an independent party.

The results of the effectiveness monitoring will determine the need for additional injections of EVO and/or ZVI. The NYSDEC will be consulted prior to completing subsequent injections at the Site. Depending on the results of the periodic monitoring, the monitoring schedule may be adjusted or remedial actions may be required. The NYSDEC and NYSDOH will be consulted to assess appropriate actions, including additional remedial actions (if warranted).

6.2 RESIDUAL AND REMAINING CONTAMINATION

In the event post-remediation groundwater samples do not indicate adequate remediation to satisfy the BCP volunteer obligation to prevent plume migration from the boundaries of the Site, compliance soil samples may be collected from AOC#1 and/or AOC#3 for analytical laboratory analysis in accordance with the field sampling plan included in the site-specific ISMP.

Residual soil contamination is below or immediately adjacent to the on-site building and/or site utilities, making it inaccessible due to structural concerns. Current exposure pathways to residual/remaining contamination are mitigated or addressed by institutional and engineering controls (i.e., cover system, SSDS, SMP) in addition to the groundwater remedy presented herein. The remediation/removal of this soil may be warranted and feasible if the building is removed in the future. In the event that that the building is removed, the NYSDEC will be consulted at that time to determine the need for further investigation and/or remediation and the necessary documentation required to complete the investigation/remediation.

6.3 LONG-TERM SITE MANAGEMENT

Validated data indicating the achievement of SCG for COC or clear indication remedial methods are effective in addressing sources/plume migration will be necessary to conclude the remedial action and proceed with long term site management. Long-term groundwater monitoring in accordance with the Site SMP will be determined after the evaluation of the remedial effectiveness monitoring data.

7.0 SCHEDULE

Refer to Table 6 for a tentative project schedule for the Site. This schedule provides the order of anticipated tasks, the ability to overlap certain activities and the duration of the planned activities. The specific dates of document submittals, field and remedial activities and project milestones will be provided in the monthly progress reports for the Site.

8.0 DELIVERABLES

After the final remedy is implemented, a report summarizing the work completed to date will be submitted to the NYSDEC in the form of a Final Engineering Report (FER) and/or Construction Completion Report (CCR), depending on the status of the project and effectiveness monitoring results. This CCR or FER will include locations, depths, and quantities of injected materials used as part of the final remedy.

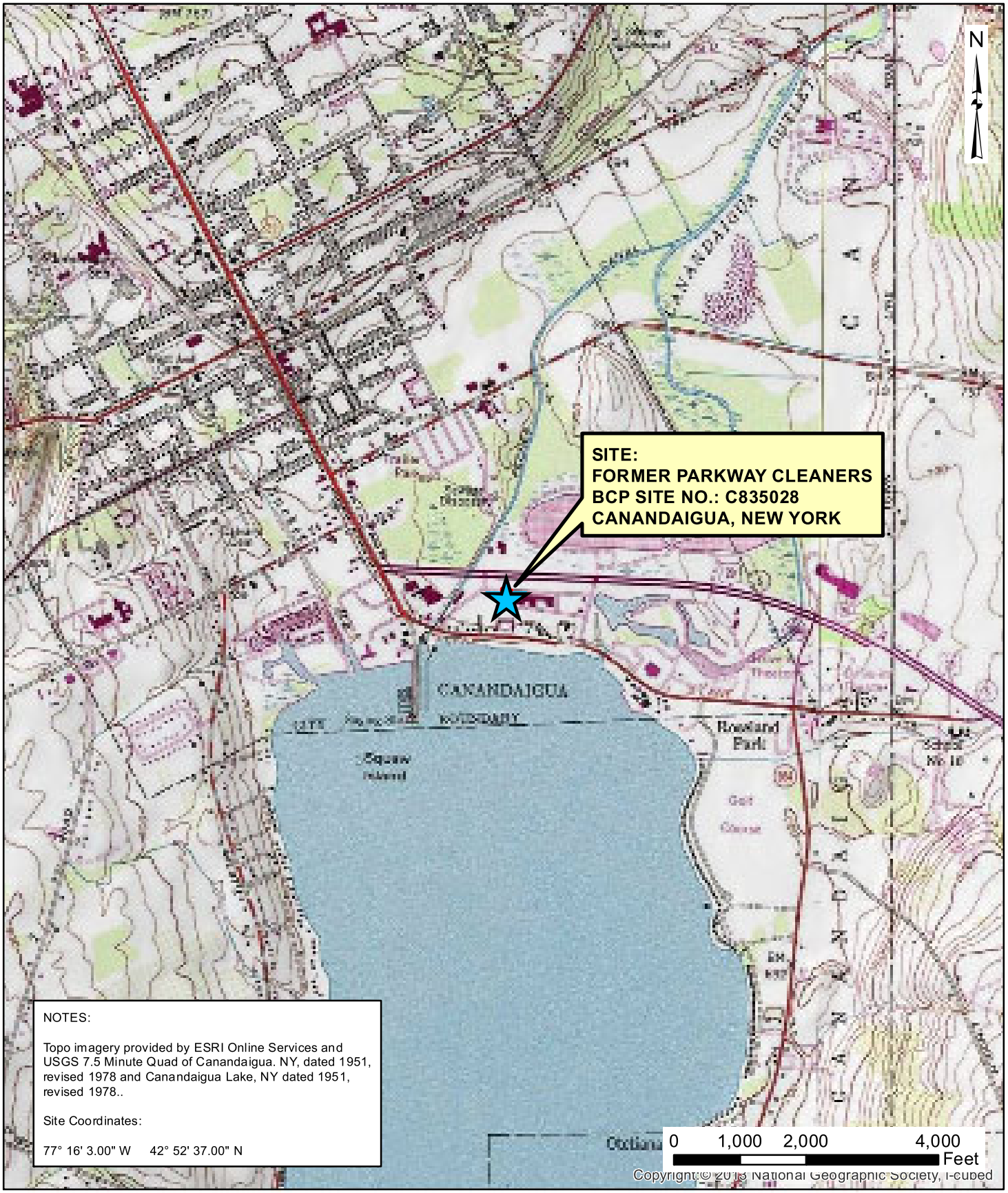
Status reports will be submitted summarizing the data collected during the subsequent periodic monitoring events completed approximately 6 months, 9 months and 12 months after the injection event. The status reports will be submitted approximately 4 weeks from the receipt of laboratory test results.

9.0 ACRONYMS

AOC	Area of Concern
AST	Above-ground Storage Tank
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
CAMP	Community Air Monitoring Program
CCR	Construction Completion Report
CID	Contained-In Demonstration
cis-1,2-DCE	cis-1,2-dichloroethene
COC	Contaminants of Concern
CSM	Conceptual Site Model
DER-10	Department of Environmental Remediation Technical Guidance for Site Investigation and Remediation
DOC	Dissolved Organic Carbon
1,1-DCE	1,1-dichloroethene
EVO	Emulsified Vegetable Oil
FER	Final Engineering Report
ft.	Feet
FOC	Fraction of Organic Carbon
FWRIA	Fish and Wildlife Resources Impact Analysis
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
ISMP	Interim Site Management Plan
MS/MD	Matrix Spike/Matrix Duplicate
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOH Guidance Document	Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene or Perchloroethylene
PID	Photoionization Detector
ppm	Parts per Million
PRAP	Proposed Remedial Action Plan
PVC	Polyvinyl Chloride
RAO	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
RI/RAA	Remedial Investigation/Recommended Remedial Alternative Report
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
SMP	Site Management Plan

Spectrum	Spectrum Analytical Inc.
SSDS	Sub-Slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCE	Trichloroethene
TOC	Total Organic Carbon
TOGs	Technical and Operational Series 1.1.1
trans-1,2-DCE	trans-1,2-dichloroethene
UIC	Underground Injection Control
USEPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound
ZVI	Zero Valent Iron

FIGURES



NOTES:

Topo imagery provided by ESRI Online Services and USGS 7.5 Minute Quad of Canandaigua. NY, dated 1951, revised 1978 and Canandaigua Lake, NY dated 1951, revised 1978..

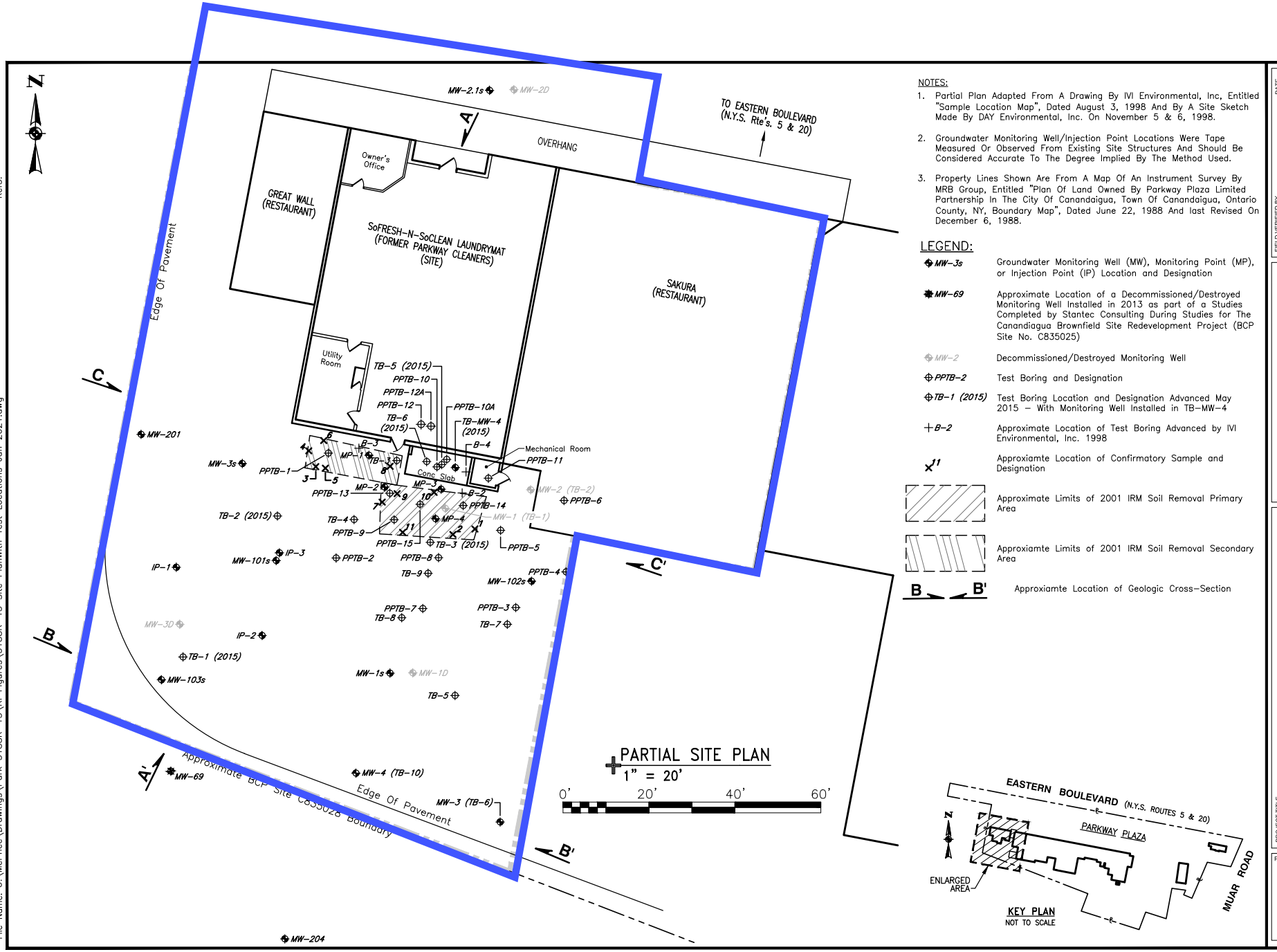
Site Coordinates:

77° 16' 3.00" W 42° 52' 37.00" N

Date: 02-17-2021 Drawn By: CPS Scale: AS NOTED	**DAY ENGINEERING, PC.** Environmental Engineering Consultants Rochester, New York 14606 New York, New York 10170	Project Title: FORMER PARKWAY CLEANERS BCP SITE NO.: C835028 CANANDAIGUA, NEW YORK Drawing Title: Project Locus Map	Project No.: 5188R-15 FIGURE 1

Document Path: E:\GIS Mapping\Conifer\5188R-15Park\5188R-01-Locus.mxd

Last Date Saved: 17 Feb 2021



NOTES:

1. Partial Plan Adapted From A Drawing By IVI Environmental, Inc, Entitled "Sample Location Map", Dated August 3, 1998 And By A Site Sketch Made By DAY Environmental, Inc. On November 5 & 6, 1998.
2. Groundwater Monitoring Well/Injection Point Locations Were Tape Measured Or Observed From Existing Site Structures And Should Be Considered Accurate To The Degree Implied By The Method Used.
3. Property Lines Shown Are From A Map Of An Instrument Survey By MRB Group, Entitled "Plan Of Land Owned By Parkway Plaza Limited Partnership In The City Of Canandaigua, Town Of Canandaigua, Ontario County, NY, Boundary Map", Dated June 22, 1988 And last Revised On December 6, 1988.

LEGEND:

MW-3s	Groundwater Monitoring Well (MW), Monitoring Point (MP), or Injection Point (IP) Location and Designation
MW-69	Approximate Location of a Decommissioned/Destroyed Monitoring Well Installed in 2013 as part of a Studies Completed by Stantec Consulting During Studies for The Canandiagua Brownfield Site Redevelopment Project (BCP Site No. C835025)
MW-2	Decommissioned/Destroyed Monitoring Well
PPTB-2	Test Boring and Designation
TB-1 (2015)	Test Boring Location and Designation Advanced May 2015 – With Monitoring Well Installed in TB-MW-4
B-2	Approximate Location of Test Boring Advanced by IVI Environmental, Inc. 1998
x11	Approxiamte Location of Confirmatory Sample and Designation
	Approximate Limits of 2001 IRM Soil Removal Primary Area
	Approxiamte Limits of 2001 IRM Soil Removal Secondary Area
B B'	Approxiamte Location of Geologic Cross-Section

FIELD VERIFIED BY	NES
DATE	1-2021
DRAWN BY	RJM
DATE DRAWN	1-7-2021
SCALE	As Noted
DATE ISSUED	1-7-2021

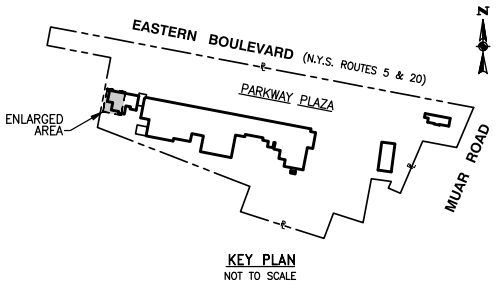
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
SITE PLAN WITH TEST LOCATIONS

PROJECT NO.
5188R-15

FIGURE 2



KEY PLAN
NOT TO SCALE

NOTE:

In accordance with current guidance, sub-slab vacuum measurements equal to, or greater than 0.002" of water are considered effective for vapor mitigation.

LEGEND:

- SP#1 2" Water on 11-26-2019 — SSDS Suction Point with Sub-Slab Vacuum Measurement made on 11-26-2019
- MP-1 -0.032" Water on 11-26-2019 — Pressure Monitoring Point with Sub-Slab Vacuum Measurement made on 11-26-2019

1 / Fig3 SITE PLAN WITH TEST LOCATIONS
1" = 10'-0"

0' 10' 20'

DESIGNED BY	BFK
DATE	1-2021
DRAWN BY	RJM/Tw
DATE DRAWN	1-7-2021
SCALE	As Noted
DATE ISSUED	1-28-2021

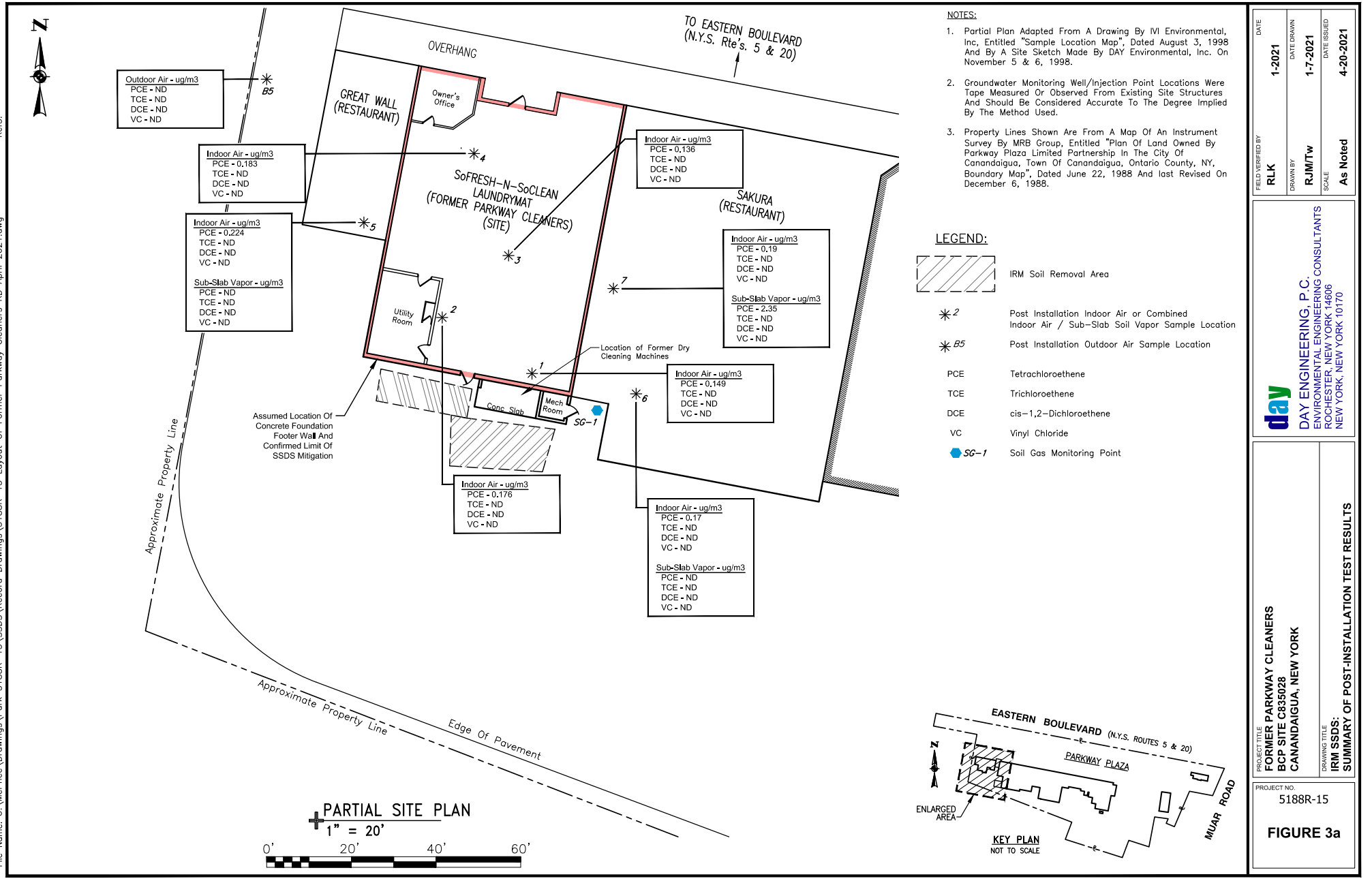
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
IRM SSDS:
LIMITS OF VAPOR MITIGATION CONTROL

PROJECT NO.
5188R-15

FIGURE 3



NOTES:

1. Partial Plan Adapted From A Drawing By IVI Environmental, Inc, Entitled "Sample Location Map", Dated August 3, 1998 And By A Site Sketch Made By DAY Environmental, Inc. On November 5 & 6, 1998.
2. Groundwater Monitoring Well/Injection Point Locations Were Tape Measured Or Observed From Existing Site Structures And Should Be Considered Accurate To The Degree Implied By The Method Used.
3. Property Lines Shown Are From A Map Of An Instrument Survey By MRB Group, Entitled "Plan Of Land Owned By Parkway Plaza Limited Partnership In The City Of Canandaigua, Town Of Canandaigua, Ontario County, NY, Boundary Map", Dated June 22, 1988 And last Revised On December 6, 1988.

LEGEND:

- IRM Soil Removal Area
- *2 — Post Installation Indoor Air or Combined Indoor Air / Sub-Slab Soil Vapor Sample Location
- *B5 — Post Installation Outdoor Air Sample Location
- PCE — Tetrachloroethene
- TCE — Trichloroethene
- DCE — cis-1,2-Dichloroethene
- VC — Vinyl Chloride
- SG-1 — Soil Gas Monitoring Point

FIELD VERIFIED BY	RLK
DATE	1-2021
DRAWN BY	RJM/Tw
DATE DRAWN	1-7-2021
SCALE	As Noted
DATE ISSUED	4-20-2021

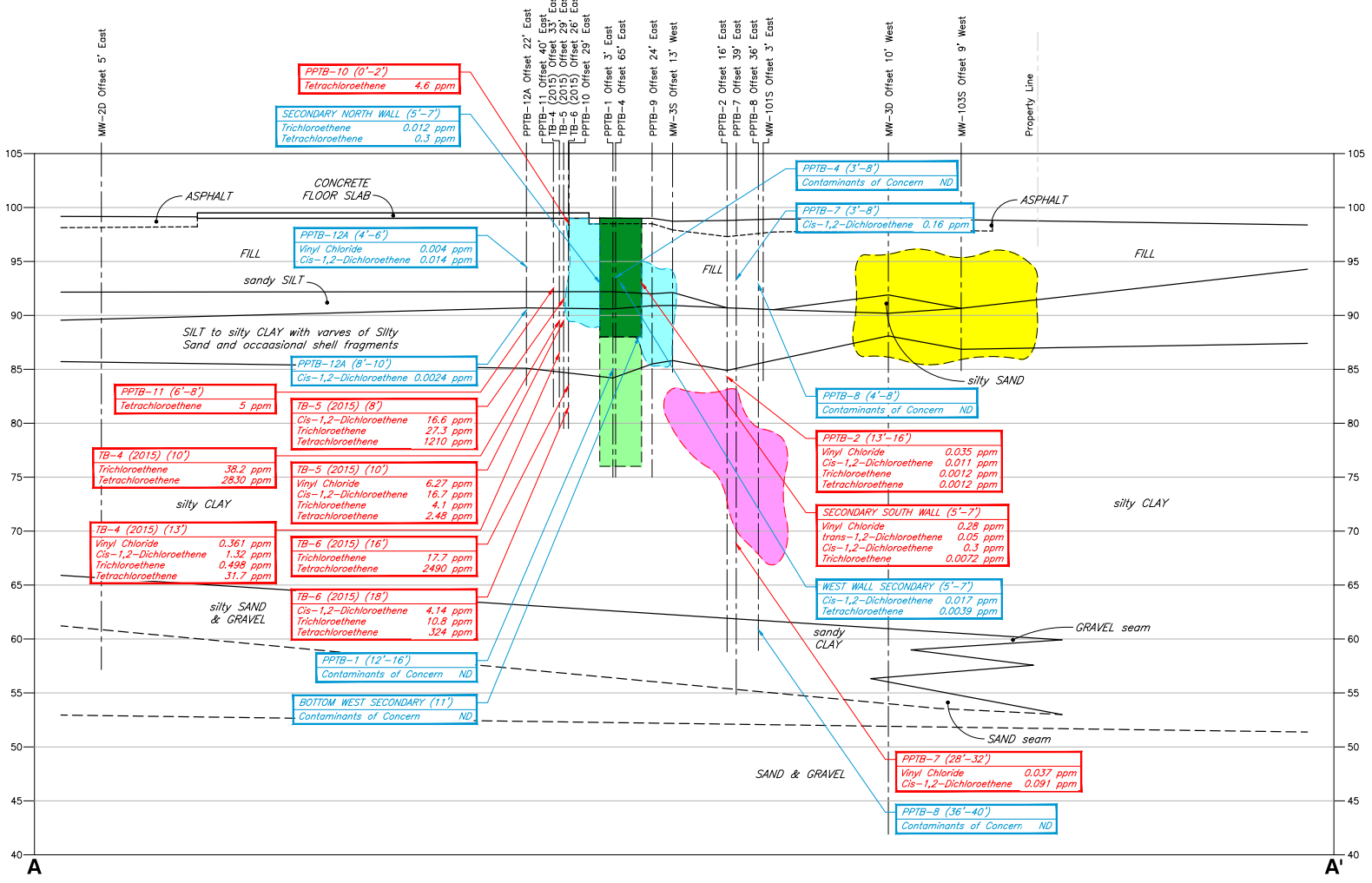
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
IRM SSDS:
SUMMARY OF POST-INSTALLATION TEST RESULTS

PROJECT NO.
5188R-15

FIGURE 3a



NOTES:

1. This Geologic Cross-Section is an estimated model representing filed conditions. Actual field conditions will vary from that presented herein. Day Engineering, P.C. cannot and does not assure their accuracy.
2. FILL – Varies by location and it may contain silt, sand and clay in various proportions sometimes intermixing with crushed stone, wood fragments, glass, metal, ash, cinders and decaying vegetation.

Protection of Groundwater SCO	mg/kg or ppm
Tetrachloroethene	1.3
Trichloroethene	0.47
Cis-1,2-Dichloroethene	0.25
Trans-1,2-Dichloroethene	0.19
1,1-Dichloroethene	0.33
Vinyl Chloride	0.02

GEOLOGIC CROSS-SECTION A-A'
1" = 10' Horizontal
1" = 5' Vertical
1" = 10' 0' 10' 20' 30'
1" = 5' 0' 5' 10' 15'

LEGEND

- Area of Concern #1 (AOC#1)
- Area of Concern #2 (AOC#2)
- Area of Concern #3 (AOC#3)
- 2001 IRM Soil Removal Primary Area Excavated To 23 Feet Below Grade
- 2001 IRM Soil Secondary Area Excavated To 11 Feet Below Grade
- PPTB-8 Sample With Contaminants Of Concern Result Below Protection Of Groundwater Soil Cleanup Objective
- PPTB-2 Sample With One Or More Contaminants Of Concern Result Exceeding Protection Of Groundwater Soil Cleanup Objective

DAY ENVIRONMENTAL, INC.
SHARING ALTERNATIVES
DATE: 1-2021
PROJECT MANAGER: NES
DRAWN BY: RJM
APPR. DRAWN: 1-8-2021
CHECKED BY: NES
DATE: 2-10-2021
APPROVED BY: RJM
DATE: 2-12-2021
PROJECT NO.: As Noted
FIGURE NO.: 2-12-2021

NO.	DATE	REVISIONS	BY
7			
6			
5			
4			
3			
2			
1			

DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
REMEDIATION ● CONSTRUCTION
NEW YORK, NEW YORK 10170

PROJECT TITLE: FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE: Geologic Cross Section A-A' With Areas Of Concern And Contaminants Of Concern Concentrations In Soil

PROJECT NO.: 5188R-15

FIGURE NO.: FIGURE 4

SHEET: OF

Reference Files Attached:
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REF2:
REF3:
REF4:
REF5:
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REF8:
REF9:
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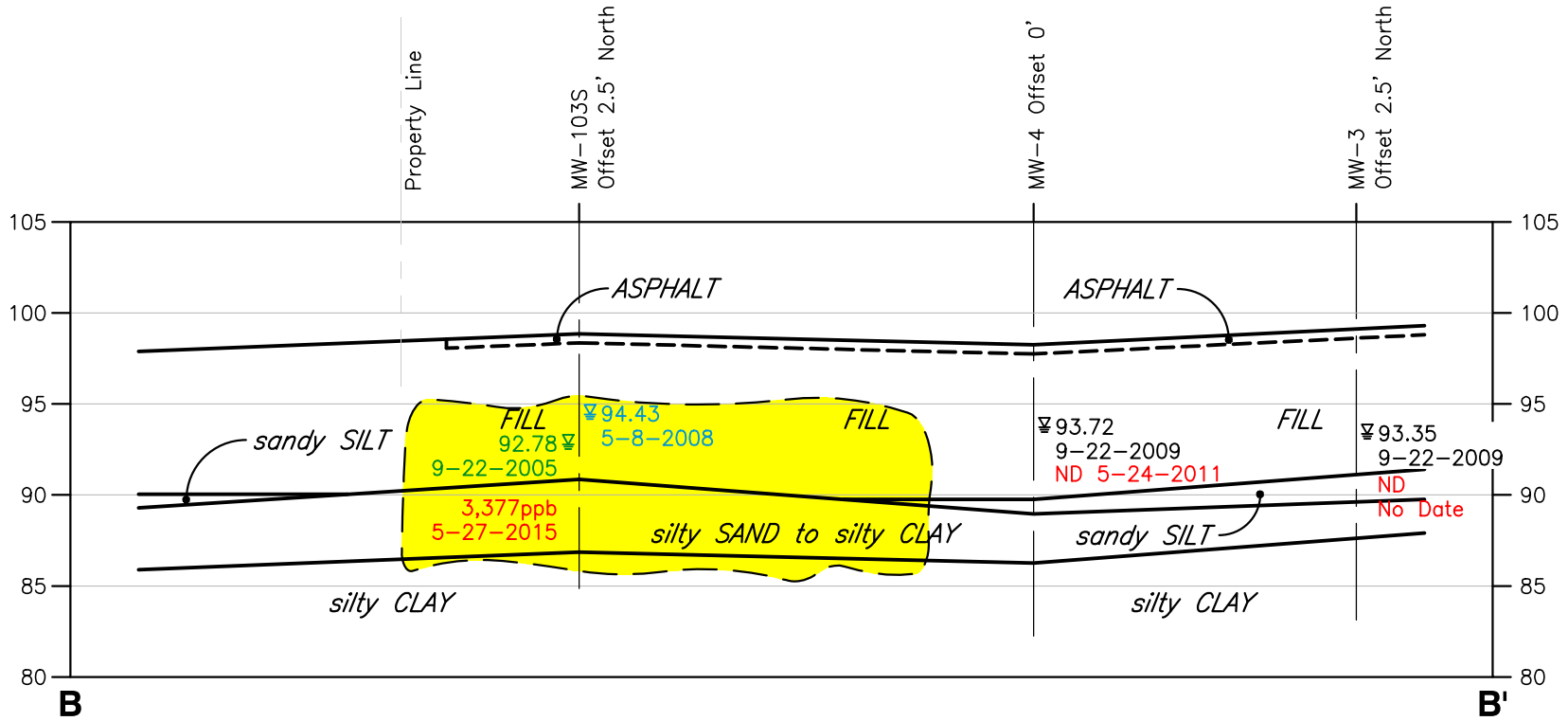


GEOLOGIC CROSS–SECTION B–B'

1" = 20' Horizontal
1" = 10' Vertical

1" = 20' 0' 20' 40'

1" = 10' 0' 10' 20'

NOTES:

1. This Geologic Cross–Section is an estimated model representing field conditions. Actual field conditions will vary from that presented herein. Day Engineering, P.C. cannot and does not assure their accuracy.
2. FILL – Varies by location and it may contain silt, sand and clay in various proportions sometimes intermixing with crushed stone, wood fragments, glass, metal, ash, cinders and decaying vegetation.
3. Static water level not measured in monitoring wells MW–3 and MW–4 On 5–8–2008
4. Contaminants of concern include PCE, TCE, Cis 1,2–DCE, Trans 1,2–DCE and vinyl chloride. With the exception of the vinyl chloride the NYSDEC TOGS 1.1.1 groundwater standard for each component is 5ppb. The NYSDEC TOGS 1.1.1 groundwater standard for vinyl chloride is 2ppb.

LEGEND

- Area of Concern #3 (AOC#3)
- 93.35 9–22–2009 — Typical Groundwater Elevation
- 94.43 5–8–2008 — Typical Groundwater High Elevation
- 92.78 9–22–2005 — Typical Groundwater Low Elevation
- 3,377ppb 5–27–2015 — Total Contaminants Of Concern (COC) In Groundwater Measured In Parts Per Billion (ppb) Note: The COC measured in this sample include: PCE–ND, TCE–ND, Cis 1,2–DCE 2,130ppb, Trans 1,2–DCE 7ppb and vinyl chloride 1,240ppb

DATE 2-12-2021
DRAWN BY RJM
SCALE As Noted

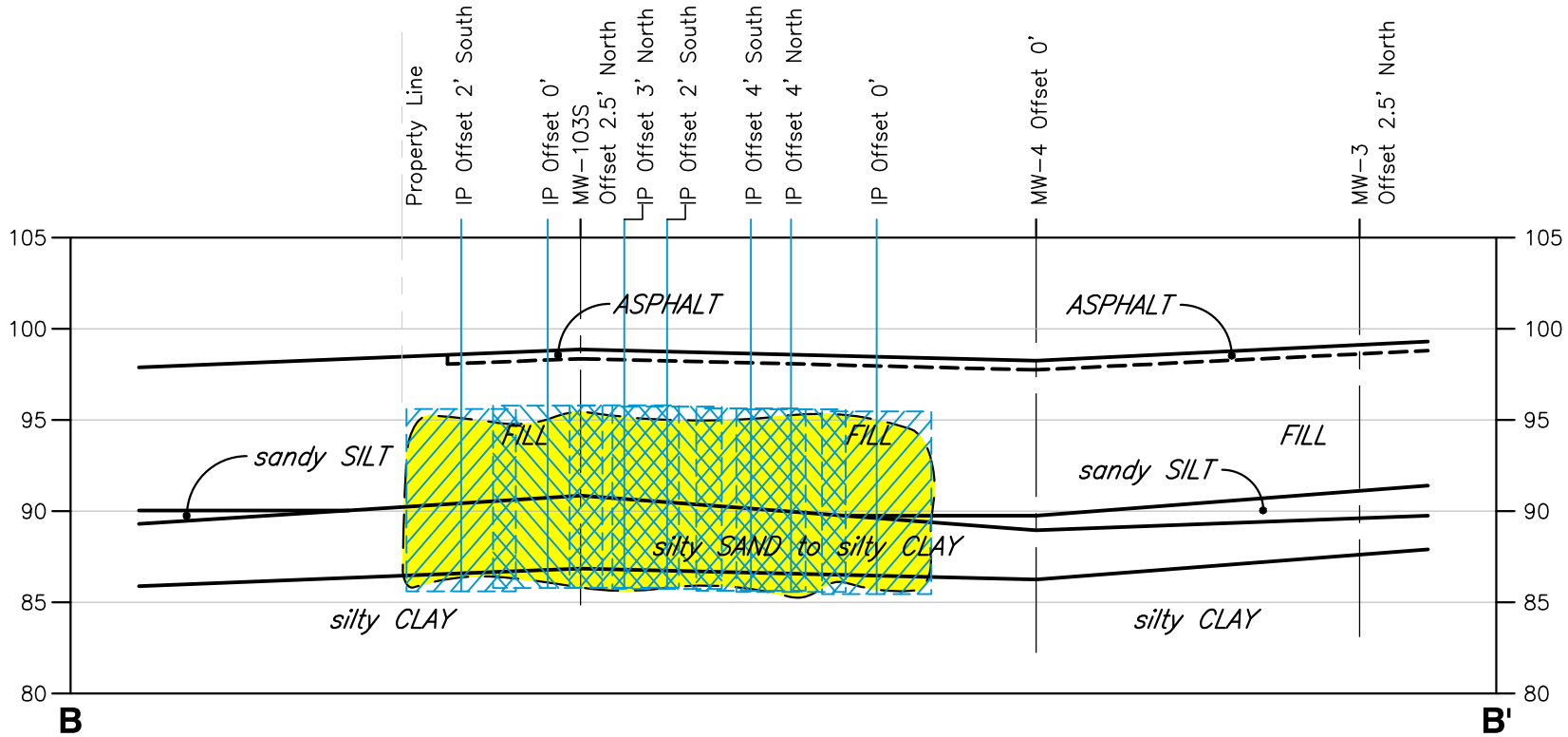
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
Geologic Cross Section B-B' With AOC#3 and COC Concentrations In Groundwater

PROJECT NO. 5188R-15

FIGURE 5



GEOLOGIC CROSS–SECTION B–B'

1" = 20' Horizontal
1" = 10' Vertical

1" = 20' 0' 20' 40' 60'

1" = 10' 0' 10' 20' 30'

LEGEND

Area of Concern #3 (AOC#3)

IP

Injection Point (IP) with assumed injection interval of 3' below grade to 13' below grade and a 6' radius of influence

Assumed radius of influence

NOTES:

1. This Geologic Cross–Section is an estimated model representing field conditions. Actual field conditions will vary from that presented herein. Day Engineering, P.C. cannot and does not assure their accuracy.

2. FILL – Varies by location and it may contain silt, sand and clay in various proportions sometimes intermixing with crushed stone, wood fragments, glass, metal, ash, cinders and decaying vegetation.

DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

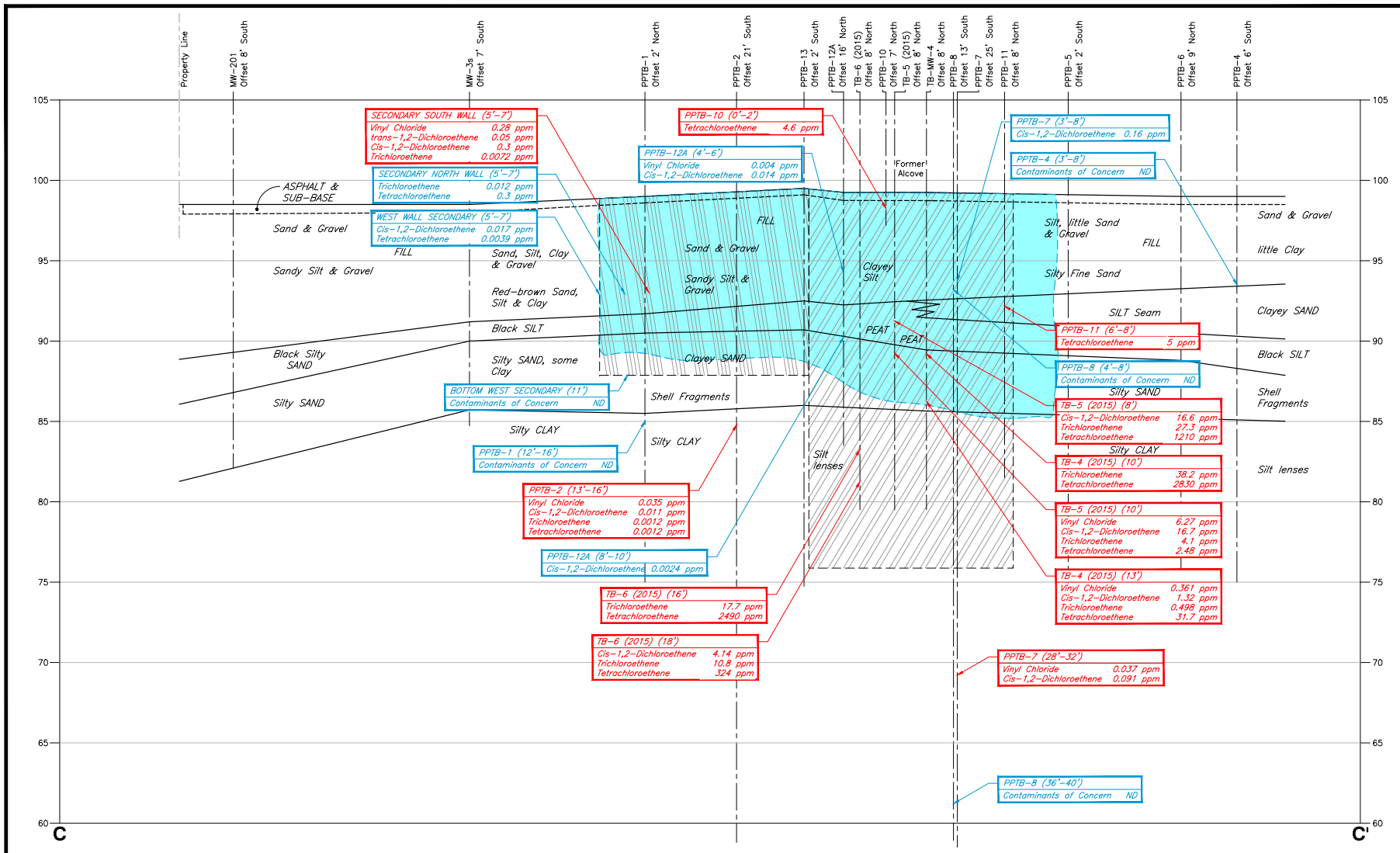
DATE 2-12-2021
DRAWN BY RJM
SCALE As Noted

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
RECOMMENDED REMEDIAL ALTERNATIVE AOC#3

PROJECT NO. 5188R-15

FIGURE 5a



NOTES:

1. This Geologic Cross-Section is an estimated model representing filed conditions. Actual field conditions will vary from that presented herein. Day Engineering, P.C. cannot and does not assure their accuracy.
2. FILL – Varies by location and it may contain silt, sand and clay in various proportions sometimes intermixing with crushed stone, wood fragments, glass, metal, ash, cinders and decaying vegetation.

Protection of Groundwater SCO	mg/kg or ppm
Tetrachloroethene	1.3
Trichloroethene	0.47
Cis-1,2-Dichloroethene	0.25
Trans-1,2-Dichloroethene	0.19
1,1-Dichloroethene	0.33
Vinyl Chloride	0.02

GEOLOGIC CROSS-SECTION C-C'
1" = 5' Horizontal
1" = 3' Vertical
1" = 5' 0' 5' 10' 15'
1" = 3' 0' 3' 6' 9'

LEGEND

- Area of Concern #1 (AOC#1)
- 2001 IRM Soil Removal Primary Area Excavated To 23 Feet Below Grade
- 2001 IRM Soil Secondary Area Excavated To 11 Feet Below Grade

PPTB-8 Sample With Contaminants Of Concern Result Below Protection Of Groundwater Soil Cleanup Objective

PPTB-2 Sample With One Or More Contaminants Of Concern Result Exceeding Protection Of Groundwater Soil Cleanup Objective

Reference Files Attached:
REF1: Section A-A' Jan 2021.dwg
REF2:
REF3:
REF4:
REF5:
REF6:
REF7:
REF8:
REF9:
REF10:

File Name: U:\MJPrivt\Drawings\Proj. 5188R-15\R Figures\Section C-C' pilotscale with sample results.dwg
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Last Saved By: Robert February 12, 2021 12:10:16 PM
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ANSI "D" (22x34)
DayEnv_AnsiD

REVISIONS	DATE	BY
7		
6		
5		
4		
3		
2		
1		

PROJECT MANAGER: NES
DRAWN BY: RJM
CHECKED BY: NES
APPROVED BY: RJM
DATE: 1-2021
DATE: 1-29-2021
DATE: 2-10-2021
DATE: 2-12-2021
SCALE: As Noted
DATE: 2-12-2021

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SHANE ALEXANDER
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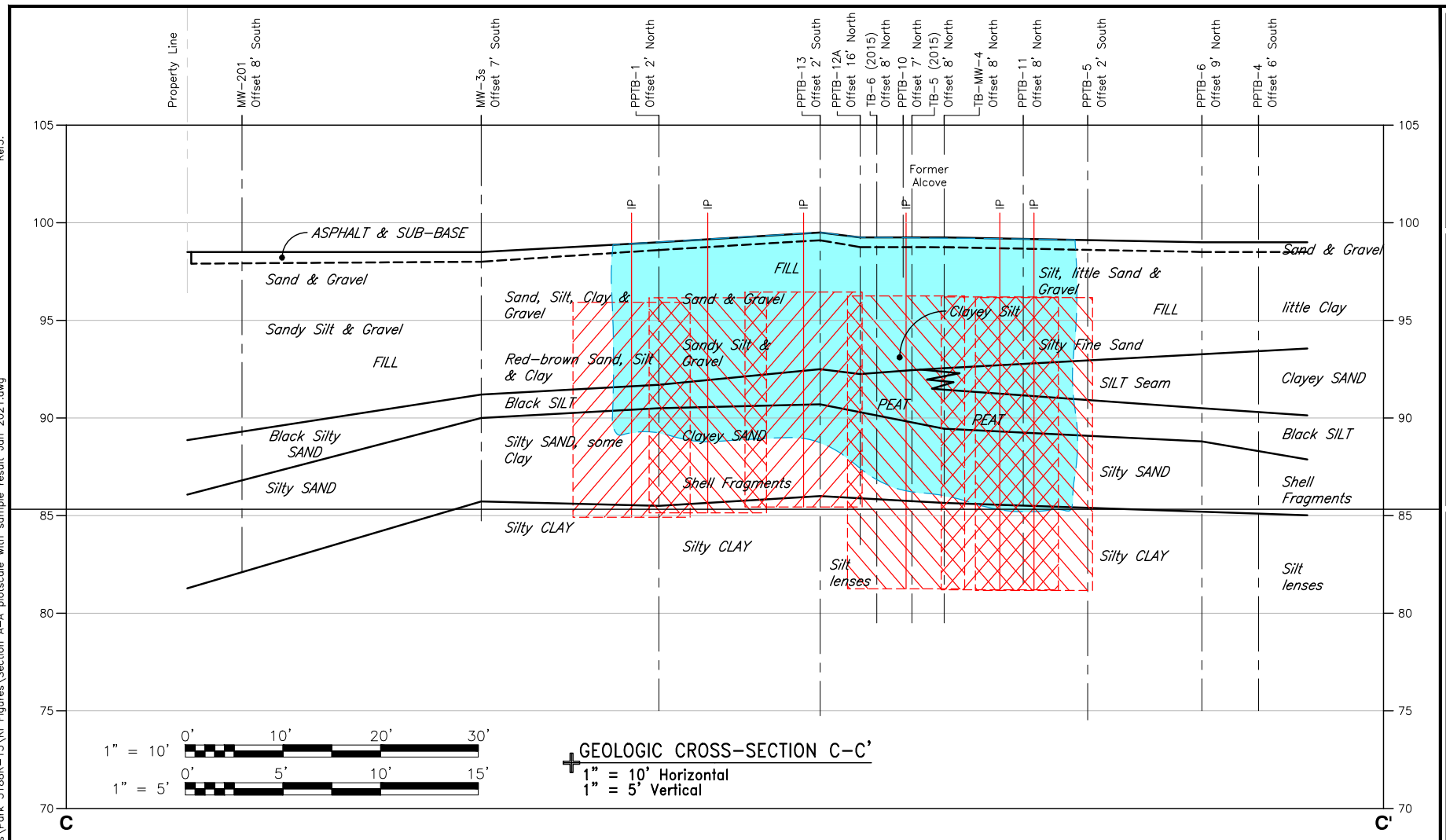
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
RECYCLING & CONSULTING
NEW YORK, NEW YORK 10170

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
Geologic Cross Section C-C' With Area Of Concern #1 (AOC#1) And Contaminants Of Concern Concentrations In Soil

PROJECT NO.
5188R-15

FIGURE NO.
FIGURE 6



GEOLOGIC CROSS-SECTION C-C'

1" = 10' Horizontal
1" = 5' Vertical

NOTES:

1. This Geologic Cross-Section is an estimated model representing filed conditions. Actual field conditions will vary from that presented herein. Day Engineering, P.C. cannot and does not assure their accuracy.
2. FILL – Varies by location and it may contain silt, sand and clay in various proportions sometimes intermixing with crushed stone, wood fragments, glass, metal, ash, cinders and decaying vegetation.
3. An IRM was completed in 2001 that removed soil south of the building (i.e., between about test boring locations PPTB-1 and PPTB-11) to elevations ranging between about 11 feet and 23 feet below grade.
4. Locations of injection points are shown for conceptual purposes only. Actual location to be determined in the field.

LEGEND

Area of Concern #1 (AOC#1)

IP

Injection Point (IP) with assumed injection interval of 3' below grade to 14' or 18' below grade and a 6' radius of influence

Assumed radius of influence

FIELD VERIFIED BY	RLK
DATE	1-2021
DRAWN BY	RJM
DATE DRAWN	2-12-2021
SCALE	As Noted
DATE ISSUED	2-12-2021

DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

PROJECT TITLE: FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE: RECOMMENDED REMEDIAL ANTERNATIVE AOC#1

PROJECT NO. 5188R-15

FIGURE 6a

Document Path: E:\GIS Mapping\Conifer\5188R-15Park\RAWP 2021-02\5188R-04A -Groundwater 20080508-Offsite Wells.mxd

Last Date Saved: 24 Feb 2021

Date	02-19-2021
Drawn By	CPS
Scale	AS NOTED

day
DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

Project Title
FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title
Potentiometric Groundwater Contour Map
for May 8, 2008: Typical High Groundwater Condition

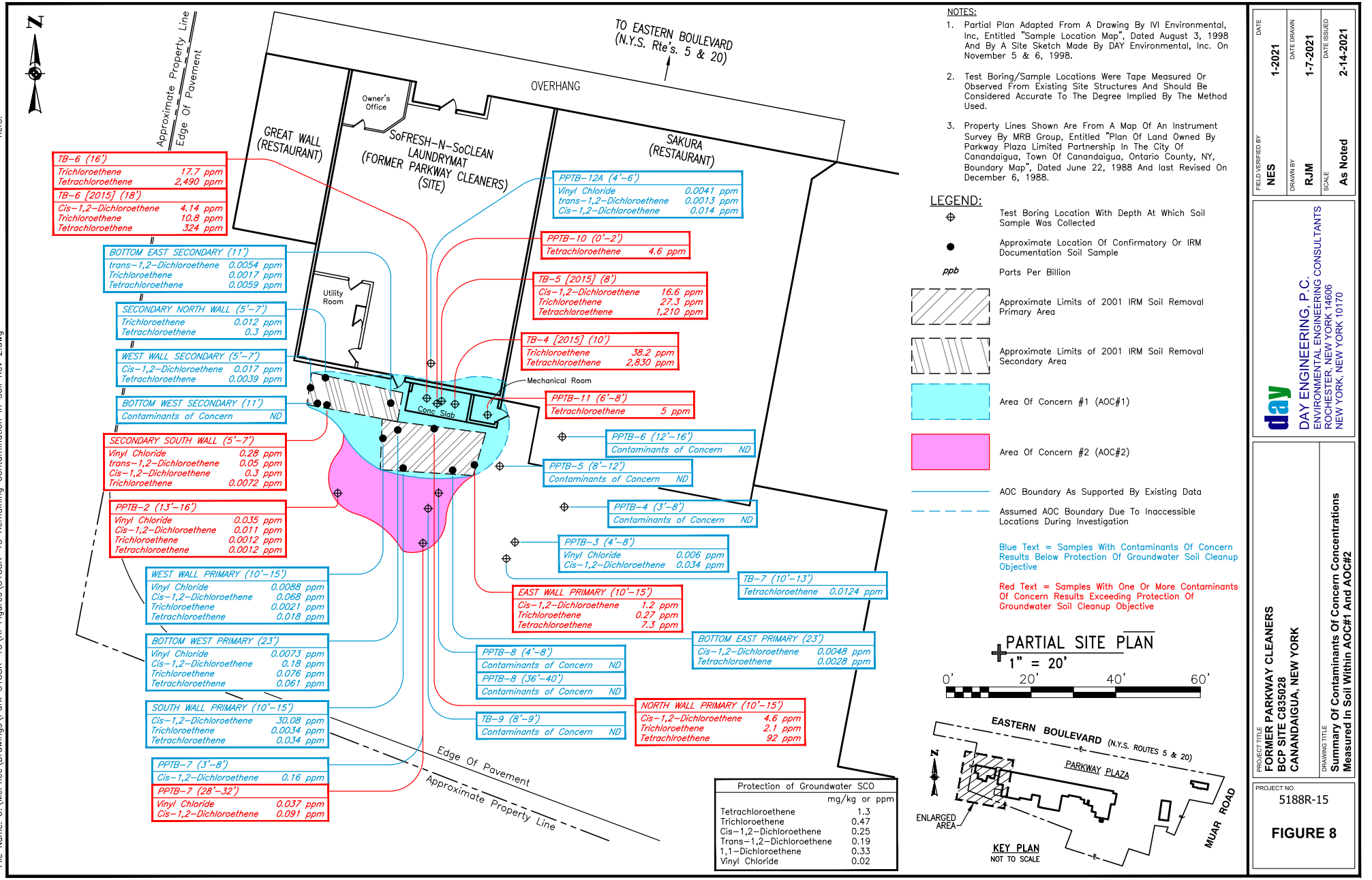
Project No.
5188R-15

FIGURE 7a

Document Path: E:\GIS Mapping\Conifer\5188R-15Park\RAWP 2021-02\5188R-04B -Groundwater 20090922.mxd

Last Date Saved: 24 Feb 2021

Date: 02-19-2021 Drawn By: CPS Scale: AS NOTED	**DAY ENGINEERING, P.C.** **Environmental Engineering Consultants** **Rochester, New York 14606** **New York, New York 10170**	Project Title: FORMER PARKWAY CLEANERS BCP SITE NO.: C835028 CANANDAIGUA, NEW YORK Drawing Title: Potentiometric Groundwater Contour Map for September 22, 2009: Typical Low Groundwater Condition	Project No. 5188R-15 FIGURE 7b



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Time Plotted: Friday, February 12, 2021 2:23:14 PM
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FIELD VERIFIED BY	NES
DATE	1-2021
DRAWN BY	RJM
DATE DRAWN	1-7-2021
SCALE	As Noted
DATE ISSUED	2-14-2021

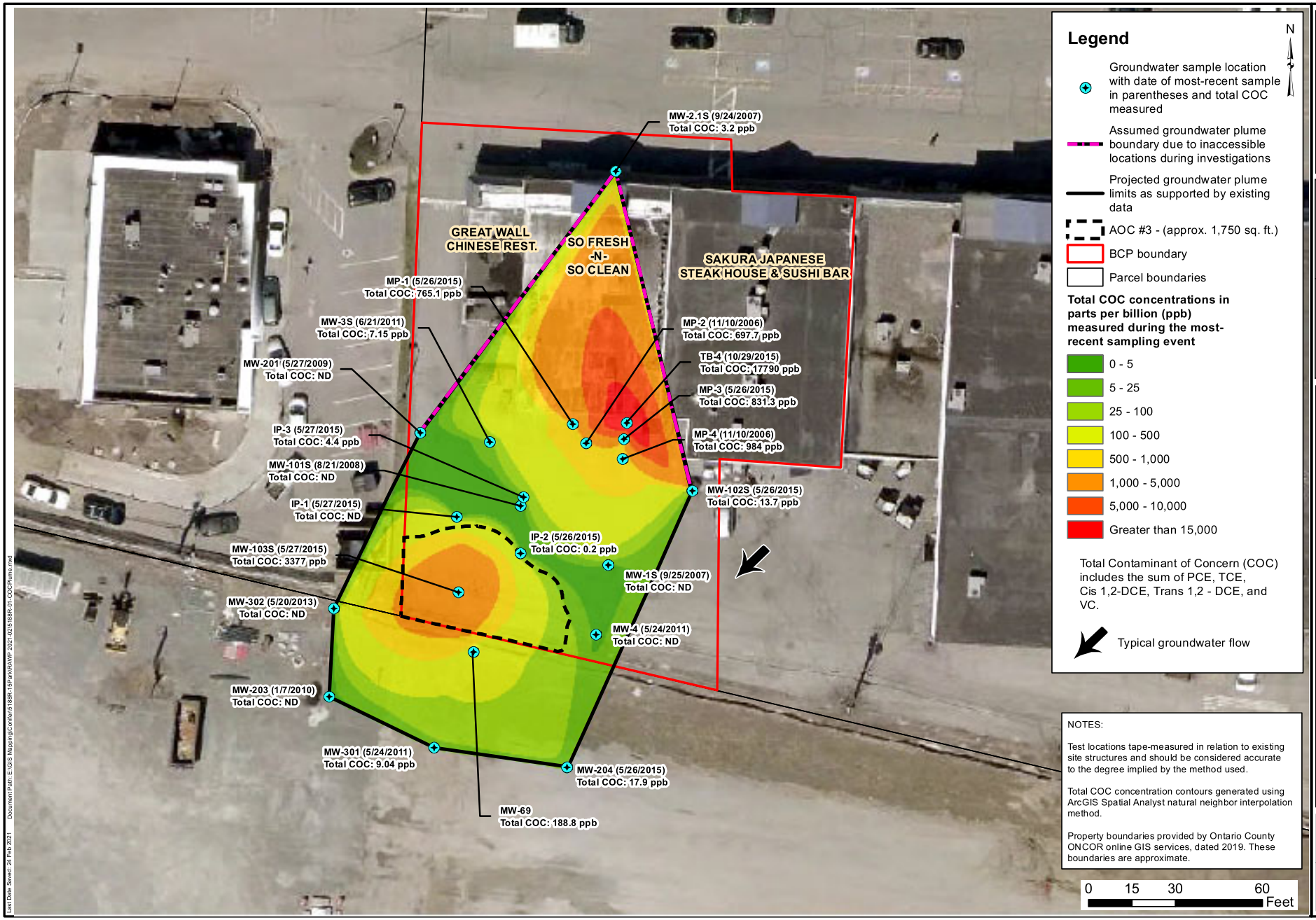
DAY ENGINEERING, P.C.
ENVIRONMENTAL ENGINEERING CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
Summary Of Contaminants Of Concern Concentrations Measured In Soil Within AOC#1 And AOC#2

PROJECT NO.
5188R-15

FIGURE 8



Last Date Saved: 24 Feb 2021 Document Path: E:\GIS Mapping\Conifer\5188R-15Pre\ARAWP 2021-02\5188R-01-COCPlume.mxd

PROJECT MANAGER	RLK
DATE	02-2021
DRAWN BY	CPS
DATE DRAWN	02-2021
SCALE	AS NOTED
DATE ISSUED	02-16-2021

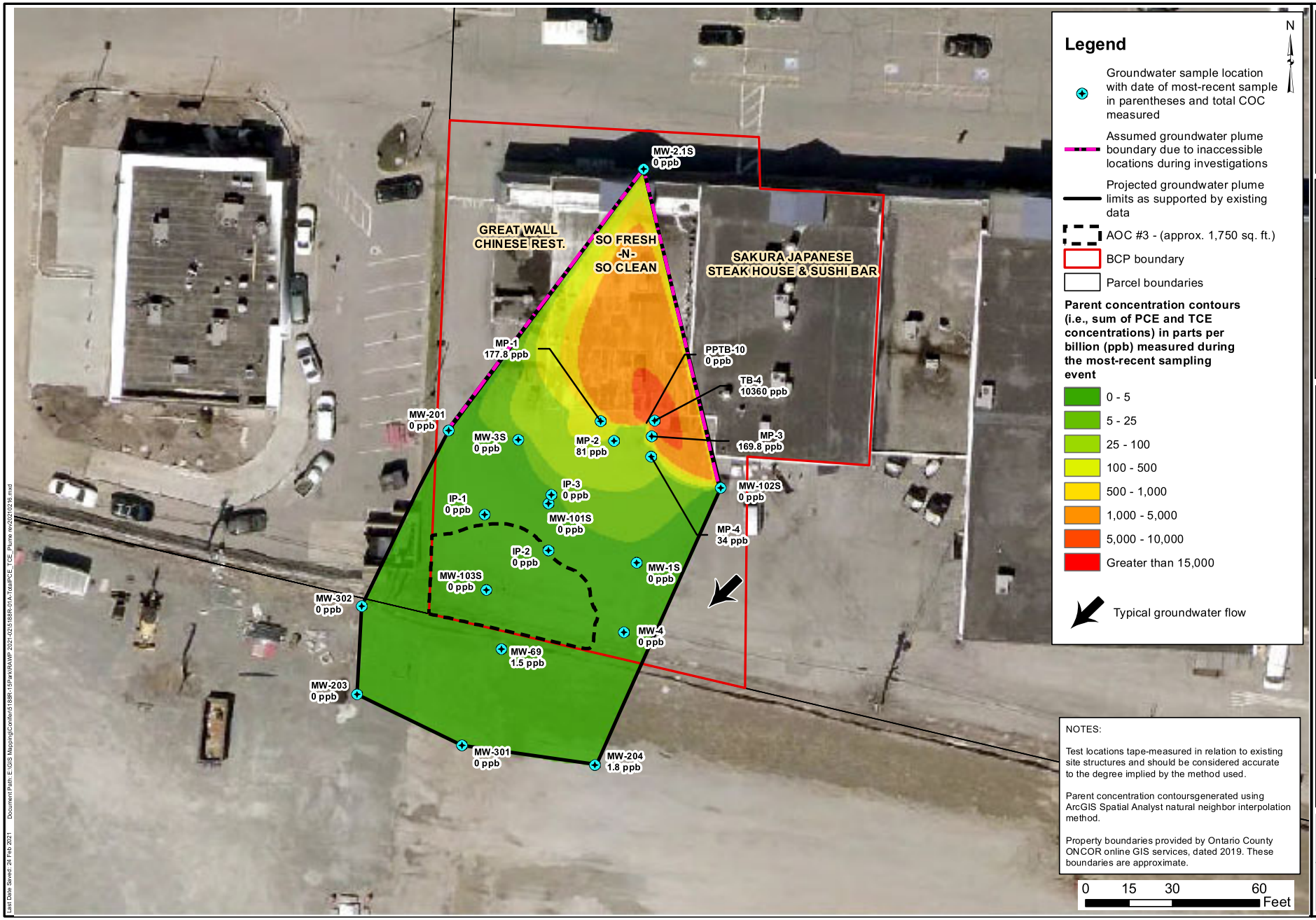
DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

Project Title: FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title: Site Plan with most-recent Total COC concentration in Groundwater

Project No. 5188R-15

FIGURE 9



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PROJECT MANAGER	RLK
DATE	02-2021
DRAWN BY	CPS
DATE DRAWN	02-2021
SCALE	AS NOTED
DATE ISSUED	02-16-2021

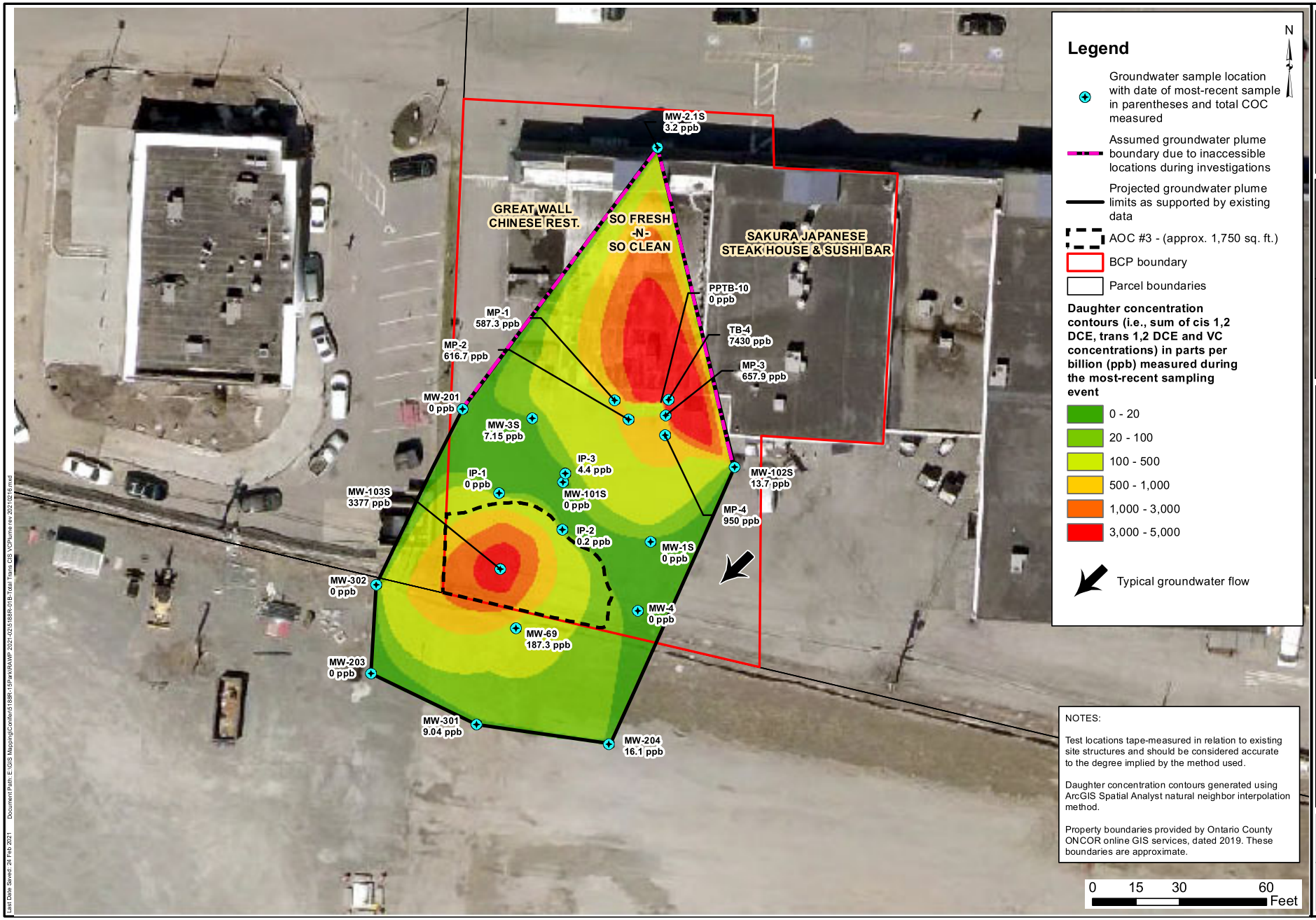
DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

Project Title: FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title: Site Plan with most-recent Parent COC concentrations (i.e., sum of PCE and TCE concentrations) in Groundwater

Project No. 5188R-15

FIGURE 9a



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PROJECT MANAGER: RLK | DATE: 02-2021
DRAWN BY: CPS | DATE DRAWN: 02-2021
SCALE: AS NOTED | DATE ISSUED: 02-16-2021

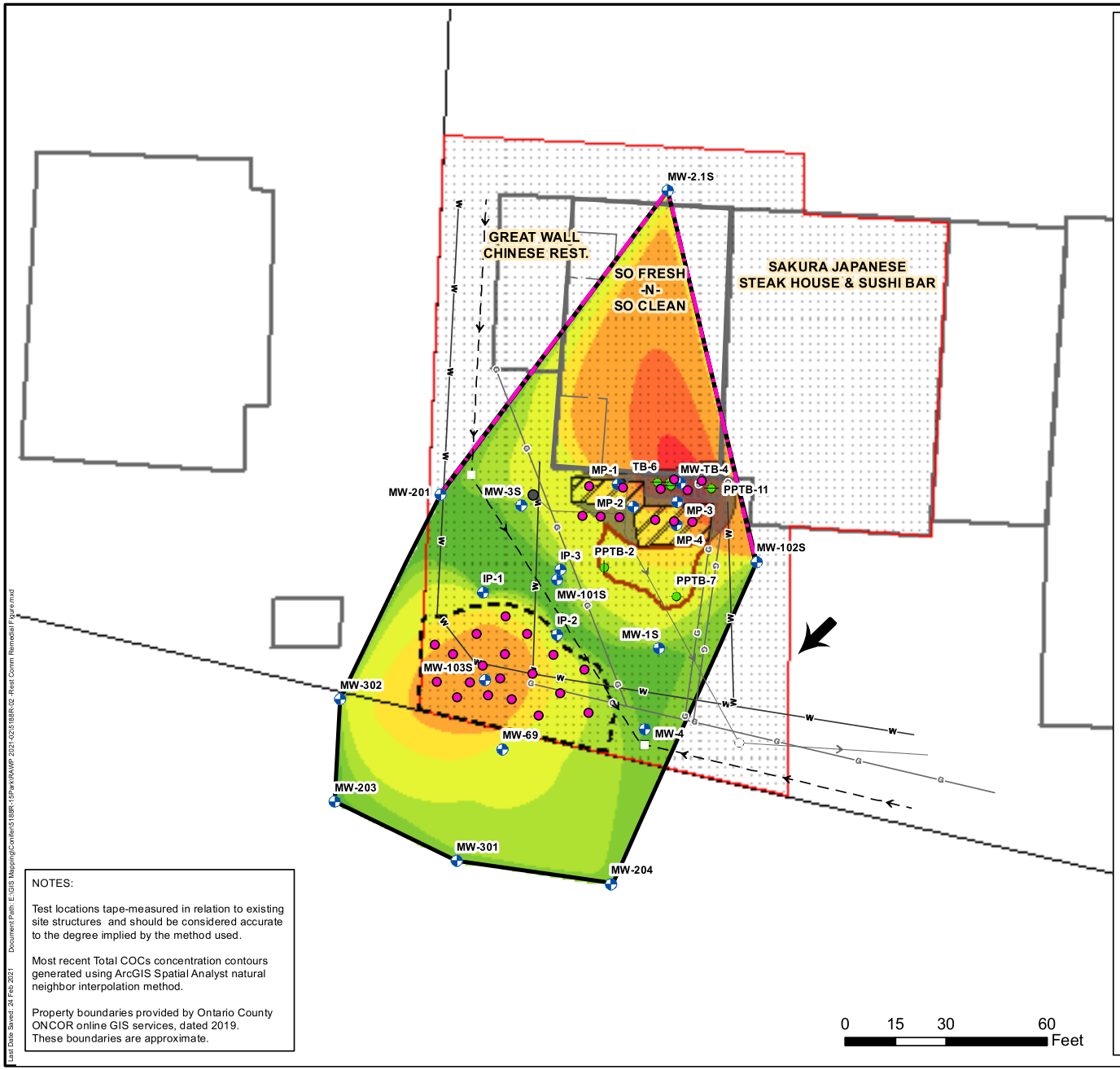
DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

Project Title: FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title: Site plan with most-recent Daughter COC concentrations (i.e., sum of Cis-1,2-DCE, Trans 1,2-DCE and VC concentrations) in Groundwater

Project No. 5188R-15

FIGURE 9b



Legend

- Proposed injection location
- Test boring
- Monitoring well
- IRM Soil removal area
- AOC #1 - Bioremediation and chemical reduction (approx. 500 sq. ft.)
- AOC #2 - Institutional and engineering controls (approx. 425 sq. ft.)
- AOC #3 - Bioremediation (approx. 1,750 sq. ft.)
- Assumed groundwater plume boundary due to inaccessible locations during investigations
- Projected groundwater plume limits as supported by existing data
- Catch Basin
- Clean Out
- Manhole
- Storm sewer
- Sanitary sewer
- Water line
- Gas line
- Building and tenant spaces
- BCP boundary
- Cover system
- Parcel boundaries

Total COC concentration contours in parts per billion (ppb) measured during most-recent sampling event (refer to Figure 6 for sample date and concentration measured)

- 0 - 5
- 5 - 25
- 25 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 5,000
- 5,000 - 10,000
- Greater than 15,000

Total Contaminant of Concern (COC) includes the sum of PCE, TCE, Cis 1,2-DCE, Trans 1,2 - DCE, and VC.

Typical groundwater flow

N

NOTES:

Test locations tape-measured in relation to existing site structures and should be considered accurate to the degree implied by the method used.

Most recent Total COCs concentration contours generated using ArcGIS Spatial Analyst natural neighbor interpolation method.

Property boundaries provided by Ontario County ONCOR online GIS services, dated 2019. These boundaries are approximate.

PROJECT MANAGER	RLK
DATE	02-2021
DRAWN BY	CPS
DATE DRAWN	02-2021
SCALE	AS NOTED
DATE ISSUED	02-16-2021

day
DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

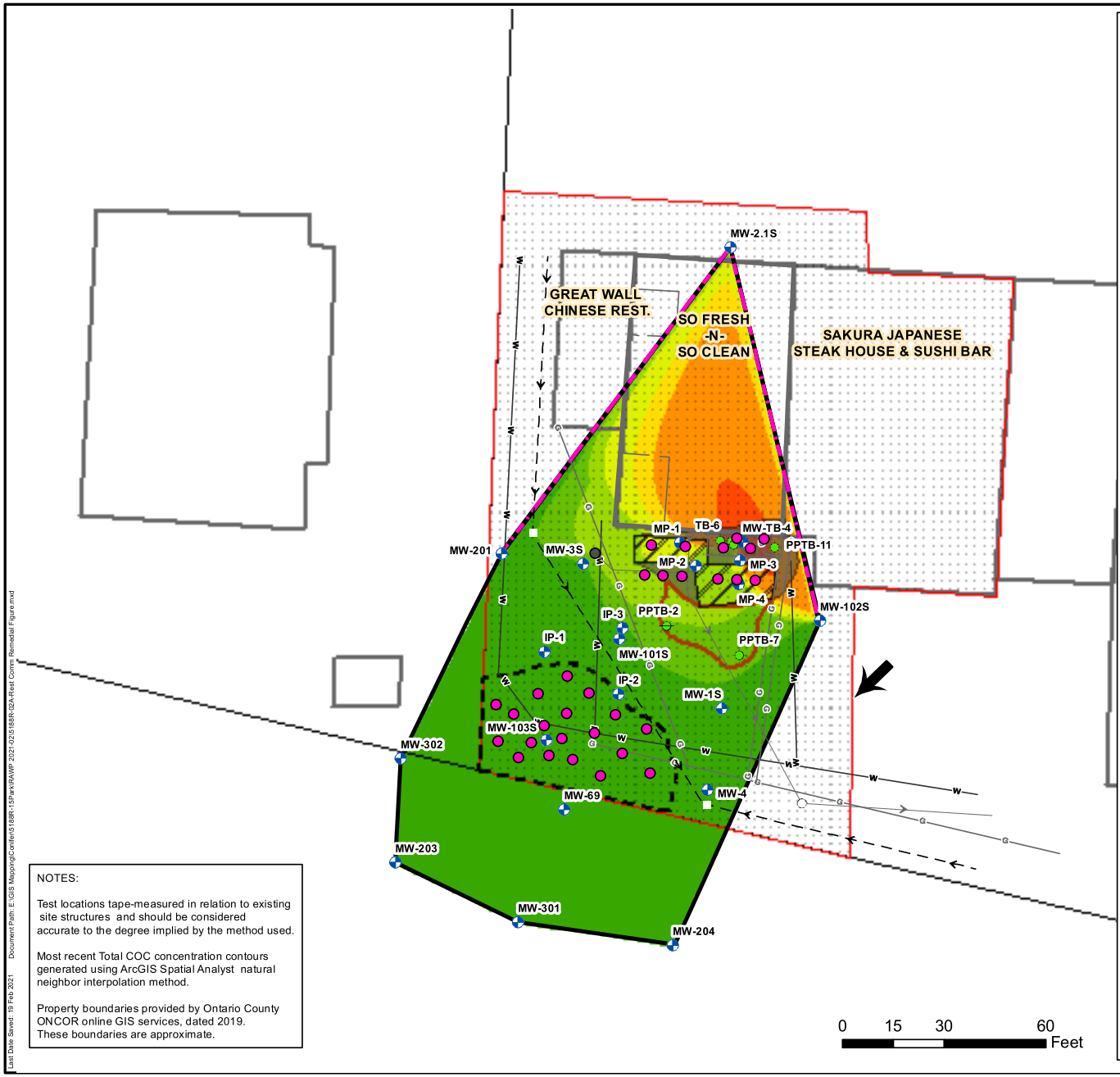
Project Title
FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title
Site Plan with Remedial Elements for Track 4 Restricted Commercial Use Alternative (Preferred Alternative)

Project No.
5188R-15

FIGURE 10

Last Date Saved: 24 Feb 2021 Document Path: E:\GIS Mapping\Conflict\5188R-15\Park\MAWP 2021-02\5188R-02 -Rest Comm Remedial Figure.mxd



Legend

- Proposed injection location
- Test boring
- Monitoring well
- IRM Soil removal area
- AOC #1 - Bioremediation and chemical reduction (approx. 500 sq. ft.)
- AOC #2 - Institutional and engineering controls (approx. 425 sq. ft.)
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- Projected groundwater plume limits as supported by existing data
- Catch Basin
- Clean Out
- Manhole
- Storm sewer
- Sanitary sewer
- Water line
- Gas line
- BCP boundary
- Cover system
- Parcel boundaries
- Building

Parent concentration contour (i.e. Sum of PCE and TCE concentrations) in parts per billion (ppb) measured during the most-recent sampling event

- 0 - 5
- 5 - 25
- 25 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 5,000
- 5,000 - 10,000
- Greater than 15,000

Typical groundwater flow

N

NOTES:

Test locations tape-measured in relation to existing site structures and should be considered accurate to the degree implied by the method used.

Most recent Total COC concentration contours generated using ArcGIS Spatial Analyst natural neighbor interpolation method.

Property boundaries provided by Ontario County ONCOR online GIS services, dated 2019. These boundaries are approximate.

PROJECT MANAGER	RLK
DATE	02-2021
DRAWN BY	CPS
DATE DRAWN	02-2021
SCALE	AS NOTED
DATE ISSUED	02-16-2021

day
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Environmental Engineering Consultants
Rochester, New York 14606
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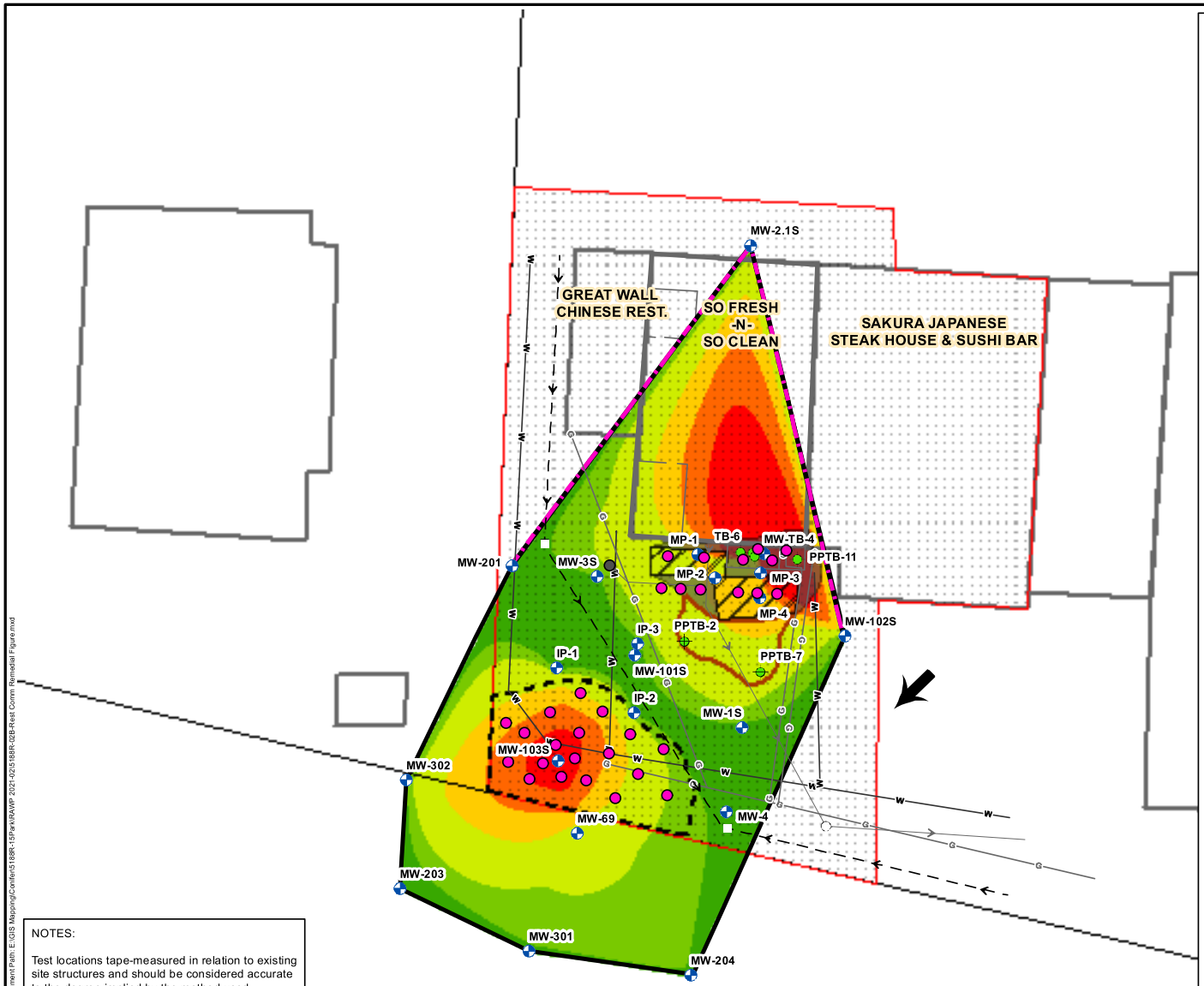
Project Title
FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title
Site Plan with Remedial Elements for Track 4 Restricted Commercial Use Alternative and Parent COC (i.e., sum of PCE and TCE concentrations) in Groundwater

Project No.
5188R-15

FIGURE 10a

Last Date Saved: 19 Feb 2021 Document Path: E:\GIS Mapping\Conifer\5188R-15\Par\MXD\WP 2021-02\5188R-02A-Rest Comm Remedial Figure.mxd



Legend

- Proposed injection location
- Test boring
- Monitoring well
- IRM Soil removal area
- AOC #1 - Bioremediation and chemical reduction (approx. 500 sq. ft.)
- AOC #2 - Institutional and engineering controls (approx. 425 sq. ft.)
- AOC #3 - Bioremediation (approx. 1,750 sq. ft.)
- Assumed groundwater plume boundary due to inaccessible locations during investigations
- Projected groundwater plume limits as supported by existing data
- Catch Basin
- Clean Out
- Manhole
- Storm sewer
- Sanitary sewer
- Water line
- Gas line
- BCP boundary
- Cover system
- Parcel boundaries
- Building

Daughter concentration contours (i.e., sum of cis 1,2 DCE, trans 1,2 DCE and VC) in part per billion (ppb) measured during the most-recent sampling event

- 0 - 20
- 20 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 3,000
- 3,000 - 5,000

Typical groundwater flow

N

NOTES:

Test locations tape-measured in relation to existing site structures and should be considered accurate to the degree implied by the method used.

Most recent daughter COC concentration contours generated using ArcGIS Spatial Analyst natural neighbor interpolation method.

Property boundaries provided by Ontario County ONCOR online GIS services, dated 2019. These boundaries are approximate.

PROJECT MANAGER	RLK
DATE	02-2021
DRAWN BY	CPS
DATE DRAWN	02-2021
SCALE	AS NOTED
DATE ISSUED	02-16-2021

day
DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

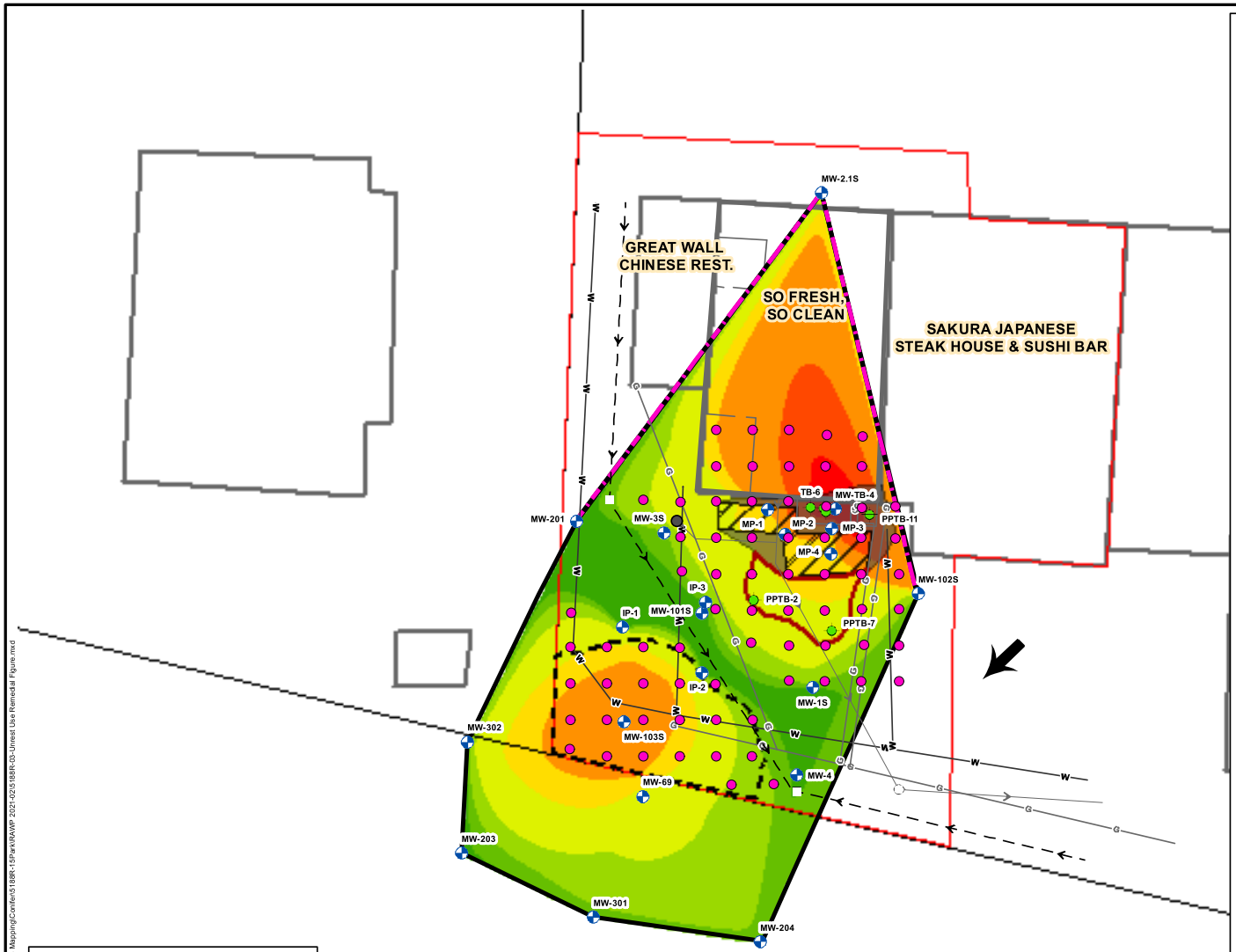
Project Title
FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title
Site Plan with Remedial Elements for Track 4 Restricted Commercial Use Alternative and Daughter COC (i.e., sum of Cis-1,2-DCE, Trans 1,2-DCE and VC concentrations) in Groundwater

Project No.
5188R-15

FIGURE 10b

Last Date Saved: 19 Feb 2021 Document Path: E:\GIS Mapping\Conifer\5188R-15Park\MXD\MP 2021-02\5188R-02B-Rest Comm Remedial Figure.mxd



Legend

- Proposed injection location
- Test boring
- Monitoring well
- IRM Soil removal area
- AOC #1 - Subsurface soil removal area (approx. 500 sq. ft.) and chemical oxidation
- AOC #2 - Subsurface soil removal area (approx. 425 sq. ft.) and chemical oxidation
- AOC #3 - chemical oxidation (approx. 1,750 sq. ft.)
- Assumed groundwater plume boundary due to inaccessible locations during investigations
- Projected groundwater plume limits as supported by existing data
- Catch Basin
- Clean Out
- Manhole
- Storm sewer
- Sanitary sewer
- Water line
- Gas line
- BCP boundary
- Parcel boundaries
- Building and tenant spaces

Total COC concentration contours in parts per billion (ppb) measured during most-recent sampling event

- 0 - 5
- 5 - 25
- 25 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 5,000
- 5,000 - 10,000
- Greater than 15,000

Total Contaminant of Concern (COC) includes the sum of PCE, TCE, Cis 1,2-DCE, Trans 1,2 - DCE, and VC.

Typical groundwater flow

NOTES:

Test locations tape-measured in relation to existing site structures and should be considered accurate to the degree implied by the method used.

Most recent total COC concentration contours using ArcGIS Spatial Analyst natural neighbor interpolation method.

Property boundaries provided by Ontario County ONCOR online GIS services, dated 2019. These boundaries are approximate.

PROJECT MANAGER	RLK
DATE	02-2021
DRAWN BY	CPS
DATE DRAWN	02-2021
SCALE	AS NOTED
DATE ISSUED	02-16-2021

DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
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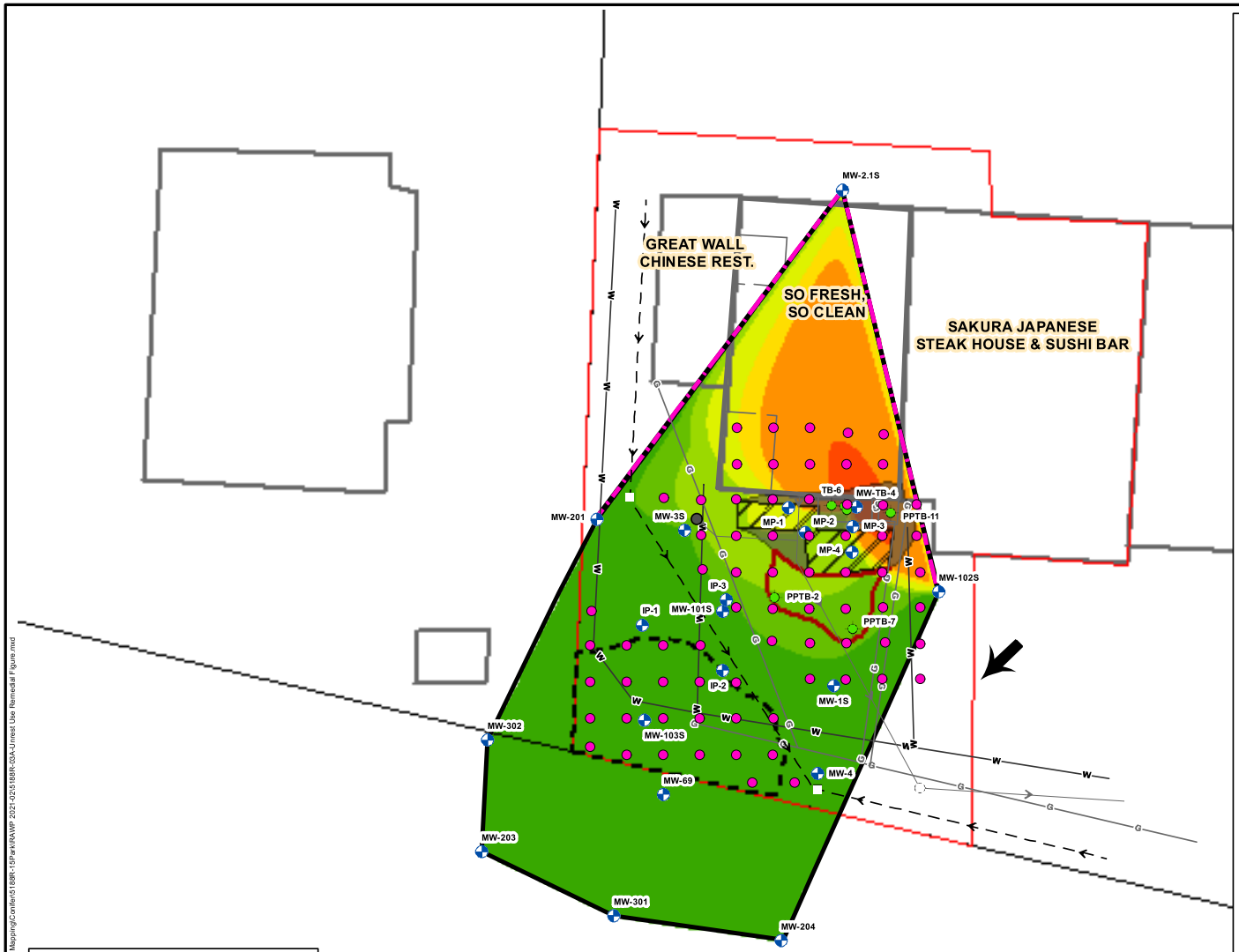
Project Title: FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title: Site Plan with Remedial Elements for Track 1 Unrestricted Use Alternative

Project No. 5188R-15

FIGURE 11

Last Date Saved: 24 Feb 2021 Document Path: E:\GIS Mapping\Conflict\5188R-15\Park\MXD\MP 2021-02\5188R-03-Unrest Use Remedial Figure.mxd



Legend

- Proposed injection location
- Test boring
- Monitoring well
- IRM Soil removal area
- AOC #1 - Subsurface soil removal area (approx. 500 sq. ft.) and chemical oxidation
- AOC #2 - Subsurface soil removal area (approx. 425 sq. ft.) and chemical oxidation
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- Catch Basin
- Clean Out
- Manhole
- Storm sewer
- Sanitary sewer
- Water line
- Gas line
- BCP boundary
- Parcel boundaries
- Building and tenant spaces

Parent COC concentration (i.e., sum of PCE and TCE concentrations) contours in parts per billion (ppb) measured during most-recent sampling event

- 0 - 5
- 5 - 25
- 25 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 5,000
- 5,000 - 10,000
- Greater than 15,000

Typical groundwater flow

N

NOTES:

Test locations tape-measured in relation to existing site structures and should be considered accurate to the degree implied by the method used.

Most recent Parent COC concentration contours using ArcGIS Spatial Analyst natural neighbor interpolation method.

Property boundaries provided by Ontario County ONCOR online GIS services, dated 2019. These boundaries are approximate.

PROJECT MANAGER	RLK
DATE	02-2021
DRAWN BY	CPS
DATE DRAWN	02-2021
SCALE	AS NOTED
DATE ISSUED	02-16-2021

day
DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

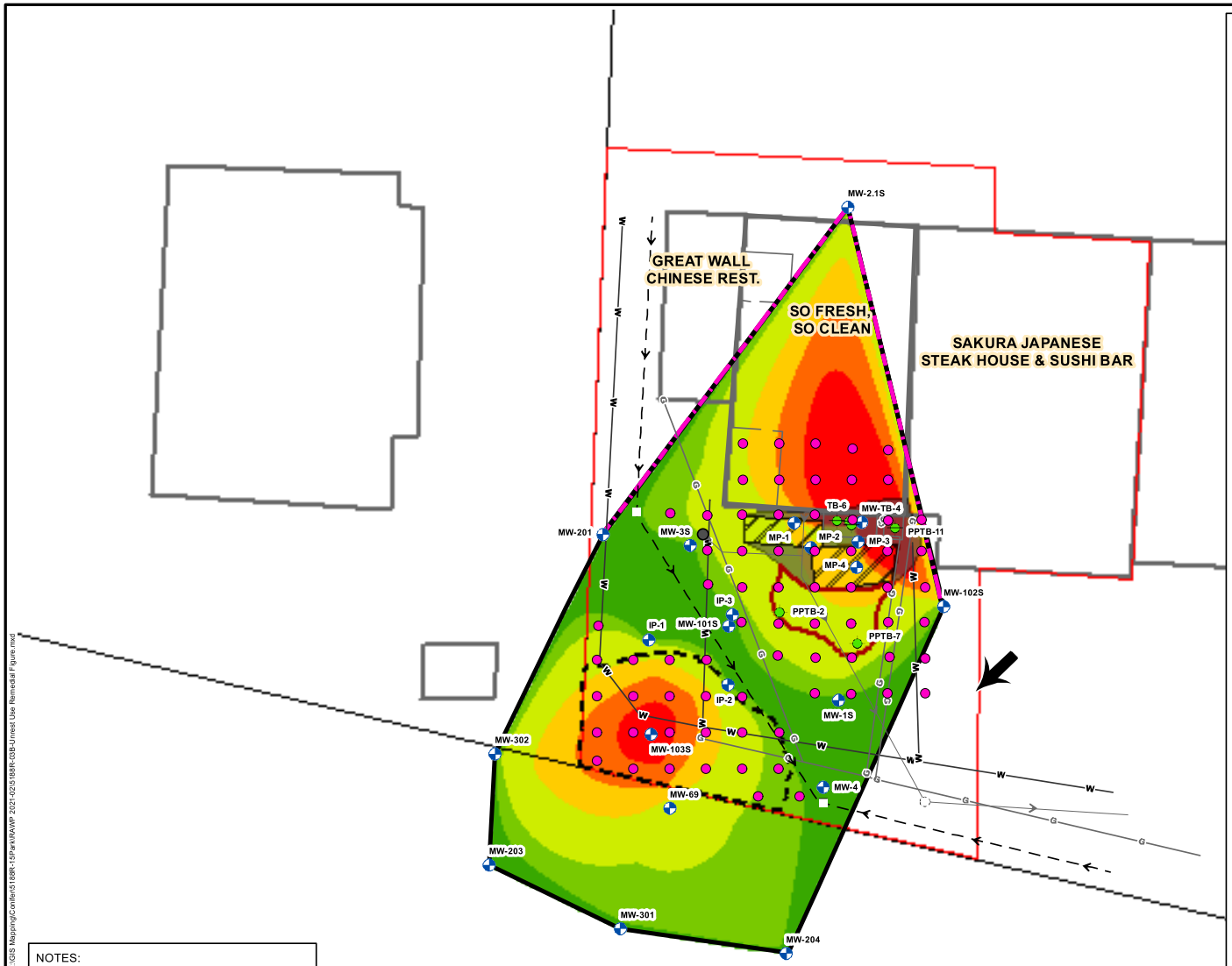
Project Title: FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title: Site Plan with Remedial Elements for Track 1 Unrestricted Use Alternative and Parent COC (i.e., sum of PCE and TCE concentrations) in Groundwater

Project No.: 5188R-15

FIGURE 11a

Last Date Saved: 25 Feb 2021 Document Path: E:\GIS Mapping\Conifer\5188R-15\ParkMWP 2021-02\5188R-03A-Unrest Use Remedial Figure.mxd



Legend

- Proposed injection location
- Test boring
- Monitoring well
- IRM Soil removal area
- AOC #1 - Subsurface soil removal area (approx. 500 sq. ft.) and chemical oxidation
- AOC #2 - Subsurface soil removal area (approx. 425 sq. ft.) and chemical oxidation
- AOC #3 - chemical oxidation (approx. 1,750 sq. ft.)
- Assumed groundwater plume boundary due to inaccessible locations during investigations
- Projected groundwater plume limits as supported by existing data
- Catch Basin
- Clean Out
- Manhole
- Storm Sewer
- Sanitary Sewer
- Water
- Gas
- BCP boundary
- Parcel boundaries
- Building and tenant spaces

Daughter concentration (i.e., sum of cis 1,2 DCE, trans 1,2 DCE and VC concentrations) contours in parts per billion (ppb) measured during most-recent sampling event

- 0 - 20
- 20 - 100
- 100 - 500
- 500 - 1,000
- 1,000 - 3,000
- 3,000 - 5,000

Typical groundwater flow

N

0 15 30 60 Feet

NOTES:

Test locations tape-measured in relation to existing site structures and should be considered accurate to the degree implied by the method used.

Most recent daughter COC concentration contours generated using ArcGIS Spatial Analyst natural neighbor interpolation method.

Property boundaries provided by Ontario County ONCOR online GIS services, dated 2019. These boundaries are approximate.

PROJECT MANAGER: RLK | DATE: 02-2021
DRAWN BY: CPS | DATE DRAWN: 02-2021
SCALE: AS NOTED | DATE ISSUED: 02-16-2021

DAY ENGINEERING, P.C.
Environmental Engineering Consultants
Rochester, New York 14606
New York, New York 10170

Project Title: FORMER PARKWAY CLEANERS
BCP SITE NO.: C835028
CANANDAIGUA, NEW YORK

Drawing Title: Site Plan with Remedial Elements for Track 1 Unrestricted Use Alternative with Daughter COC (i.e., sum of cis-1,2-DCE, Trans 1,2-DCE and VC concentrations) in Groundwater

Project No. 5188R-15

FIGURE 11b

Last Date Saved: 25 Feb 2021 Document Path: E:\GIS Mapping\Conifer\5188R-15\Par\MXD\MP 2021-02\5188R-03B-Unrest Use Remedial Figure.mxd

TABLES

TABLE 1

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

HISTORIC SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
OVERBURDEN GROUNDWATER MONITORING WELLS

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-1S								MW-2.1S							
		10/10/01	1/24/02	7/24/02	2/13/04	6/22/04	3/14/06	11/10/06	9/25/07	9/19/01	1/24/02	7/24/02	2/13/04	6/22/04	3/22/05*	11/10/06	9/24/07
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cis-1,2-DCE	5	--	2 J	--	--	2.2	--	2.3	--	--	2 J	4.6	1.5	3.8	--	1.5	--
Trans-1,2-DCE	5	--	--	5	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	--	--	--	--	**3.0**	--	--	--	--	--	--	--	--	--	**2.5**	**3.2 J**

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-3S												
		9/19/01	1/24/02	7/24/02	2/13/04	6/22/04	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/11/09	5/27/09	6/21/11
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	--	--	--	--	--	**5.6**	--	--	--	--	--	--	--
Cis-1,2-DCE	5	--	--	**8.8**	3.7	**12.0**	**590**	**13**	**610 D**	--	**103**	--	--	**2.49**
Trans-1,2-DCE	5	--	--	--	--	--	**5.2**	--	2.6	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	--	1J	**5.9**	**4.1**	**5.9**	**410**	**5.5**	**130**	--	**45.2**	--	--	**4.66**

(1) New York State Department of Environmental Conservation (NYSDEC) June 1998 Division of Water Technical Operational and Guidance Series 1.1.1 (TOGS 1.1.1) Ambient Groundwater Standards and Guidance Values

-- "Not detected" (refer to analytical laboratory reports for detection limits utilized)

D = Compound concentration was obtained from a diluted analysis.

J Indicates an estimated value

* Sample collected from a new (replacement) well

8.8 Bold - Denotes that the concentration exceeds the NYSDEC TOGS 1.1.1 groundwater standards/guidance values

PCE = Tetrachloroethene
TCE = Trichloroethene
CIS-1,2 DCE = CIS-1,2-Dischloroethene
Trans 1,2-DCE = trans-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
VC = Vinyl Chloride

TABLE 1

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

HISTORIC SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
OVERBURDEN GROUNDWATER MONITORING WELLS

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-101S									MW-102S												
		2/13/04	6/22/04	3/22/05	7/26/05	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/13/04	6/22/04	3/22/05	7/26/05	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/11/09	5/27/09	1/7/10	5/24/11	5/26/15
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	**5.4**	**9.2**	3.8	--	--	--	--	--	--	--	1.8	3.5	1.8	3.9	2.7	--	--	--	--	--	--	--	--
Cis-1,2-DCE	5	**250**	**220**	**54**	2.9	1.1	3.2	3.8 J	--	--	**10**	**12**	**30**	**52**	**44**	**74**	**130**	**68.5**	**90.2**	**14.9**	**48.4**	**42.3**	**25.2**	1.2
Trans-1,2-DCE	5	3.9	4.4	--	--	--	1.3	--	--	--	1.1	1.3	1.6	2.9	1.7	2.5	2.5 J	--	2.06	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	**27**	**31**	**11**	--	--	**3.7**	**14**	**--**	--	**10**	**4.8**	**14**	**28**	**17**	**31**	**51**	**24.3**	**35.5**	**23.4**	**34.5**	**23.7**	**20.9**	**12.5**

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-103S															
		9/20/04	12/15/04	3/22/05	7/26/05	3/14/06	11/10/06	9/25/07	5/8/08	8/22/08	2/11/09	5/27/09	1/7/10	7/23/10	5/24/11	5/20/13	5/27/15
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cis-1,2-DCE	5	**390**	**48**	**210**	**180**	**37**	**47**	**47**	**70.8**	**240**	**163**	**328**	**676**	**940**	**1,050**	**657**	**2,130 D**
Trans-1,2-DCE	5	--	--	2.9	2.0	--	1.3	--	--	3.62	--	--	--	--	--	--	**7 J D**
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	**130**	**9.8**	**61**	**66**	**19**	**37**	**32**	**101**	**177**	**138**	**255**	**349**	**425**	**646**	**413**	**1,240 D**

(1) New York State Department of Environmental Conservation (NYSDEC) June 1998 Division of Water Technical Operational and Guidance Series 1.1.1 (TOGS 1.1.1) Ambient Groundwater Standards and Guidance Values

-- "Not detected" (refer to analytical laboratory reports for detection limits utilized)

D = Compound concentration was obtained from a diluted analysis.

J Indicates an estimated value

* Sample collected from a new (replacement) well

8.8 Bold - Denotes that the concentration exceeds the NYSDEC TOGS 1.1.1 groundwater standards/guidance values

PCE = Tetrachloroethene

TCE = Trichloroethene

CIS-1,2 DCE = CIS-1,2-Dischloroethene

Trans 1,2-DCE = trans-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

VC = Vinyl Chloride

TABLE 1

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

HISTORIC SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
OVERBURDEN GROUNDWATER MONITORING WELLS

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MP-1						MP-2	MP-3										MP-4
		3/14/06	11/10/06	9/25/07	1/7/10	5/24/11	5/26/15	11/10/06	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/11/09	5/27/09	1/7/10	5/24/11	5/26/15	11/10/06
PCE	5	**19**	**8.2**	**270 D**	**40**	**122**	**100 D**	**39**	--	**25**	**14**	**--**	**--**	**--**	**--**	**--**	**40.6**	**65.8 D**	**18**
TCE	5	**22**	2.5	**110**	**33.4**	**34**	**77.8 D**	**42**	--	**51**	**44**	**--**	**--**	**32.5**	**26**	**57.7**	**69.3**	**104 D**	**16**
Cis-1,2-DCE	5	**610**	**280**	**930 D**	**179**	**91**	**560 D**	**520**	**--**	**460**	**1300 D**	**712**	**801**	**609**	**614**	**776**	**541**	**580 D**	**750**
Trans-1,2-DCE	5	--	3.6	**6.9 J**	2.18	--	**6.7 J D**	**6.7**	--	--	**5.9 J**	**--**	**--**	**--**	**--**	**--**	**--**	3.3 J D	--
1,1-DCE	5	--	--	3.2 J	--	--	--	--	--	--	3.4 J	--	--	--	--	--	--	3.6 J D	--
Vinyl Chloride	2	**120**	**75**	**23 J**	**12.9**	--	**20.6 D**	**90**	**--**	**270**	**300 D**	**--**	**291**	**42.0**	**--**	**--**	**--**	**74.6 D**	**200**

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	IP-1					IP-2		IP-3		MW-4				MW-201					MW-TB-4
		8/28/09	2/11/09	5/27/09	6/21/11	5/27/15	6/21/11	5/26/15	6/21/11	5/27/15	2/11/09	5/27/09	1/7/10	5/24/11	9/24/07	5/8/08	8/22/08	2/11/09	5/27/09	10/29/15
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**6910**
TCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**3450**
Cis-1,2-DCE	5	--	--	--	--	--	**5.78**	0.2 J	**10.2**	2.4	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**6820**
Trans-1,2-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	--	--	--	--	--	--	--	**9.73**	2	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**610**

(1) New York State Department of Environmental Conservation (NYSDEC) June 1998 Division of Water Technical Operational and Guidance Series 1.1.1 (TOGS 1.1.1) Ambient Groundwater Standards and Guidance Values

-- "Not detected" (refer to analytical laboratory reports for detection limits utilized)

D = Compound concentration was obtained from a diluted analysis.

J Indicates an estimated value

* Sample collected from a new (replacement) well

8.8 Bold - Denotes that the concentration exceeds the NYSDEC TOGS 1.1.1 groundwater standards/guidance values

PCE = Tetrachloroethene
TCE = Trichloroethene
CIS-1,2 DCE = CIS-1,2-Dischloroethene
Trans 1,2-DCE = trans-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
VC = Vinyl Chloride

TABLE 2

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

Summary of Detected Volatile Organic Compounds (VOCs) in Parts Per Million or PPM

Supplemental Soil Samples

DETECTED VOC (mg/Kg)	Protection of Ground Water SCO(1)	Unrestricted Use SCO(1)	Restricted Commerical Use SCO(1)	TB-4 (10')	TB-4 (13')	TB-5 (8')	TB-5 (10')	TB-6 (16')	TB-6 (18')
				5/28/15	5/28/15	5/28/15	5/28/15	5/28/15	5/28/15
PCE	1.3	1.3	150	**2,830 D**	**31.7 D**	**1,210 D**	**2.48 D**	**2,490 D**	**324 D**
TCE	0.47	0.47	200	**38.2 J D**	**0.498 D**	**27.3 D**	**4.1 D**	**17.7 D**	**10.8 D**
Cis-1,2-DCE	0.25	0.25	500	**--**	**1.32 D**	**16.6 J D**	**16.7 D**	**--**	**4.14 J D**
Trans-1,2-DCE	0.19	0.19	500	--	--	--	--	--	--
1,1-DCE	0.33	0.33	500	--	--	--	--	--	--
Vinyl Chloride	0.02	0.02	13	**--**	**0.361 D**	**--**	**6.27 D**	**--**	**--**

All values are in mg/kg or parts per million (ppm)

(1) Soil cleanup objectives (SCO) are as referenced in 6 NYCRR Part 375-6, Remedial Program Cleanup Objectives, dated December 14, 2006

-- "Not detected" (refer to analytical laboratory reports for detection limits utilized)

D = Compound concentration was obtained from a diluted analysis.

J Indicates an estimated value

PCE = Tetrachloroethene

TCE = Trichloroethene

CIS-1,2 DCE = CIS-1,2-Dischloroethene

Trans 1,2-DCE = trans-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

VC = Vinyl Chloride

Concentration exceeds both the Protection of GW SCO & the Unrestricted Use SCO

Concentration exceeds a Protection of Groundwater, Unrestricted Use and Restricted Commercial Use SCOs

TABLE 3

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK

Summary of Detected Volatile Organic Compounds (VOCs) in parts per billion or PPB

Soil Samples

Detected Compound	Protection of Groundwater SCO [1]	Unrestricted Use SCOs (2)	Restricted Commercial SCOs (3)	TB-1 (10'-12') 11/15/98	TB-3 (6'-8') 11/15/98	TB-7 (12'-13') 11/15/98	TB-9 (8'-9') 11/15/98	SUMP 11/15/98	PPTB-1 (4'-6') 9/5/00	PPTB-1 (12'-16') 9/5/00	PPTB-2 (13'-16') 9/5/00	PPTB-3 (4'-8') 9/5/00	PPTB-5 (8'-12') 9/5/00	PPTB-6 (4'-8') 9/6/00	PPTB-6 (12'-16') 9/6/00	PPTB-7 (28'-32') 9/6/00	PPTB-8 (4'-8') 9/6/00
Vinyl Chloride	20	20	13,000	ND	ND	ND	ND	ND	ND	ND	**35**	6	ND	ND	ND	**37**	ND
Acetone	50	50	500,000	ND	ND	ND	ND	ND	ND	10	15	ND	35	**55**	26	25	**62**
Carbon Disulfide	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichlorothene	190	190	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	250	250	500,000	ND	ND	ND	ND	ND	ND	ND	11	34	ND	ND	ND	91	ND
2-Butanone (MEK)	120	120	500,000	ND	ND	ND	ND	ND	ND	ND	12	ND	11	9.8	3.1	6	9.7
Trichloroethene	470	470	200,000	ND	ND	ND	ND	ND	**1,100**	ND	1.2	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1300	1,300	150,000	**48,837**	**7,954**	12.4	ND	ND	**7,100**	ND	1.2	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	50	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	ND	ND
1,1-Dichloroethene	330	330	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes

ND = Not detected above laboratory detection limits.

NA = Not Available or Not Listed

(1) = Protection of Groundwater soil cleanup objective (SCO) as referenced in 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives, dated December 14, 2006.

(2) = Unrestricted use soil cleanup objective (SCO) as referenced in 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives, dated December 14, 2006.

(3) = Restricted Commercial SCO as referenced in 6 NYCRR Part 375 dated December 14, 2006.

35: Concentration exceeds Unrestricted Use SCO and Protection of Groundwater SCO.

290.00 Concentration exceeds Unrestricted Use SCO, Protection of Groundwater SCO, and Commercial Use SCO

: Soil Sample Collected From a Location Not Removed as Part of the IRM.

TABLE 3

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK

Summary of Detected Volatile Organic Compounds (VOCs) in parts per billion or PPB

Soil Samples

Detected Compound	Protection of Groundwater SCO (1)	Unrestricted Use SCOs (2)	Restricted Commercial SCOs (3)	PPTB-8 (36'-40') 9/6/00	PPTB-9 (16'-18') 9/6/00	PPTB-4 (3'-8') 9/5/00	PPTB-7 (3'-8') 9/6/00	PPTB-10 (0'-2') 9/6/00	PPTB-11 (6'-8') 9/7/00	PPTB-12A (4'-6') 9/7/00	PPTB-13 (12'-14') 9/7/00	PPTB-13 (21'-22') 9/7/00	PPTB-14 (20'-24') 9/7/00	PPTB-15 (23'-24') 9/7/00	PPTB-12A (8'-10') 9/7/00	PP-SUMP 9/7/00	PPTB-14 (4'-8') 9/7/00	PPTB-15 (4'-8') 9/7/00	EAST WALL PRIMARY (10'-15') 11/27/01
Vinyl Chloride	20	20	13,000	ND	**31**	ND	ND	ND	ND	4.1	**260**	140	ND	4	ND	**10,000**	ND	20	ND
Acetone	50	50	500,000	ND	14	ND	16	ND	ND	19	ND	14	ND	53	59	ND	ND	16	ND
Carbon Disulfide	NA	NA	NA	ND	3.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichlorothene	190	190	500,000	ND	ND	ND	ND	ND	ND	1.3	ND	11	ND	ND	ND	**850**	ND	ND	ND
cis-1,2-Dichloroethene	250	250	500,000	ND	**2,000**	ND	160	ND	ND	14	**3,400**	**2,900**	**5,500**	18	2.4	**57,000**	**14,000**	37	**1,200**
2-Butanone (MEK)	120	120	500,000	ND	ND	ND	ND	ND	ND	2.6	ND	ND	ND	ND	10	ND	ND	ND	ND
Trichloroethene	470	470	200,000	ND	**1,800**	ND	ND	ND	ND	ND	**3,800**	**3,300**	**4100**	29	ND	**1,900**	**17,000**	ND	270
Tetrachloroethene	1300	1,300	150,000	ND	**11,000**	ND	ND	**4,600**	**5,000**	ND	**12,000**	**1,400**	**290,000**	1200	ND	**13,000**	**820,000**	ND	**7,300**
Methylene Chloride	50	50	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	330	330	500,000	ND	ND	ND	ND	ND	ND	ND	ND	6.8	ND	ND	ND	ND	ND	ND	ND

Notes

ND = Not detected above laboratory detection limits.

NA = Not Available or Not Listed

(1) = Protection of Groundwater soil cleanup objective (SCO) as referenced in 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives, dated December 14, 2006.

(2) = Unrestricted use soil cleanup objective (SCO) as referenced in 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives, dated December 14, 2006.

(3) = Restricted Commercial SCO as referenced in 6 NYCRR Part 375 dated December 14, 2006.

35: Concentration exceeds Unrestricted Use SCO and Protection of Groundwater SCO.

290.00 Concentration exceeds Unrestricted Use SCO, Protection of Groundwater SCO, and Commercial Use SCO

: Soil Sample Collected From a Location Not Removed as Part of the IRM.

TABLE 3

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK

Summary of Detected Volatile Organic Compounds (VOCs) in parts per billion or PPB

Soil Samples

Detected Compound	Protection of Groundwater SCO (1)	Unrestricted Use SCOs (2)	Restricted Commercial SCOs (3)	BOTTOM EAST PRIMARY (23') 11/27/01	BOTTOM WEST SECONDARY (11') 11/28/01	WEST WALL SECONDARY (5'-7') 11/28/01	SECONDARY SOUTH WALL (5'-7') 11/28/01	SECONDARY NORTH WALL (5'-7') 11/28/01	WEST WALL PRIMARY (10'-15') 12/3/01	BOTTOM EAST SECONDARY (11') 12/3/01	BOTTOM WEST PRIMARY (23') 12/3/01	NORTH WALL PRIMARY (10'-15') 12/4/01	SOUTH WALL PRIMARY (10'-15') 12/4/01
Vinyl Chloride	20	20	13,000	ND	ND	ND	**280**	ND	8.8	ND	7.3	ND	ND
Acetone	50	50	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NA	NA	NA	ND	ND	ND	ND	ND	ND	1.5	ND	ND	ND
trans-1,2-Dichlorothene	190	190	500,000	ND	ND	ND	50	ND	ND	5.4	ND	ND	ND
cis-1,2-Dichloroethene	250	250	500,000	4.8	ND	17	**300**	ND	68	ND	180	**4,600**	38
2-Butanone (MEK)	120	120	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	470	470	200,000	ND	ND	ND	7.2	12	2.1	1.7	76	**2,100**	3.4
Tetrachloroethene	1300	1,300	150,000	2.8	ND	3.9	ND	300	18	5.9	61	**92,000**	34
Methylene Chloride	50	50	500,000	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	330	330	500,000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes

ND = Not detected above laboratory detection limits.

NA = Not Available or Not Listed

(1) = Protection of Groundwater soil cleanup objective (SCO) as referenced in 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives, dated December 14, 2006.

(2) = Unrestricted use soil cleanup objective (SCO) as referenced in 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives, dated December 14, 2006.

(3) = Restricted Commercial SCO as referenced in 6 NYCRR Part 375 dated December 14, 2006.

35: Concentration exceeds Unrestricted Use SCO and Protection of Groundwater SCO.

290.00 Concentration exceeds Unrestricted Use SCO, Protection of Groundwater SCO, and Commercial Use SCO

: Soil Sample Collected From a Location Not Removed as Part of the IRM.

Table 4
Former Parkway Cleaners
NYSDEC BCP Site C835028

Fish and Wildlife Resources Impact Analysis Decision Key	If YES Go to:	If NO Go to:
1. Is the site or area of concern a discharge or spill event?	13	(2)
2. Is the site or area of concern a point source of contamination to the groundwater which will be prevented from discharging to surface water? Soil contamination is not widespread, or if widespread, is confined under buildings and paved areas.	(13)	3
3. Is the site and all adjacent property a developed area with buildings, paved surfaces and little or no vegetation?	4	9
4. Does the site contain habitat of an endangered, threatened or special concern species?	Section 3.10.1	5
5. Has the contamination gone off-site?	6	14
6. Is there any discharge or erosion of contamination to surface water or the potential for discharge or erosion of contamination?	7	14
7. Are the site contaminants PCBs, pesticides or other persistent, bioaccumulable substances?	Section 3.10.1	8
8. Does contamination exist at concentrations that could exceed ecological impact SCGs or be toxic to aquatic life if discharged to surface water?	Section 3.10.1	14
9. Does the site or any adjacent or downgradient property contain any of the following resources? i. Any endangered, threatened or special concern species or rare plants or their habitat ii. Any DEC designated significant habitats or rare NYS Ecological Communities iii. Tidal or freshwater wetlands iv. Stream, creek or river v. Pond, lake, lagoon vi. Drainage ditch or channel vii. Other surface water feature viii. Other marine or freshwater habitat ix. Forest x. Grassland or grassy field xi. Parkland or woodland xii. Shrubby area xiii. Urban wildlife habitat xiv. Other terrestrial habitat	11	10
10. Is the lack of resources due to the contamination?	3.10.1	14
11. Is the contamination a localized source which has not migrated and will not migrate from the source to impact any on-site or off-site resources?	14	12
12. Does the site have widespread surface soil contamination that is not confined under and around buildings or paved areas?	Section 3.10.1	12
13. Does the contamination at the site or area of concern have the potential to migrate to, erode into or otherwise impact any on-site or off-site habitat of endangered, threatened or special concern species or other fish and wildlife resource? (See #9 for list of potential resources. Contact DEC for information regarding endangered species.)	Section 3.10.1	(14)
14. No Fish and Wildlife Resources Impact Analysis needed.		

Table 5
Comparison of Remedial Alternatives

Former Parkway Cleaners
Canandaigua, New York
NYSDEC Site Number C835028

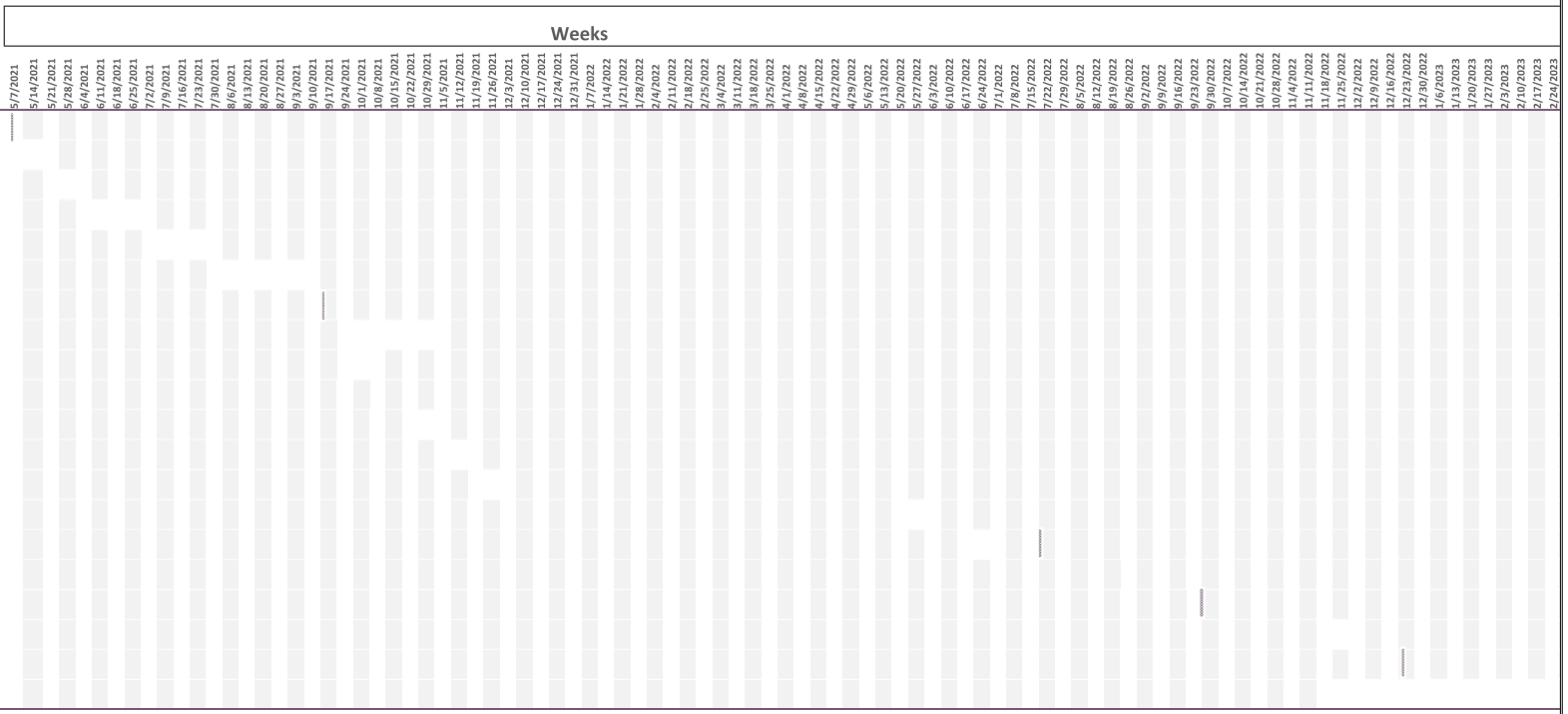
Remediation Criteria	**No Further Action Alternative**	**Track 4 Restricted Commercial Use Alternative**	**Track 1 Unrestricted Use Alternative**
Protection of Human Health and Environment	No	Yes	Yes
Compliance with SCGs	No	Soil and overburden groundwater would not meet all SCGs in all locations.	Soil and overburden groundwater would meet SCGs.
Long-Term Effectiveness and Permanence	Low	Moderate	High
Reduction of Toxicity, Mobility and Volume	Low	Moderate	High
Short-Term Impacts and Effectiveness	Impacts - Low Effectiveness - Low	Impacts -Moderate Effectiveness - Moderate	Impacts - High Effectiveness - High
Implementability	Easy	Moderate	Difficult
Green Remediation and Sustainability	Poor	Moderate	Poor
Acceptable for Planned Future Land Use	No	Yes	Yes
Total Present Worth Cost	**Total = $0.00**	**Total = $360,519.21**	**Total = $1,084,153.51**

Table 6
Former Parkway Cleaners
Parkway Plaza
Canandaigua, New York
BCP Site #C835028

Project Schedule - Remedial Action Work Plan

Plan Duration

ACTIVITY	PLAN START (Weeks)	PLAN DURATION (Days)
Submit Unsigned RAWP for Informal Review	5/7/2021	1
Agency Review	5/14/2021	7
Revise and Submit Signed RAWP for Agency Approval	5/21/2021	10
Agency Review and Approval	5/31/2021	30
Decision Document Preparation	6/30/2021	30
45 Day Public Comment Period	7/30/2021	45
NYSDEC Approval to Start Work	9/13/2021	1
Contractor Selection/Coordination	9/20/2021	42
USEPA Injection Permit	9/20/2021	14
Utility Stakeout	10/4/2021	7
Site Preparation/Site Controls	10/25/2021	14
EVO/ZVI Injection	11/8/2021	14
EVO Injection	11/15/2021	14
6-Month Effectiveness Monitoring Event	5/24/2022	7
6-Month Post Remediation Status Report	6/24/2022	1
9-Month Effectiveness Monitoring Event	8/23/2022	7
9-Month Post Remediation Status Report	9/23/2022	1
12-Month Effectiveness Monitoring Event	11/23/2022	7
12-Month Post Remediation Status Report	12/24/2022	1
CCR/FER Preparation	11/24/2022	92



APPENDIX A

SUPPLEMENTAL STUDIES TEST BORING LOGS AND MONITORING WELL INSTALLATION DIAGRAMS

DAY ENVIRONMENTAL, INC.

ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-1

Ground Elevation: - Datum: -
Date Started: 5/28/2015 Date Ended: 5/28/2015
Borehole Depth: 8.0' Borehole Diameter: 2 1/4"
Completion Method: ☐ Well Installed ☐ Backfilled with Grout ■ Backfilled with Cuttings
Water Level (Date): Not Encountered

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
0							0.0	Asphalt (~2")	Near MW-103S
1							0.0	Light brown, SILT, little fine Sand, some fine Gravel, moist	
2	NA	S-1	0-5	50	-	0.0	0.0		
3							0.0		
4							0.0		
5							0.0		
6	NA	S-2	5-8	70	-	0.0	0.0	...some medium Gravel	
7							0.0		
8								Dark brown, PEAT, some Organics, trace fine Gravel, moist	
9								Bottom of Test Boring @ 8.0'	
10									
11									
12									
13									
14									
15									
16									

Notes:
1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to an isobutylene standard measured in the headspace above the sample using a MiniRae 2000 or PPB RAEequipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-1

1563 LYELL AVENUE
ROCHESTER, NEW YORK 14606
(585) 454-0210
FAX (585) 454-0825

www.dayenvironmental.com

420 LEXINGTON AVENUE, SUITE 300
NEW YORK, NEW YORK 10170
(212) 986-8645
FAX (212) 986-8657

DAY ENVIRONMENTAL, INC.

ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-2

Ground Elevation: -
Datum: -
Date Started: 5/28/2015
Date Ended: 5/28/2015
Borehole Depth: 10.0'
Borehole Diameter: 2 1/4"
Completion Method: ☐ Well Installed ☐ Backfilled with Grout ■ Backfilled with Cuttings
Water Level (Date): ~ 9.0'

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
0							0.0	Asphalt (~ 3")	Near IP-3
1							0.0	Light brown, SILT and fine Gravel, trace fine Sand, moist	
2	NA	S-1	0-5	50	-	0.0	0.0		
3							0.0		
4							0.0	...SILT, some fine Gravel	
5								SILT, some fine Sand, moist	
6							0.0		
7	NA	S-2	5-10	60	-	0.4	0.0		
8							0.0		
9							0.0	Dark brown, PEAT, some Organics, moist	
10							0.3		
11							0.2	Greenish-gray, fine SAND, trace Silt, wet	
12							0.4		
13								Bottom of Test Boring @ 10.0'	
14									
15									
16									

Notes:
1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to an isobutylene standard measured in the headspace above the sample using a MiniRae 2000 or PPB RAEequipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-2

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DAY ENVIRONMENTAL, INC.

ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-3

Ground Elevation: -
Datum: -
Date Started: 5/28/2015
Date Ended: 5/28/2015
Borehole Depth: 14.0'
Borehole Diameter: 2 1/4"
Completion Method: ☐ Well Installed ■ Backfilled with Grout ■ Backfilled with Cuttings
Water Level (Date): ~ 10.0'

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
0							0.0	Asphalt	Near MP-3
1							0.0	Brown, fine Sandy SILT, some coarse Gravel, moist	
							0.0		
2							0.0		
	NA	S-1	0-5	60	-	14.5	0.0		
3							0.0		
							0.0		
4							3.3	Brown, SILT, trace fine Sand, moist	
							4.5		
5							3.9		
							10.9		
6							23.8		
							3.3	...some Clay	
7							0.0		
	NA	S-2	5-10	60	-	29.4	0.0		
8							0.0		
							0.0		
9							0.0		
							0.0	Dark brown, PEAT, some fine Gravel, moist	
10							0.0		
							0.0	Brown, SILT, trace Clay, wet	
11							0.0		
							0.0		
12	NA	S-3	10-14	100	-	0.0	0.0		
							0.0		
13							0.0		
							0.0		
14							0.0		
								Bottom of Test Boring @ 14.0'	
15									
16									

Notes:
1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to an isobutylene standard measured in the headspace above the sample using a MiniRae 2000 or PPB RAEequipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-3

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DAY ENVIRONMENTAL, INC.

ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #:	2105R-99
Project Address:	Former Parkway Cleaners
	Canandaigua, NY
DAY Representative:	W. Batiste, S. Shoemaker
Drilling Contractor:	TREC Environmental, Inc.
Sampling Method:	Direct Push

Test Boring TB-4

Ground Elevation: - Datum: -

Date Started: 5/28/2015 Date Ended: 5/28/2015

Borehole Depth: 20.0' Borehole Diameter: 8"

Completion Method: ■ Well Installed ☐ Backfilled with Grout ☐ Backfilled with Cuttings

Water Level (Date): Not Encountered

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
1								Concrete Slab (.3' thick)	
2	NA	S-1	0-5	45	-	78.0		Brown, SILT, some fine Sand, little fine Gravel, moist	
3									
4									
5									
6	NA	S-2	5-10	40	-	3600		...Silty fine SAND, trace Clay	
7									
8									
9									
10								...wet, strong chemical odor (perchloroethene)	**Analytical Laboratory Sample TB-4 (10')**
11									
12	NA	S-3	10-15	75	-	>9999		Brown, Silty CLAY, little Shells, wet	
13									**Analytical Laboratory Sample TB-4 (13')**
14									
15									
16									

Notes:
1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to an isobutylene standard measured in the headspace above the sample using a MiniRae 2000 or PPB RAEequipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-4

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ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-4

Ground Elevation: - Datum: -
Date Started: 5/28/2015 Date Ended: 5/28/2015
Borehole Depth: 20.0' Borehole Diameter: 8"
Completion Method: ■ Well Installed ☐ Backfilled with Grout ☐ Backfilled with Cuttings
Water Level (Date): Not Encountered

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
17								Brown, Silty CLAY, wet	
18	NA	S-4	15-20	60	-	15.6			
19									
20								Bottom of Test Boring @ 20.0'	
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									

Notes: 1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to a benzene standard measured in the headspace above the sample using a MiniRae 2000 equipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-4

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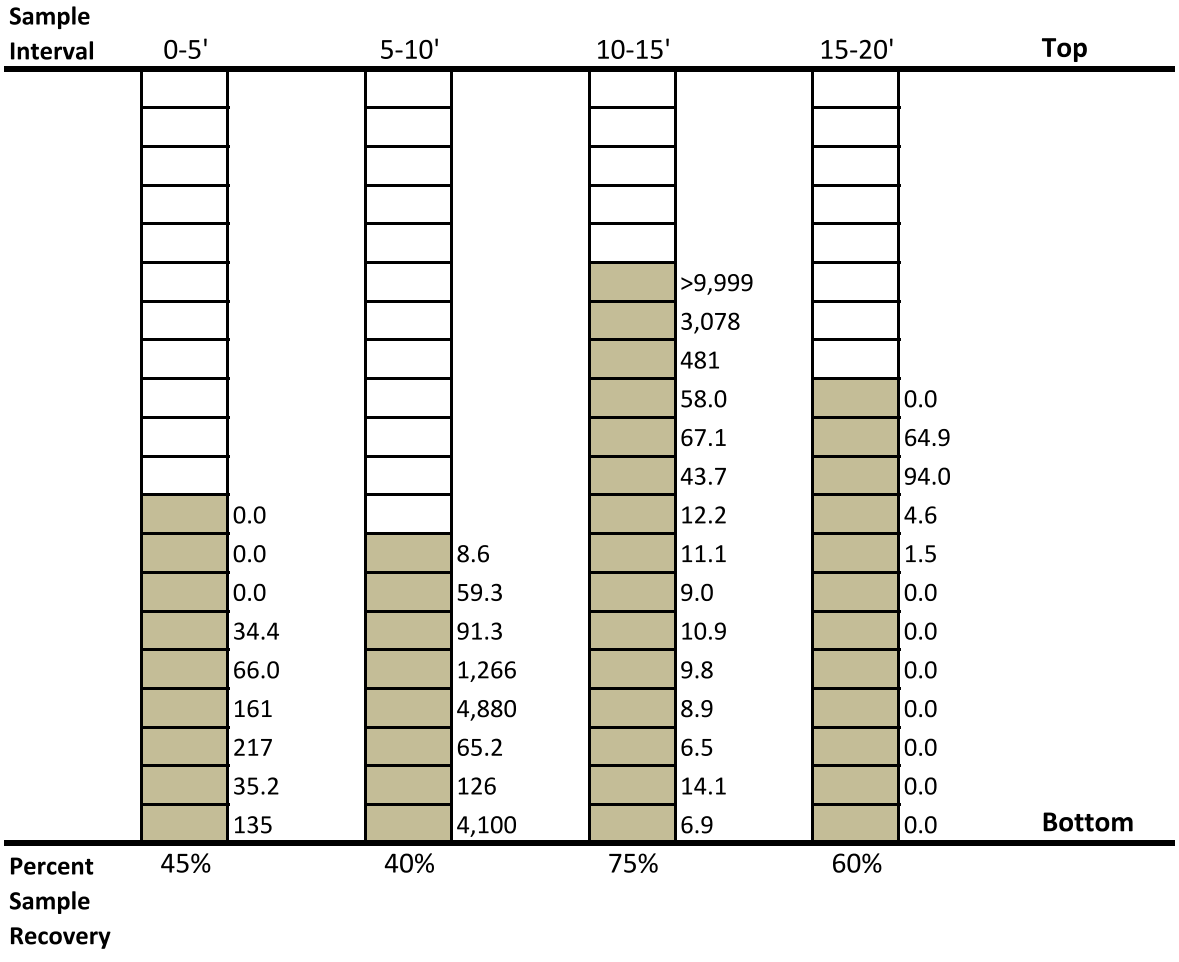
Former Parkway Cleaners
Parkway Plaza
Canandaigua, New York
VCP Site No. V00238-8

Peak PID Readings (ppm) Measured
Each 0.25 Foot Interval Within Macro Core Liner
Test Boring TB-4



8.6 = Peak PID reading measured in sample interval

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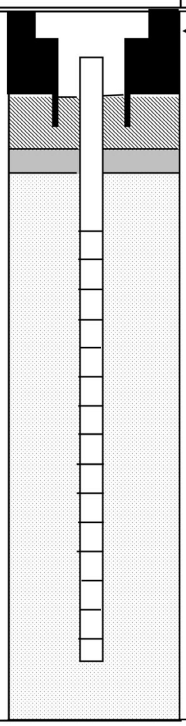
MONITORING WELL CONSTRUCTION DIAGRAM

Project #:	2105R-99				**MONITORING WELL TB-4**
Project Address:	Former Parkway Cleaners				
	Canandaigua, NY	Ground Elevation:	-	Datum:	-
DAY Representative:	WDB, SMS	Date Started:	5/28/2015	Date Ended:	5/28/2015
Drilling Contractor:	TREC				
Sampling Method:	Direct Push	Water Level (Date):	Not encountered		

Refer to Test Boring Log TB-4 for Soil Description



←Flush Mounted Roadbox

_____Depth to Top of Riser Pipe (ft)

1.0 Depth to Bottom of Cement Surface Patch (ft)

Backfill Type Bentonite

1.0 Depth to Top of Bentonite Seal (ft)

5.0 Depth to Bottom of Bentonite Seal (ft)

7.5 Depth to Top of Well Screen (ft)

8.0 Diameter of Borehole (in)

Backfill Type Sand

2.0 Inside Diameter of Well (in)

Type of Pipe PVC

Screen slot size 10 Slot

17.5 Depth to Bottom of Well Screen (ft)

18.0 Depth to Bottom of Borehole (ft)

Notes: 1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.

2) NA = Not Available or Not Applicable

MONITORING WELL TB-4

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DAY ENVIRONMENTAL, INC.

ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-5

Ground Elevation: -
Datum: -
Date Started: 5/28/2015
Date Ended: 5/28/2015
Borehole Depth: 20.0'
Borehole Diameter: 2 1/4"
Completion Method: ☐ Well Installed ☐ Backfilled with Grout ■ Backfilled with Cuttings
Water Level (Date): Not Encountered

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
1								Concrete Slab (~ 3")	
2	NA	S-1	0-5	60	-	41.6		Brown, SILT, some fine Sand, trace Clay, moist	
3									
4									
5								Brown, Clayey SILT, fine Sand lense, moist, chemical odor (perchloroethene)	
6									
7	NA	S-2	5-10	40	-	257			
8									**Analytical Laboratory Samplt TB-5 (8')**
9								Dark brown, PEAT, some Organics, moist	
10								Dark brown, Silty CLAY, moist Greenish-Gray, fine SAND, wet	**Analytical Laboratory Sample TB-5 (10')**
11								Brown, fine Sandy SILT, trace Shells, wet	
12	NA	S-3	10-15	70	-	306		...some shells	
13								Brown, Silty CLAY, wet	
14									
15									
16									

Notes:
1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to an isobutylene standard measured in the headspace above the sample using a MiniRae 2000 or PPB RAEequipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-5

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ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-5

Ground Elevation: - Datum: -
Date Started: 5/28/2015 Date Ended: 5/28/2015
Borehole Depth: 20.0' Borehole Diameter: 8"
Completion Method: ☐ Well Installed ☐ Backfilled with Grout ■ Backfilled with Cuttings
Water Level (Date): Not Encountered

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
17								Brown, Silty CLAY, wet	
18	NA	S-4	15-20	20	-	0.0			
19									
20								Bottom of Test Boring @ 20.0'	
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									

Notes: 1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to a benzene standard measured in the headspace above the sample using a MiniRae 2000 equipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-5

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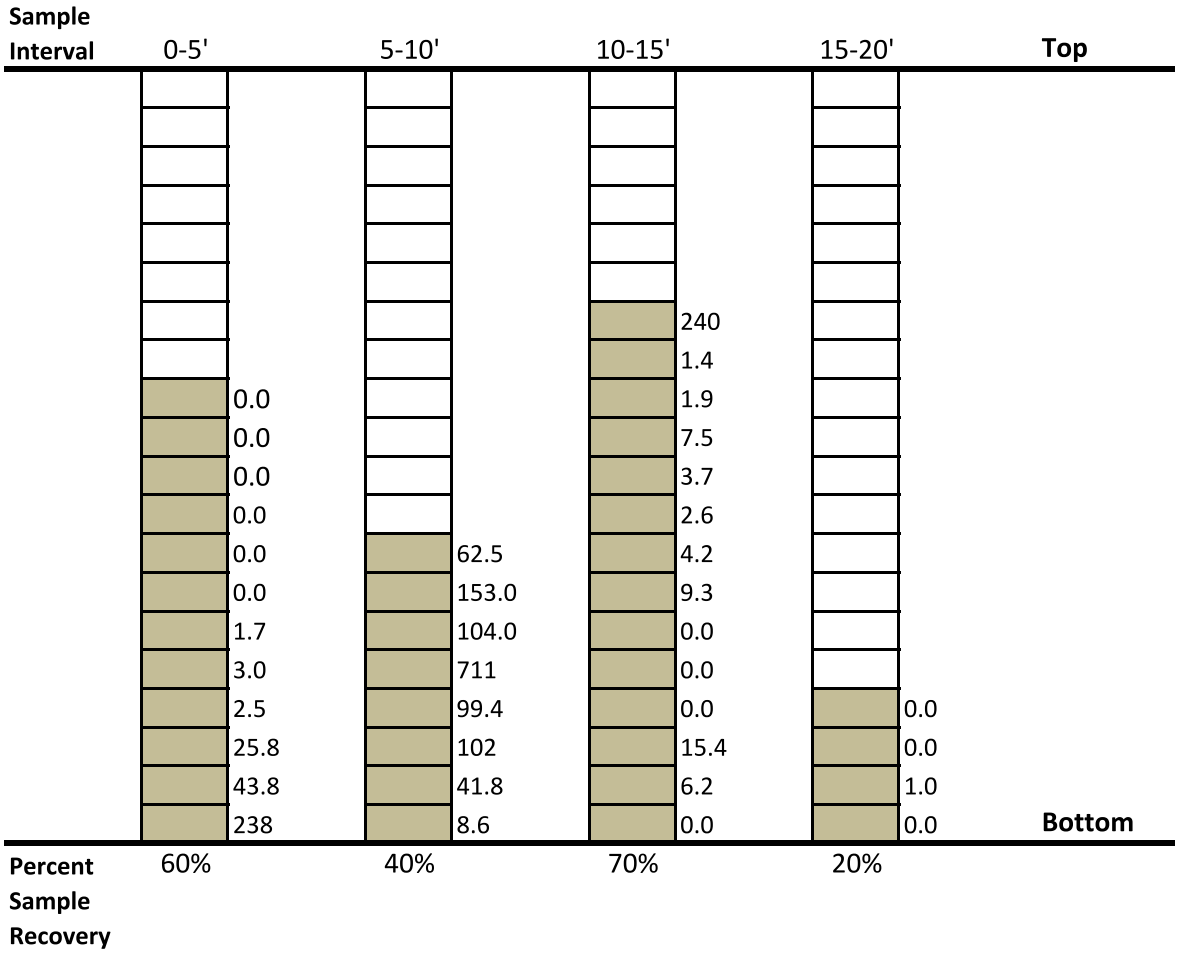
Former Parkway Cleaners
Parkway Plaza
Canandaigua, New York
VCP Site No. V00238-8

Peak PID Readings (ppm) Measured
Each 0.25 Foot Interval Within Macro Core Liner
Test Boring TB-5



= No Recovery = Sample Recovered

8.6 = Peak PID reading measured in sample interval

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-6

Ground Elevation: -
Datum: -
Date Started: 5/28/2015
Date Ended: 5/28/2015
Borehole Depth: 20.0'
Borehole Diameter: 2 1/4"
Completion Method: ☐ Well Installed ■ Backfilled with Grout ■ Backfilled with Cuttings
Water Level (Date): Not Encountered

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
1								Concrete Slab (~ 3")	
2	NA	S-1	0-5	40	-	18.7		Brown, SILT, some fine Sand, tract Clay, moist	
3									
4									
5									
6									
7	NA	S-2	5-10	60	-	156		Dark brown, PEAT, some Organics, moist, chemical odor (perchloroethene)	
8									
9								...some Sand	
10									
11								Light tan, fine SAND, little Silt, wet	
12	NA	S-3	10-15	80	-	12.3		Brown, Silty fine SAND, wet	
13									
14									
15								Brown, Clayey SILT, wet	
16									**Analytical Laboratory Sample TB-6 (16')**

Notes:
1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to an isobutylene standard measured in the headspace above the sample using a MiniRae 2000 or PPB RAEequipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-6

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ENVIRONMENTAL CONSULTANTS

AN AFFILIATE OF DAY ENGINEERING, P.C.

Project #: 2105R-99
Project Address: Former Parkway Cleaners
Canandaigua, NY
DAY Representative: W. Batiste, S. Shoemaker
Drilling Contractor: TREC Environmental, Inc.
Sampling Method: Direct Push

Test Boring TB-6

Ground Elevation: -
Datum: -
Date Started: 5/28/2015
Date Ended: 5/28/2015
Borehole Depth: 20.0'
Borehole Diameter: 2 1/4"
Completion Method: ☐ Well Installed ■ Backfilled with Grout ■ Backfilled with Cuttings
Water Level (Date): Not Encountered

Depth (ft)	Blows per 0.5 ft.	Sample Number	Sample Depth (ft)	% Recovery	N-Value or RQD%	Headspace PID (ppm)	PID Reading (ppm)	Sample Description	Notes
17								Brown, Clayey SILT, wet	
18	NA	S-4	15-20	60	-	987			**Analytical Laboratory Sample TB-6 (18')**
19								Brown, Silty CLAY, wet	
20								Bottom of Test Boring @ 20.0'	
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									

Notes:
1) Water levels were made at the times and under conditions stated. Fluctuations of groundwater levels may occur due to seasonal factors and other conditions.
2) Stratification lines represent approximate boundaries. Transitions may be gradual.
3) PID readings are referenced to a benzene standard measured in the headspace above the sample using a MiniRae 2000 equipped with a 10.6 eV lamp.
4) NA = Not Available or Not Applicable
5) Headspace PID readings may be influenced by moisture

Test Boring TB-6

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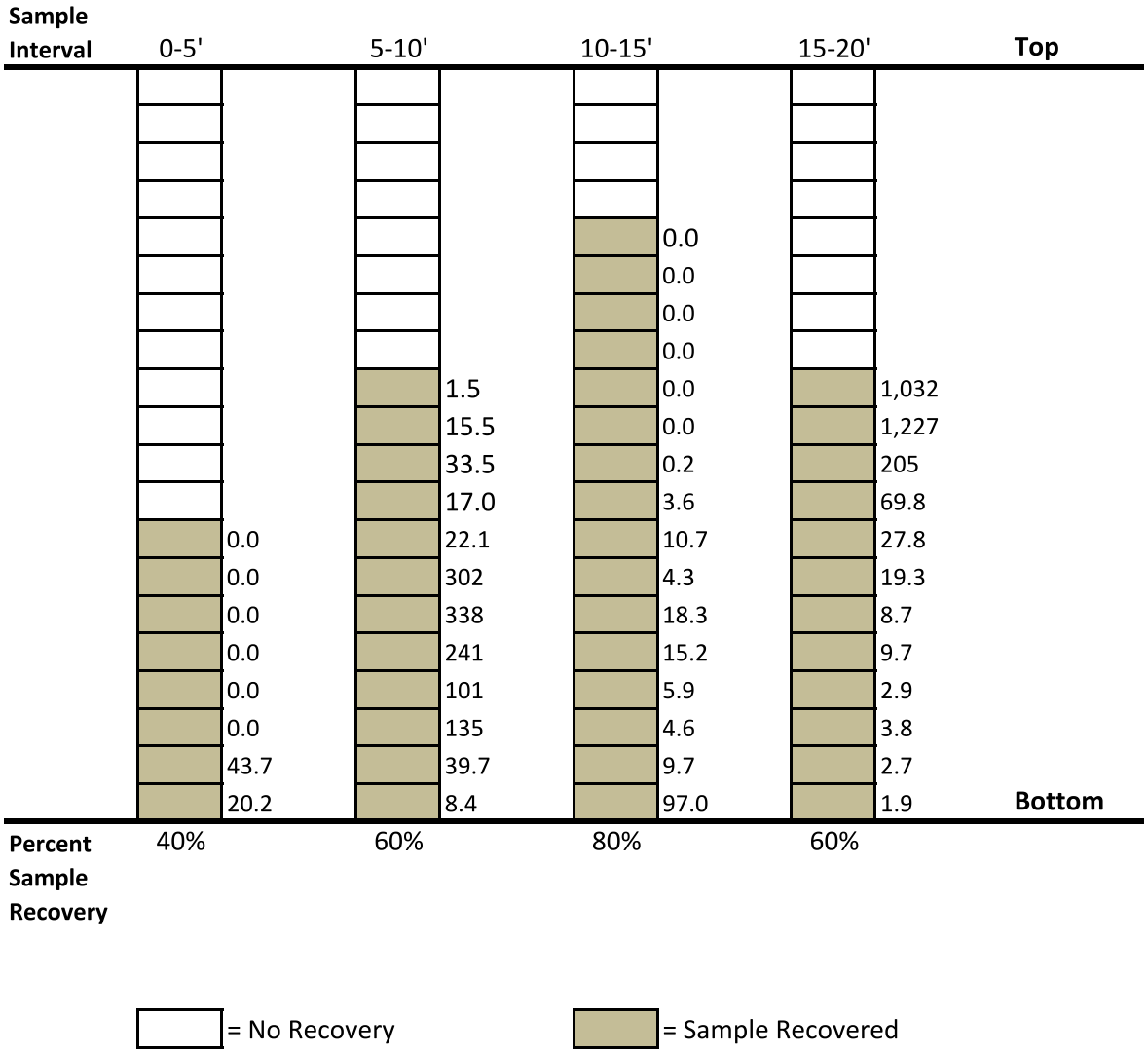
Former Parkway Cleaners
Parkway Plaza
Canandaigua, New York
VCP Site No. V00238-8

Peak PID Readings (ppm) Measured
Each 0.25 Foot Interval Within Macro Core Liner
Test Boring TB-6



= No Recovery = Sample Recovered

8.6 = Peak PID reading measured in sample interval

APPENDIX B

HEALTH AND SAFETY PLAN AND COMMUNITY AIR MONITORING PLAN

HEALTH AND SAFETY PLAN

FORMER PARKWAY CLEANERS
EASTERN BOULEVARD
PARKWAY PLAZA
CITY OF CANANDAIGUA, ONTARIO COUNTY, NEW YORK
NYSDEC SITE NUMBER: C835028

Prepared For:	Parkway Plaza Limited Partnership 46 Prince Street Rochester, New York 14607
Prepared By:	Day Environmental, Inc. 1563 Lyell Avenue Rochester, New York 14606
Project No.:	5188R-19
Date:	September 2013 (Revised February 2019)

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Figures

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Attachments

1.0 INTRODUCTION

This Health and Safety Plan (HASP) outlines the policies and procedures necessary to protect workers and the public from potential environmental hazards posed during site evaluation and remediation activities conducted at the Site under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP). As outlined in this HASP, the above activities shall be conducted in a manner to minimize the probability of injury, accident, or incident occurrence.

Although the HASP focuses on the specific work activities planned for this Site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations can arise that require deviations from the original HASP.

The subject property (Site) consists of three tenant spaces (47 Eastern Boulevard, 51 Eastern Boulevard and 57 Eastern Boulevard) and associated parking areas within the Parkway Plaza (an approximate 0.5-acre portion of an approximately 12.78-acre commercial property located on the south side of Routes 5 & 20 (39 Eastern Boulevard), City of Canandaigua, Ontario County, New York. A project locus map is included as Figure 1.

The property addressed 47 Eastern Boulevard is currently operated as The Great Wall Restaurant. The property addressed 51 Eastern Boulevard is currently vacant and most recently contained a coin-operated laundromat (i.e., Parkway Laundry) and in the past (i.e., between about 1963 and 1991) dry-cleaning operations were performed at this location (i.e., the former Parkway Cleaners), and also the location in which the majority, if not all, the remedial activities will be completed. The property addressed 57 Eastern Boulevard is currently operated by Sakura Japanese Steak House and Sushi Bar. The Site is bound to the north, east and west by Parkway Plaza and to the south by currently vacant land that was a mobile home park until 2008 when the trailers were removed and redeveloped as a multi-tenant residential/commercial property. A Site Plan is included as Figure 2.

1.1 Site History and Previous Studies

Parkway Plaza was originally constructed in approximately 1957, and prior to construction of Parkway Plaza (including the Site), the property consisted of vacant undeveloped land. The former Parkway Cleaners began operations sometime between 1968 and 1978, and perchloroethene (a/k/a tetrachloroethene, or PCE) was used as a dry-cleaning solvent at this location until approximately 1991. The PCE used at the Site was stored in an approximate 100-gallon aboveground storage tank (AST), which was mounted on the roof of the former Parkway Cleaners building. [Note: This AST was removed as part of the soil removal IRM conducted in 2001.]

Based upon an interview conducted in May 2000 with a past manager of the former Parkway Cleaners, the following items were identified with respect to operations conducted at this facility.

- Bulk dry cleaning was performed at the Site and there were three dry cleaning machines that were located in the southern end of the building. The backs of the machines were located in the Alcove portion of the building and the front of the machines faced outward into the laundromat.

- PCE was the solvent used in the dry-cleaning machines and these machines were equipped with cooling systems that condensed the PCE vapors that were exhausted from the clothes as they dried. Some of the PCE would be lost either by staying on the clothes or through the exhaust. Reportedly, very little waste was generated and periodically the PCE in the dry-cleaning machines had to be replenished.

- Delivery and pickup of PCE solvent was conducted at the south end of the building (i.e., through the Alcove) and customer drop-off and pick-up was at the north end of the building.

- The PCE was stored in an aboveground tank that was located on the roof of the building above the dry-cleaning machines. A pipe came off the bottom of the tank, ran into the building behind the machines and it had a spigot on the end. The solvent was added to the machines by filling a bucket from the spigot and pouring it into the machines. PCE was not stored in other locations within the building.

Wastewater generated at the Parkway Plaza has been discharged to the municipal sanitary sewer system since the development of the property in 1957. As described above, the dry-cleaning equipment for the former Parkway Cleaners was located within an Alcove portion of the building that housed the former Parkway Cleaners. An exterior sediment trap/sump that was connected to the sanitary sewer line was located immediately adjacent to the south side of the Alcove portion of the building. A hole in the concrete block wall of the Alcove portion of the building (i.e., located between the former location of the dry-cleaning equipment and the exterior sediment trap/sump) suggests that the dry-cleaning equipment discharged into this sediment trap/sump. The walls of the sediment trap/sump were constructed of concrete block and this structure contained a soil bottom. The studies completed to date determined that the sediment trap/sump was a “source area” of the halogenated volatile organic compound (VOC) impact at the Site. A drawing showing relevant features of the former Parkway Cleaners facility is presented as Figure 3.

Test borings and wells were advanced on the Site and evidence of chlorinated VOC contamination was detected in soil and groundwater samples primarily south of the building (i.e., in proximity to the sediment trap/sump). Concentrations of VOCs detected in some of the soil and groundwater samples exceeded NYSDEC recommended soil cleanup objectives and/or groundwater standards.

The ground surface on exterior portions of the Site in the area of VOCs is paved with asphalt or concrete. Heterogeneous fill consisting primarily of reworked soil and trace amounts of brick underlies the asphalt and concrete. Some organics and wood were observed near the bottom of the fill, which may be indicative of the top of the former original ground surface prior to filling. The fill extends to depths up to approximately 8 feet below the ground surface. The indigenous

soil beneath the fill generally consists of mixtures of sand, cobbles and gravel underlain by gap-graded alternating layers of clay, silt, sand, or mixtures thereof. The apparent top of bedrock was not encountered during advancement of the test borings.

Analytical laboratory test data for groundwater samples collected from overburden groundwater monitoring wells during previous studies are included in Table 1. The locations from which the groundwater samples were collected are depicted on Figure 2.

1.2 Scope of Work

The following field activities are anticipated during remediation activities as part of the Brownfield Cleanup Program at this Site.

- Site Preparation and mobilization activities;
- Implementation of a Remedial Action Work Plan to treat the saturated soil and groundwater containing residual chlorinated VOCs that primarily consist of PCE and its associated breakdown products;
- Contingency for additional in-situ remediation, if warranted;
- Management of Study and Remediation derived wastes;
- Vapor Mitigation System monitoring;
- Site restoration and demobilization activities;
- Indoor air and sub-slab vapor testing; and
- Groundwater Monitoring to track remedy performance

This HASP can be modified to cover other site activities, when appropriate. The owner of the property, its contractors, and other site workers will be responsible for the development and/or implementation of health and safety provisions associated with normal construction activities or site activities.

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Designated Health and Safety Specialist (DHSS) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP.

2.1 Designated Health and Safety Specialist

The DHSS is responsible for the contents of the HASP and ensures that the HASP complies with federal, state, and local health and safety requirements. If necessary, the DHSS can modify the HASP to adjust for on-site changes that affect safety. The DHSS will coordinate with the SSO on modifications to the HASP and will be available for consultation when required. The DHSS will not necessarily be on site during the field activities.

2.2 Project Manager

The PM has the overall responsibility for the project and to assure that the goals of the site evaluation and remediation program are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SSO to ensure that the site evaluation and remediation program goals are completed in a manner consistent with the HASP.

2.3 Site Safety Officer

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field full-time while site activities are in progress. The SSO's operational responsibilities will be monitoring, including personal and environmental monitoring, ensuring personal protective equipment maintenance, and assignment of protection levels. The SSO will be the main contact in any on-site emergency situation. The SSO will direct field activities involved with safety and be responsible for stopping work when unacceptable health or safety risks exist. The SSO is responsible for ensuring that on-site personnel understand and comply with safety requirements.

2.4 Employee Safety Responsibility

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use the equipment provided in a safe and responsible manner as directed by the SSO.

2.5 OSHA Records

Required records are maintained at DAY's Rochester, New York office.

2.6 Key Safety Personnel

The following individuals are anticipated to share responsibility for health and safety at the site.

Designated Health and Safety Specialist	Nick J. Harding
Project Manager	Nathan E. Simon, P.E
Site Safety Officer	Charles A. Hampton, Thomas E. Roszak, or Heather McLennan

* Mr. Harding has a Master's Degree in Industrial Hygiene from the University of Rochester, and has over 25 years of experience in occupational safety and industrial hygiene. A copy of Mr. Harding's resume is included in Attachment 1.

3.0 SAFETY RESPONSIBILITY

Contractors, consultants, state or local agencies, or other parties, and their employees, involved with this BCP project will be responsible for their own safety while on-site. Their employees will be required to understand the information contained in this HASP, and must follow the recommendations that are made in this document.

4.0 JOB HAZARD ANALYSIS

There are many hazards associated with site evaluation and remediation work on a site, and this HASP discusses some of the anticipated hazards for this Site. The hazards listed below deal specifically with those hazards associated with the management of the impacted media (i.e., soil and groundwater impacted with chlorinated VOCs).

4.1 Chemical Hazards

Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage to the point of contact or can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact.

A list of selected site-specific chlorinated VOCs, that have been detected at the Site are presented below. The VOCs detected at the Site appear attributable to past dry-cleaning operations on the Site. This list also presents the permissible exposure limits (PELs) and levels that are considered immediately dangerous to life and health (IDLH) for the selected VOCs.

4.1.1 List of Potential Chemical Hazards

CONSTITUENT	EXPOSURE LIMITS	IDLH	TARGET ORGANS
Tetrachloroethene	100 ppm PEL	150 ppm	eyes, skin, respiratory system, liver, kidneys, CNS
Trichloroethene	100 ppm PEL	1000 ppm	eyes, skin, respiratory system, heart, liver, CNS
1,2-Dichloroethene (total)	200 ppm PEL	1000 ppm	eyes, respiratory system, CNS
Vinyl Chloride	1 ppm PEL	Not determined	liver, CNS, blood, respiratory system, lymphatic system, liver cancer

Notes: PEL = OSHA Permissible Exposure Limits (TWA for 8-hour day)
IDLH = Immediately Dangerous to Life or Health Concentrations
CNS = Central Nervous System

The potential routes of exposure for these analytes and chemicals include inhalation, ingestion, skin absorption and skin/eye contact. The potential for exposure through any one of these routes will depend on the activity conducted. The most likely routes of exposure for the activities that are performed during site evaluation and remediation of the Site include inhalation and skin contact.

If other chemicals are encountered during site evaluation and remediation activities, this HASP may need to be modified to include those chemicals.

4.1.2 Remediation Reagent Properties

Various chemicals and biologic agents will be used during the remediation process. Anyone using iron powder in vegetable oil, colloidal buffers, non-toxic microbes and/or emulsified vegetable oil should read and understand each element and section of the vendor's current Safety Data Sheet (SDS) for the materials to be used at the Site. A copy of EOS's SDS for EOSzvi, EOS Pro, BAC-9 and CoBupH_{Mg} is included in Attachment 2.

The attached SDS include specific sections for first aid measures, fire-fighting measures, accidental release measures, handling and storage measures, exposure controls and personal protection. Physical and chemical properties, stability and reactivity, toxicological information, ecological information, disposal considerations, transportation information and regulatory information are also included on the SDS.

4.2 Physical Hazards

There are physical hazards associated with this project, which might compound the chemical hazards. Hazard identification, training, adherence to the planned site evaluation and remediation measures, and careful housekeeping can prevent many problems or accidents arising from physical hazards. Potential physical hazards associated with this project and suggested preventative measures include:

- Slip/Trip/Fall Hazards - Some areas may have wet surfaces that will greatly increase the possibility of inadvertent slips. Caution must be exercised when using steps and stairs due to slippery surfaces in conjunction with the fall hazard. Good housekeeping practices are essential to minimize the trip hazards.

- Small Quantity Flammable Liquids - Small quantities of flammable liquids will be stored in "safety" cans and labeled according to contents.

- Electrical Hazards - Electrical devices and equipment shall be de-energized prior to working near them. All extension cords will be kept out of water, protected from crushing, and inspected regularly to ensure structural integrity. Temporary electrical circuits will be protected with ground fault circuit interrupters. Only qualified electricians are authorized to work on electrical circuits. Heavy equipment (e.g., backhoe, drill rig) shall not be operated within 10 feet of high voltage lines, unless proper protection from the high voltage lines is provided by the appropriate utility company.

- Noise - Work around large equipment often creates excessive noise. The effects of noise can include:

    - Workers being startled, annoyed, or distracted.

    - Physical damage to the ear resulting in pain, or temporary and/or permanent hearing

loss.

- Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.

Proper hearing protection will be worn as deemed necessary. In general, feasible administrative or engineering controls shall be utilized when onsite personnel are subjected to noise exceeding an 8-hour time weighted average sound level of 90 d(B)A (decibels on the A-weighted scale). In addition, whenever employee noise exposures equal or exceed an 8-hour, time weighted average sound level of 85 d(B)A, employers shall administer a continuing, effective hearing conservation program as described in OSHA Regulation 29 CFR Part 1910.95.

- Heavy Equipment - Each morning before start-up, heavy equipment will be inspected to ensure safety equipment and devices are operational and ready for immediate use.

- Subsurface and Overhead Hazards - Before any excavation activity, efforts will be made to determine whether underground utilities and potential overhead hazards will be encountered. Underground utility clearance must be obtained prior to subsurface work.

4.3 Environmental Hazards

Environmental factors such as weather, wild animals, insects, and irritant plants can pose a hazard when performing outdoor tasks. The SSO shall make every reasonable effort to alleviate these hazards should they arise.

4.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. In particular:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

Site workers will be encouraged to increase consumption of water or electrolyte-containing beverages such as Gatorade® when the potential for heat stress exists. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendation to the SSO.

4.3.2 Exposure to Cold

With outdoor work in the winter months, the potential exists for hypothermia and frostbite. Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel

will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

5.0 SITE CONTROLS

To prevent migration of contamination caused through tracking by personnel or equipment, work areas, and personal protective equipment staging/decontamination areas will be specified prior to beginning operations.

5.1 Site Zones

When warranted and impacted materials present the potential for worker exposure, personnel entering the “exclusion zone” (EZ) must wear the mandated level of PPE. A "contaminant reduction zone” (CRZ) shall be established where personnel can begin personal and equipment decontamination procedures. This can reduce potential off-site migration of impacted media. Contaminated equipment or clothing will not be allowed outside the CRZ (e.g., on clean portions of the Site) unless properly containerized for disposal. Operational support facilities will be located outside the CRZ (i.e., in a "support zone"), and normal work clothing and support equipment are appropriate in this area. If possible, the support zone shall be located upwind of site investigation and remediation activities.

5.2 General

The following items will be requirements to protect the health and safety of workers during implementation of construction activities that disturb VOC-contaminated material.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination shall not occur in the EZ and/or CRZ during disturbance of VOC-impacted soil or groundwater.
- Personnel admitted in the exclusion zone and contaminant reduction zone shall be properly trained in health and safety techniques and equipment usage in accordance with applicable OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations referenced in 29 CFR 1910.120 and 29 CFR 1926.65.
- No personnel shall be admitted in the EZ without the proper safety equipment.
- Proper decontamination procedures shall be followed before leaving the Site.

6.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of PPE, which are or may be required at this job site. Personnel entering the work zone and transition zone shall be trained in the use of the anticipated PPE to be utilized.

6.1 Anticipated Protection Levels

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site mobilization	D	
Site prep/construction of engineering controls	D	
Extrusive work (e.g., surveying, etc.)	D	
Intrusive work (e.g., injection of remediation amendments and microbes, groundwater monitoring, SSDS monitoring, vapor monitoring, etc.)	C/Modified D/D	Based on air monitoring, and SSO discretion
CRZ- Decontamination	C/Modified D/D	Based on air monitoring, and SSO discretion
Support zone	D	
Site breakdown and demobilization	D	

It is anticipated that work conducted as part of this site evaluation and remediation project will be performed in Level D, modified Level D and possibly level C PPE. If conditions are encountered that require higher levels of PPE (e.g., Level B or A), the work will immediately be stopped. The appropriate government agencies (e.g., NYSDEC, NYSDOH, etc.) will be notified, and the proper health and safety measures will be implemented (e.g., develop and implement engineering controls, upgrade in PPE, etc.).

6.2 Protection Level Descriptions

This section lists the minimum requirements for each protection level. Modifications to these requirements can be made upon approval of the SSO. If Level A, Level B, and/or Level C PPE is required, Site personnel that enter the work zone and/or transition zone must be properly trained and certified in the use of those levels of PPE.

6.2.1 Level D

Level D consists of the following:
- Safety glasses
- Hard hat when working with heavy equipment
- Steel-toed work boots
- Protective gloves during sampling or handling of potential VOC-contaminated media
- Work clothing as prescribed by weather

6.2.2 Modified Level D

Modified Level D consists of the following:
- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work gloves
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to impacted liquids or impacted particulates].

6.2.3 Level C

Level C consists of the following:
- Air-purifying respirator with appropriate cartridges
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to impacted liquids or particulates].
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, or PVC overboots, if appropriate
- Nitrile, neoprene, or PVC gloves, if appropriate
- Face shield (when projectiles or splashes pose a hazard)

6.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator. Level B PPE is not anticipated to be required during this site evaluation and remediation project. If the need for level B PPE becomes evident, all Site activities will be ceased until Site conditions are further evaluated, and any necessary modifications to the HASP have been approved by the Project Manager, DHSS or SSO. Subsequently, the appropriate safety measures (including Level B PPE) must be implemented prior to commencing site activities.

6.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-

encapsulating, vapor-proof suit capable of maintaining positive pressure. Level A PPE is not anticipated to be required during this site evaluation and remediation project. If the need for level A PPE becomes evident, all Site activities will be ceased until Site conditions are further evaluated, and any necessary modifications to the HASP have been approved by the Project Manager, DHSS or SSO. Subsequently, the appropriate safety measures (including Level A PPE) must be implemented prior to commencing site activities.

6.3 Respiratory Protection

Any respirator used will meet the requirements of OSHA 29 CFR 1910.134. Both the respirator and cartridges specified shall be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910). Air purifying respirators shall not be worn if contaminant levels exceed designated use concentrations. The workers will wear respirators with approval for: organic vapors <1,000 parts per million (ppm); and dusts, fumes and mists with a TWA <0.05 $mg/m^{3.}$

No personnel who have facial hair, which interferes with the respirator's sealing surface, will be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

Only workers who have been certified by a physician as being physically capable of respirator usage shall be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on-site that require respirator protection.

7.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work Site.

7.1 Personnel Decontamination

Personnel involved with site evaluation and remediation activities that involve disturbing VOC-impacted media will follow the decontamination procedures described herein to ensure that material which workers may have contacted in the work zone and/or transition zone does not result in personal exposure and is not spread to clean areas of the Site. This sequence describes the general decontamination procedure. The specific stages can vary depending on the Site, the task, and the protection level, etc.

1. Leave EZ and go to CRZ
2. Remove soil/debris from boots and gloves
3. Remove boots
4. Remove gloves
5. Remove Tyvek suit and discard, if applicable
6. Remove and wash respirator, if applicable
7. Go to support zone

7.2 Equipment Decontamination

Contaminated equipment shall be decontaminated in the transition zone before leaving the Site. Decontamination procedures can vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steam cleaning the exterior of the equipment. Personnel performing this task will wear the proper PPE.

7.3 Disposal

Disposable clothing will be treated as contaminated waste and be disposed of properly. Liquids (e.g., decontamination water, etc.) generated by site evaluation and remediation activities will be disposed of in accordance with applicable regulations.

8.0 AIR MONITORING

Air monitoring will be conducted in order to determine airborne particulate and contamination levels during activities that have the potential to disturb contaminated soil, fill material or dry remediation reagent. Air monitoring will be conducted in order to determine airborne contamination levels, but not particulates, during activities that have the potential to disturb contaminated groundwater. Additional air monitoring may be conducted at the discretion of the SSO. VOC and particulate readings will be recorded on daily air monitoring logs that are accompanied by a daily figure. This documentation will be available for NYSDEC and NYSDOH personnel to review.

The following chart describes the direct reading instrumentation that will be utilized and appropriate action levels.

Monitoring Device	Action level	Response/Level of PPE
PID Volatile Organic Compound Meter	< 25 ppm in breathing zone	Level D
	25-100 ppm in breathing zone	Cease work, implement vapor suppression techniques such as application of BioSolve. If levels are not reduced below 25 ppm in the breathing zone, then upgrade PPE to Level C.
	>100 ppm in breathing zone	Level A, Stop work, evaluate the use of engineering controls, etc. If levels are not reduced below 100 ppm in the breathing zone, then upgrade PPE to Level A or Level B.
RTAM Particulate Meter	< 100 ug/m^3 (i.e., < 0.1 mg/m^3) over an integrated period not to exceed 15 minutes.	Continue working
	> 100 ug/m^3 over an integrated period not to exceed 15 minutes.	Cease work, implement dust suppression, change in way work performed, etc. If levels are not reduced below 150 ug/m^3, then upgrade PPE to Level C.

PID = Photoionization detector RTAM = Real Time Aerosol Monitor ug/m^3 = microgram per meter cubed

8.1 PARTICULATE MONITORING

During activities where contaminated materials (e.g., soil, fill, etc.) or remediation reagent may be disturbed, air monitoring will include real-time monitoring for particulates using a RTAM particulate meter at the perimeter of the exclusion zone in accordance with the Final DER-10 Technical Guidance for Site Investigation and Remediation dated May 2010. DER-10 uses an action level of 100 ug/m^3 (0.10 mg/m^3) over background conditions for an integrated period not to exceed 15 minutes. Levels of particulates will periodically be measured in the air at active work areas within the exclusion zone, and at the contaminant reduction zone when levels are detected above background in the exclusion zone. If the action level is exceeded, or if visible dust is

observed leaving the work site, then work shall be discontinued until corrective actions are implemented. Corrective actions may include dust suppression, change in the way work is performed, and/or upgrade of personal protective equipment.

8.2 VOLATILE ORGANIC COMPOUND MONITORING

During activities where contaminated materials may be disturbed, a PID will be used to monitor total VOCs in the ambient air. The PID will prove useful as a direct reading instrument to aid in determining if current respiratory protection is adequate or needs to be upgraded. The SSO will take background measurements before operations begin in an area to determine the amount of VOCs naturally occurring in the air. Levels of VOCs will periodically be measured in the air at active work areas within the exclusion zone, and at the contaminant reduction zone when levels are detected above background at the perimeter of the exclusion zone.

8.3 COMMUNITY AIR MONITORING PLAN

During intrusive activities, activities that have the potential to disturb contaminated soil or fill material, and activities that have the potential for airborne releases of remediation reagents (e.g., pH buffer in the form of dust or particulates), this Community Air Monitoring Plan (CAMP) will be implemented. The CAMP includes real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each designated work area when activities with the potential to release VOCs or dust are being conducted at the Site. This CAMP is based on the NYSDOH Generic CAMP included as Appendix 1A of the NYSDEC document titled *"DER-10, Technical Guidance for Site Investigation and Remediation"* dated May 2010. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of project activities. An upwind background station will be established at the beginning of the day and monitored throughout the day to verify the location is upwind. In the event wind direction changes, a subsequent background location will be established and monitored, and the change in wind direction will be noted. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. Reliance on the CAMP should not preclude simple, common sense measures to keep VOCs, dust, and odors at a minimum around, and downwind of, the work areas.

Continuous monitoring will be conducted during ground intrusive activities involving potentially contaminated soil, fill material or groundwater. Ground intrusive activities include advancement / installation of test borings or injection points.

Periodic monitoring for VOCs will be conducted during non-intrusive activities involving potentially contaminated soil, fill material or groundwater where deemed appropriate (e.g., during baseline monitoring, performance monitoring, cover system installation, management of IRM-derived wastes, long-term monitoring, etc.).

VOC and particulate 15-minute readings, and instantaneous readings (if collected), will be recorded on daily air monitoring logs that are accompanied by a daily figure. This documentation will be available for NYSDEC and NYSDOH personnel to review.

8.3.1 VOC Monitoring, Response Levels, and Actions

VOCs must be monitored at the downwind perimeter of the immediate work area (i.e., areas within the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 ppm above background for the 15-minute average, work activities must be temporarily halted and monitoring must be continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source or vapors identified, corrective actions taken to abate emissions (e.g., application of BioSolve), and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case less than 20 feet), is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the Site, activities must be shutdown.

8.3.2 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations must be monitored continuously at the upwind and downwind perimeters of the Site at temporary particulate monitoring stations. The particulate monitoring must be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and provided that no visible dust is

migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ug/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

The following chart summarizes the direct reading instrumentation and appropriate action levels that will be utilized during CAMP monitoring.

Monitoring Device	CAMP Action level	Response/Level of PPE
PID Volatile Organic Compound Meter	< 5 ppm at Site perimeter, over an integrated period not to exceed 15 minutes.	Continue work.
	5-25 ppm at Site perimeter over an integrated period not to exceed 15 minutes.	Stop work, identify vapor source, take corrective actions, and continue monitoring. Resume work if <5ppm for 15-minute average at 200 feet downwind or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case <20 feet).
	>25 ppm at Site perimeter.	Stop work, further evaluate the use of engineering controls, etc.
RTAM Particulate Meter	< 100 ug/m^3 over an integrated period not to exceed 15 minutes, and no observable dust leaving the work area.	Continue working.
	> 100 ug/m^3 over an integrated period not to exceed 15 minutes, or if observable dust leaving the work area.	Cease work, implement dust suppression, change in way work performed, etc. Resume work if levels brought below 150 ug/m^3 above background and no visible dust leaving the work area.

9.0 EMERGENCY RESPONSE

To provide first-line assistance to field personnel in the case of illness or injury, the following items will be made immediately available on the Site:

- First-aid kit
- Portable emergency eye wash
- Supply of clean water

9.1 Emergency Telephone Numbers

The following telephone numbers are listed in case there is an emergency at the Site:

Fire/Police Department:	911
Poison Control Center:	(800) 222-1222
NYSDEC Spill Hotline	(800) 457-7362
NYSDEC Contact Timothy Schneider	(585) 226-5480
NYSDOH Contact Julia Kenney	(585) 402-7860
Day Environmental, Inc. Nathan E. Simon, P.E.	(585) 454-0210 (x109)
Parkway Plaza Limited Partnership Andrew Bodewes	(585) 434-5520
Nearest Hospital:	F.F. Thompson Hospital 350 Parrish Street Canandaigua, New York
Hospital Phone Number:	(585) 396-6000
Directions to the Hospital (refer to map included as Figure 4):	Exit Site and turn left (west) onto Eastern Boulevard (Rte. 5 & 20). Follow Rte. 5 & 20 west and turn right (north) onto South Main Street. Follow South Main Street and turn left onto Parrish Street. F.F. Thompson Hospital is approximately 0.3 miles on the right. Follow Emergency Room signs.

9.2 Evacuation

Although unlikely, it is possible that a site emergency could require evacuating all personnel from the Site. If required, the SSO will give the appropriate signal for site evacuation (i.e., hand signals, alarms, etc.).

All personnel shall exit the site and shall congregate in an area designated by the SSO. The SSO shall ensure that all personnel are accounted for. If someone is missing, the SSO will alert emergency personnel. The appropriate government agencies will be notified as soon as possible regarding the evacuation, and any necessary measures that may be required to mitigate the reason for the evacuation.

9.3 Medical Emergency

In the event of a medical emergency involving illness or injury to one of the on-site personnel, the Site should be shut-down and immediately secured. The appropriate government agencies should be notified immediately. The area in which the injury or illness occurred should not be entered until the cause of the illness or injury is known. The nature of injury or illness should be assessed. If the victim appears to be critically injured, administer first aid and/or CPR as needed. Instantaneous real-time air monitoring should be done in accordance with air monitoring outlined in Section 8.0 of this HASP.

9.4 Contamination Emergency

It is unlikely that a contamination emergency will occur; however, if such an emergency does occur, the Site should be shut-down and immediately secured. If an emergency rescue is needed, notify, Police, Fire Department and EMS Units immediately. Advise them of the situation and request an expedient response. The appropriate government agencies should be notified immediately. The area in which the contamination occurred should not be entered until the arrival of trained personnel who are properly equipped with the appropriate PPE and monitoring instrumentation. (See also Section 8.0 of this HASP).

9.5 Fire Emergency

In the event of a fire on-site, the site should be shut-down and immediately secured. The area in which the fire occurred should not be entered until the cause can be determined. All non-essential site personnel should be evacuated from the Site to a safe, secure area. Notify the Fire Department immediately. Advise the Fire Department of the situation and the identify of any hazardous material involved. The appropriate government agencies should be notified as soon as possible.

The four classes of fire along with their constituents are as follows:

Class A: Wood, cloth, paper, rubber, many plastics, and ordinary combustible materials.
Class B: Flammable liquids, gases and greases.
Class C: Energized electrical equipment.
Class D: Combustible metals such as magnesium, titanium, sodium, potassium.

Small fires on-site may be actively extinguished; however, extreme care should be taken while in this operation. All approaches to the fire should be done from the upwind side if possible. Distance from on-site personnel to the fire should be close enough to ensure proper application of the extinguishing material, but far enough away to ensure that the personnel are safe. The proper extinguisher should be utilized for the Class(s) of fire present on the site. If possible, the fuel source should be cut off or separated from the fire. Care must be taken when performing operations involving the shut-off values and manifolds, if present.

Examples of proper extinguishing agent as follows:

Class A: Water
Water with 1% AFFF Foam (Wet Water)
Water with 6% AFFF or Fluorprotein Foam
ABC Dry Chemical

Class B: ABC Dry Chemical
Purple K
Carbon Dioxide
Water with 6% AFFF Foam

Class C: ABC Dry Chemical
Carbon Dioxide

Class D: Metal-X Dry Powder

No attempt should be made against large fires. These should be handled by the Fire Department.

9.6 Spill or Air Release

In the event of a spill or air release of a hazardous material on-site, the Site should be shut-down and immediately secured. The area in which the spill or release occurred should not be entered until the cause can be determined and site safety can be evaluated. All non-essential site personnel should be evacuated from the Site to a safe, secure area. The appropriate government agencies should be notified as soon as possible. The spilled or released material should be immediately identified and appropriate containment measures should be implemented, if possible. Real-time air monitoring should be implemented as outlined in Section 8.0 of this HASP. If the material is unknown, Level B protection is mandatory. Samples of the material should be acquired to facilitate identification of the material.

9.7 Locating Containerized Waste or Buried Tanks

In the event that containerized waste (e.g., drums) or buried tanks are located during site evaluation and remediation activities, the site should be shut-down and immediately secured. The area in which containerized wastes and/or tanks are discovered should not be entered until site safety can be

evaluated. All non-essential site personnel should be evacuated from the Site to a safe, secure area. The appropriate government agencies should be notified as soon as possible. The SSO shall monitor the area as outlined in Section 8.0 of this HASP.

Prior to any handling, containers and/or tanks will be visually assessed by the SSO to gain as much information as possible about their contents. As a precautionary measure, personnel shall assume that unlabelled containers contain hazardous materials until their contents are characterized. If the material is unknown, Level B protection is mandatory. To the extent possible based upon the nature of the containers encountered, actions may be taken to stabilize the area and prevent migration (e.g., placement of berms, etc.). Subsequent to initial visual assessment and any required stabilization, an environmental contractor will sample, test, remove, and dispose of any containers, tanks, and their contents.

10.0 CONFINED SPACE ENTRY PROGRAM

Although unlikely, confined space entry may occur during this project. Confined spaces include excavation trenches, utility vaults, etc. The Contractor will be responsible for identifying confined spaces prior to anyone entering them. Entry procedures into confined spaces will be completed in accordance with the requirements of 29 CFR 1910.146 (OSHA Permit-Required Confined Space Regulation). Only properly trained individuals shall be allowed to participate in confined space entries.

As shown in 29 CFR 1910.146, a "Confined Space" is defined as:

1. a space "large enough and so configured that an employee can bodily enter and perform assigned work";
2. a space that "has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pits)"; and
3. a space "not designed for continuous employee occupancy".

As shown in 29 CFR 1910.146, a "Permit-Required Confined Space" is defined as:

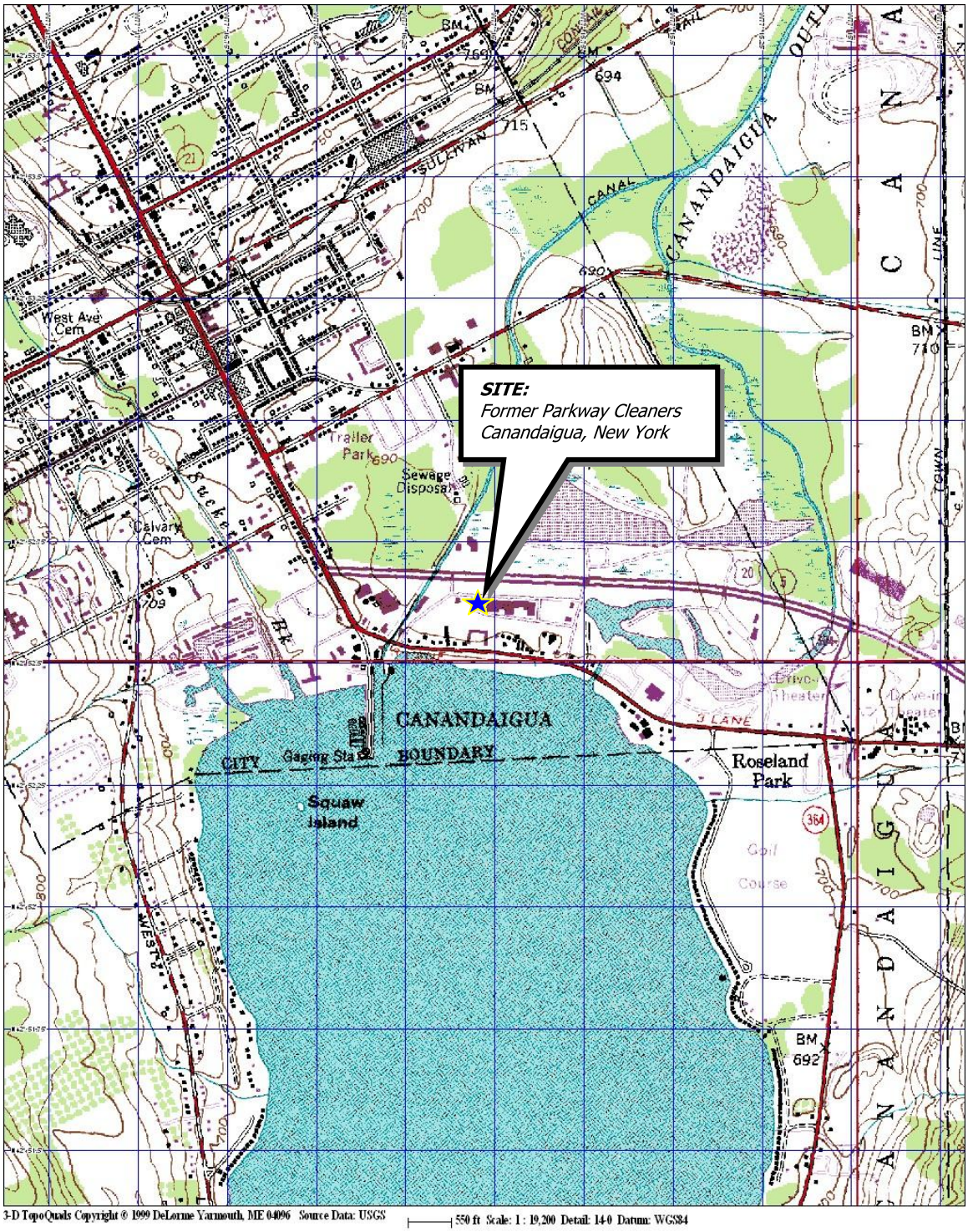
1. a space that "contains or has a potential to contain a hazardous atmosphere";
2. a space that "contains a material that has the potential for engulfing an entrant";
3. a space that "has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section"; or
4. a space that "contains any other recognized serious safety and health hazards".

Permit-required confined space entry procedures do not need to be implemented if the four characteristics defining a permit-required confined space are eliminated (e.g., shore excavation walls, vent air in the confined space, etc.).

11.0 TRAINING REQUIREMENTS

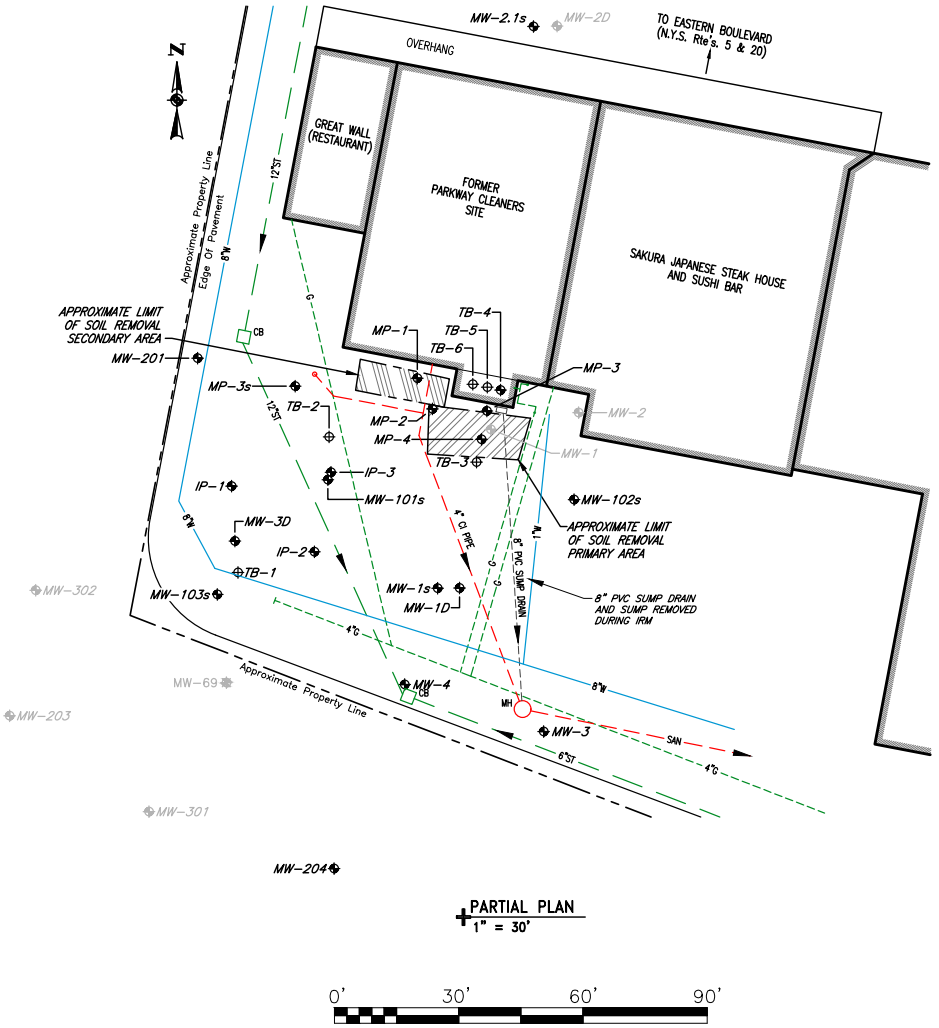
DAY personnel involved with site evaluation and remediation activities that have the potential to come into contact with VOC-impacted material are required to take a 40-hour training class. This training covers personal protective equipment, toxicological effects of various chemicals, handling of unknown tanks and drums, confined-space entry procedures, and electrical safety. This course is in compliance with OSHA requirements in 29 CFR 1910.120. In addition, employees receive annual 8-hour refresher training, and supervisory personnel receive an additional 8-hour training in handling hazardous waste operations. Personnel entering the work zone will be trained in the provisions of this HASP.

FIGURES



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad maps Canandaigua (NY) 1978 and Canandaigua Lake (NY) 1978. Site Lat/Long: N42° 52.6' – W77° 16.0'

DATE **2/25/2019** DRAWN BY **RJM** SCALE **1" = 2000'**	**DAY ENVIRONMENTAL, INC.** ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008 NEW YORK, NEW YORK 10165-1617	PROJECT TITLE **FORMER PARKWAY CLEANERS** **BCP SITE NO. C835028** **CANANDAIGUA, NEW YORK** DRAWING TITLE **PROJECT LOCUS MAP**	PROJECT NO. **5188R-15** **FIGURE 1**



PARTIAL PLAN
1" = 30'

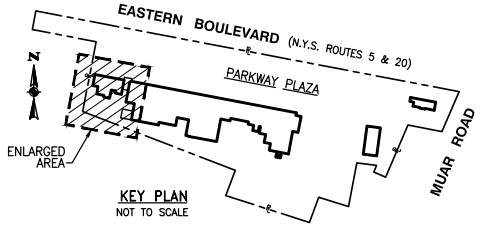
0' 30' 60' 90'

NOTES:

1. Partial Plan Adapted From A Drawing By IVI Environmental, Inc, Entitled "Sample Location Map", Dated August 3, 1998 And By A Site Sketch Made By DAY Environmental, Inc. On November 5 & 6, 1998.
2. Groundwater Monitoring Well/Injection Point Locations Were Tape Measured Or Observed From Existing Site Structures And Should Be Considered Accurate To The Degree Implied By The Method Used.
3. Property Lines Shown Are From A Map Of An Instrument Survey By MRB Group, Entitled "Plan Of Land Owned By Parkway Plaza Limited Partnership In The City Of Canandaigua, Town Of Canandaigua, Ontario County, NY, Boundary Map", Dated June 22, 1988 And last Revised On December 6, 1988.

LEGEND

MW-1s	Groundwater Monitoring Well (MW), Monitoring Point (MP) Or Existing Former Injection Point (IP)
MW-2	Decommissioned/Destroyed Monitoring Well
MW-69	Approximate Location Of A Decommissioned/Destroyed Monitoring Well Installed In 2013 As Part Of Studies Completed By Stantec Consulting During Studies For The Canandaigua Brownfield Site Redevelopment Project (BCP Site No. C835025)
TB-1	Test Boring Location advanced May 2015 – with monitoring well installed in Test Boring TB-4
SAN	Approximate Location Of Sanitary Sewer
MH	Sanitary Sewer Manhole
6"ST	Storm Sewer With Size Of Pipe Noted
CB	Storm Sewer Catch Basin
8"W	Water Main With Size Of Pipe Noted
4"G	Inferred Location Of Natural Gas Main With Size Of Pipe Noted
	Presumed Flow Direction



KEY PLAN
NOT TO SCALE

FIELD VERIFIED BY	RLK
DATE	2-2019
DRAWN BY	RJM
DATE DRAWN	2-25-2019
SCALE	As Noted
DATE ISSUED	2-25-2019

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14606
NEW YORK, NEW YORK 10170

PROJECT TITLE
FORMER PARKWAY CLEANERS
BCP SITE C835028
CANANDAIGUA, NEW YORK

DRAWING TITLE
Site Plan With Test Locations

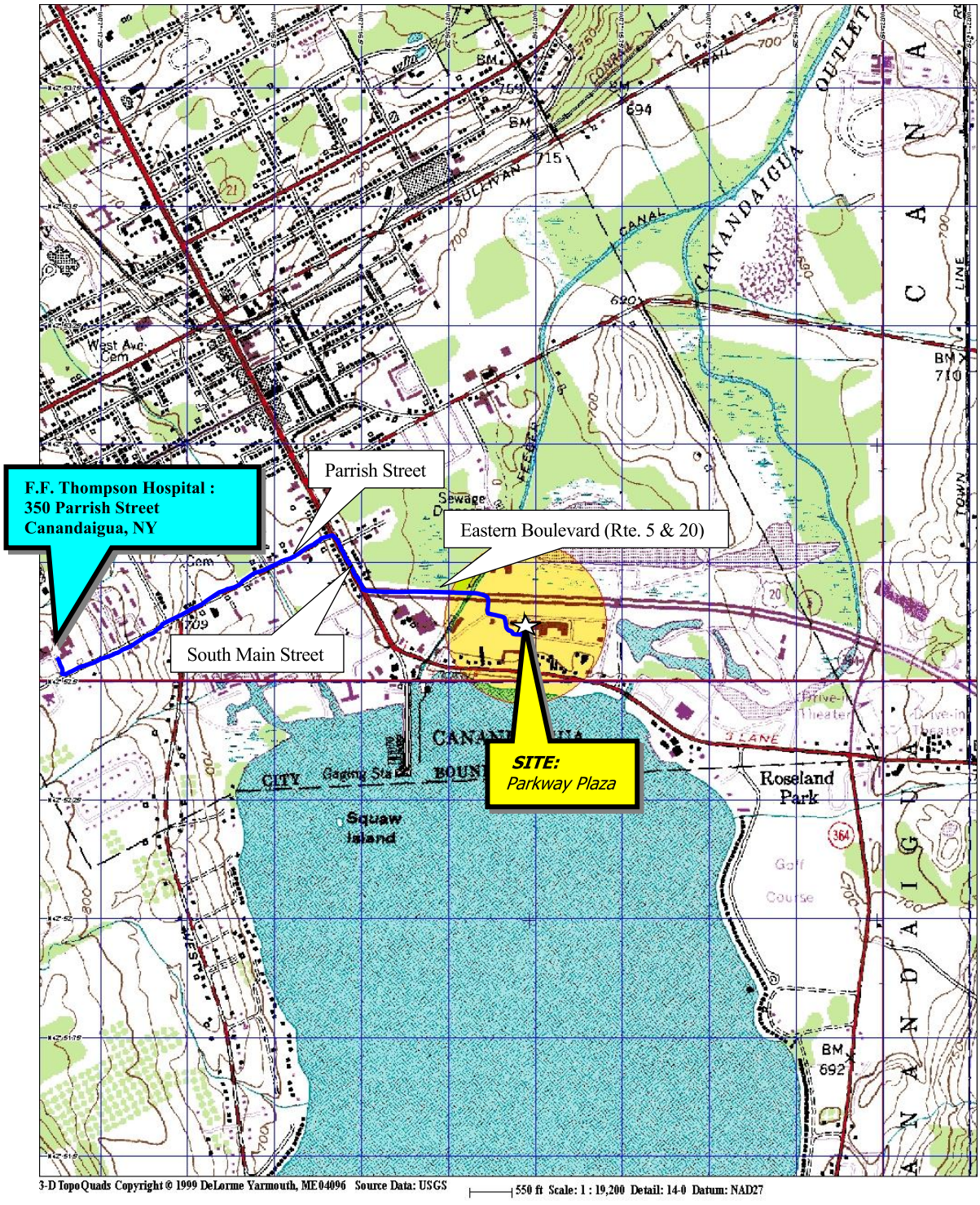
PROJECT NO.
5188R-15

FIGURE 2

Ref1:
Ref2:
Ref3:

Xerox4432AnsiB-2; 11 x 17
Layout Name: Layout1
Pen Setting File: 800psFullcolor.ctb

Time Plotted: Monday, February 25, 2019 12:58:29 PM
File Name: P:\Drawings\Park 5188R-15\5188R-15 Test Locations Feb 2019.dwg



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad maps Canandaigua (NY) 1978 and Canandaigua Lake (NY) 1978. Site Lat/Long: N42d-52.6' – W77d-16.0'

DATE 09-17-2013 DRAWN BY CAH SCALE 1" = 2000'	DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14606	PROJECT TITLE FORMER PARKWAY CLEANERS CANANDAIGUA, NEW YORK DRAWING TITLE ROUTE TO HOSPITAL	PROJECT NO. 5188R-15 Figure 3

TABLE

TABLE 1

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

HISTORIC SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
OVERBURDEN GROUNDWATER MONITORING WELLS

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-1S								MW-2.1S							
		10/10/01	1/24/02	7/24/02	2/13/04	6/22/04	3/14/06	11/10/06	9/25/07	9/19/01	1/24/02	7/24/02	2/13/04	6/22/04	3/22/05*	11/10/06	9/24/07
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cis-1,2-DCE	5	--	2 J	--	--	2.2	--	2.3	--	--	2 J	4.6	1.5	3.8	--	1.5	--
Trans-1,2-DCE	5	--	--	5	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	--	--	--	--	**3.0**	--	--	--	--	--	--	--	--	--	**2.5**	**3.2 J**

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-3S												
		9/19/01	1/24/02	7/24/02	2/13/04	6/22/04	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/11/09	5/27/09	6/21/11
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	--	--	--	--	--	**5.6**	--	--	--	--	--	--	--
Cis-1,2-DCE	5	--	--	**8.8**	3.7	**12.0**	**590**	**13**	**610 D**	--	**103**	--	--	**2.49**
Trans-1,2-DCE	5	--	--	--	--	--	**5.2**	--	2.6	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	--	1J	**5.9**	**4.1**	**5.9**	**410**	**5.5**	**130**	--	**45.2**	--	--	**4.66**

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J Indicates an estimated value

* Sample collected from a new (replacement) well

8.8 Bold - Denotes that the concentration exceeds the NYSDEC TOGS 1.1.1 groundwater standards/guidance values

PCE = Tetrachloroethene
TCE = Trichloroethene
CIS-1,2 DCE = CIS-1,2-Dischloroethene
Trans 1,2-DCE = trans-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
VC = Vinyl Chloride

TABLE 1

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

HISTORIC SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
OVERBURDEN GROUNDWATER MONITORING WELLS

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-101S									MW-102S												
		2/13/04	6/22/04	3/22/05	7/26/05	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/13/04	6/22/04	3/22/05	7/26/05	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/11/09	5/27/09	1/7/10	5/24/11	5/26/15
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	**5.4**	**9.2**	3.8	--	--	--	--	--	--	--	1.8	3.5	1.8	3.9	2.7	--	--	--	--	--	--	--	--
Cis-1,2-DCE	5	**250**	**220**	**54**	2.9	1.1	3.2	3.8 J	--	--	**10**	**12**	**30**	**52**	**44**	**74**	**130**	**68.5**	**90.2**	**14.9**	**48.4**	**42.3**	**25.2**	1.2
Trans-1,2-DCE	5	3.9	4.4	--	--	--	1.3	--	--	--	1.1	1.3	1.6	2.9	1.7	2.5	2.5 J	--	2.06	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	**27**	**31**	**11**	--	--	**3.7**	**14**	**--**	--	**10**	**4.8**	**14**	**28**	**17**	**31**	**51**	**24.3**	**35.5**	**23.4**	**34.5**	**23.7**	**20.9**	**12.5**

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-103S															
		9/20/04	12/15/04	3/22/05	7/26/05	3/14/06	11/10/06	9/25/07	5/8/08	8/22/08	2/11/09	5/27/09	1/7/10	7/23/10	5/24/11	5/20/13	5/27/15
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cis-1,2-DCE	5	**390**	**48**	**210**	**180**	**37**	**47**	**47**	**70.8**	**240**	**163**	**328**	**676**	**940**	**1,050**	**657**	**2,130 D**
Trans-1,2-DCE	5	--	--	2.9	2.0	--	1.3	--	--	3.62	--	--	--	--	--	--	**7 J D**
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	**130**	**9.8**	**61**	**66**	**19**	**37**	**32**	**101**	**177**	**138**	**255**	**349**	**425**	**646**	**413**	**1,240 D**

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CIS-1,2 DCE = CIS-1,2-Dischloroethene

Trans 1,2-DCE = trans-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

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TABLE 1

FORMER PARKWAY CLEANERS
PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

HISTORIC SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
OVERBURDEN GROUNDWATER MONITORING WELLS

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MP-1						MP-2	MP-3										MP-4
		3/14/06	11/10/06	9/25/07	1/7/10	5/24/11	5/26/15	11/10/06	3/14/06	11/10/06	9/25/07	5/8/08	8/21/08	2/11/09	5/27/09	1/7/10	5/24/11	5/26/15	11/10/06
PCE	5	**19**	**8.2**	**270 D**	**40**	**122**	**100 D**	**39**	--	**25**	**14**	**--**	**--**	**--**	**--**	**--**	**40.6**	**65.8 D**	**18**
TCE	5	**22**	2.5	**110**	**33.4**	**34**	**77.8 D**	**42**	--	**51**	**44**	**--**	**--**	**32.5**	**26**	**57.7**	**69.3**	**104 D**	**16**
Cis-1,2-DCE	5	**610**	**280**	**930 D**	**179**	**91**	**560 D**	**520**	**--**	**460**	**1300 D**	**712**	**801**	**609**	**614**	**776**	**541**	**580 D**	**750**
Trans-1,2-DCE	5	--	3.6	**6.9 J**	2.18	--	**6.7 J D**	**6.7**	--	--	**5.9 J**	**--**	**--**	**--**	**--**	**--**	**--**	3.3 J D	--
1,1-DCE	5	--	--	3.2 J	--	--	--	--	--	--	3.4 J	--	--	--	--	--	--	3.6 J D	--
Vinyl Chloride	2	**120**	**75**	**23 J**	**12.9**	--	**20.6 D**	**90**	**--**	**270**	**300 D**	**--**	**291**	**42.0**	**--**	**--**	**--**	**74.6 D**	**200**

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	IP-1					IP-2		IP-3		MW-4				MW-201				
		8/28/09	2/11/09	5/27/09	6/21/11	5/27/15	6/21/11	5/26/15	6/21/11	5/27/15	2/11/09	5/27/09	1/7/10	5/24/11	9/24/07	5/8/08	8/22/08	2/11/09	5/27/09
PCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cis-1,2-DCE	5	--	--	--	--	--	**5.78**	0.2 J	**10.2**	2.4	--	--	--	--	**--**	**--**	**--**	**--**	**--**
Trans-1,2-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	--	--	--	--	--	--	--	**9.73**	2	--	--	--	--	**--**	**--**	**--**	**--**	**--**

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TABLE 1

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PARKWAY PLAZA
CANANDAIGUA, NEW YORK
BCP Site No. C835028

HISTORIC SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
OVERBURDEN GROUNDWATER MONITORING WELLS

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-69	MW-203						MW-204									MW-301			MW-302			
		5/26/15	9/24/07	5/8/08	8/22/08	2/11/09	5/27/09	1/7/10	9/24/07	5/8/08	8/22/08	2/11/09	5/27/09	1/7/10	5/24/11	5/20/13	5/26/15	9/22/09	1/7/10	5/24/11	9/22/09	1/7/10	5/24/11	5/20/13
PCE	5	**--**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TCE	5	1.5	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**	**1.8**	--	--	--	--	--	--	--
Cis-1,2-DCE	5	**83.3**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**8.68**	4.41	**5.71**	2.14	**--**	3.76	6.2	**16.7**	**12.4**	**9.04**	**--**	**--**	**--**	**--**
Trans-1,2-DCE	5	**--**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-DCE	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	2	**104 D**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**3.37**	**5.95**	**2.98**	**5.54**	**3.18**	**--**	**3.82**	**9.9**	**3.78**	**4.71**	--	**--**	**--**	**--**	**--**

DETECTED VOC (ug/l)	Groundwater Standard or Guidance Value (1)	MW-TB-4
		10/29/15
PCE	5	**6910**
TCE	5	**3450**
Cis-1,2-DCE	5	**6820**
Trans-1,2-DCE	5	**--**
1,1-DCE	5	--
Vinyl Chloride	2	**610**

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1,1-DCE = 1,1-Dichloroethene
VC = Vinyl Chloride

ATTACHMENT 1

NICHOLAS J. HARDING

EXPERIENCE

Day Environmental, Inc.: 2006 to present
Years with Other Companies: 25+

AREAS OF SPECIALIZATION

- Health and Safety Management Systems
- Environmental Management Systems
- Environmental, Health and Safety Training

EDUCATION

University of Rochester, M.S. Industrial Hygiene, 1999
Rochester Institute of Technology, B.S. Environmental Engineering, 1979

REGISTRATION/AFFILIATIONS

40-Hour OSHA Hazardous Waste Site Worker Training
OSHA 30-Hour General Industry Outreach Trainer
American Society of Safety Engineers, member since 2000
New York Water Environment Association, Industrial Issues Committee, Past Chair

RESPONSIBILITIES AND PROJECT EXPERIENCE

Mr. Harding has over 25 years of technical and managerial experience working on various environmental, health and safety issues for industry and consulting firms, and he is currently a member of DAY's Industrial Compliance Group. Mr. Harding has been involved with a number of industrial clients providing services relating to conducting facility health and safety assessments and developing Corrective Action Plans; preparing comprehensive safety programs, including Hazard Communication, Hearing Conservation, Respiratory Protection, Emergency Response and Confined Space Entry; personal and area industrial hygiene monitoring, environmental compliance auditing; environmental and safety training, hazardous waste compliance assessments, etc. Some of his representative projects are described below.

As Project Manager with Day Environmental, Rochester, NY

- **Corning NetOptix facility, Keene, NH** – this long-term project includes developing comprehensive environmental, health and safety policies and procedures to comply with Corporate and regulatory agency guidelines at this Diamond Turning facility of 120 employees. Programs developed include Contingency and Emergency Action Response, Bloodborne Pathogens, Hazardous Waste Management, Exotic Materials Exposure Control, EHS Inspections, and New Equipment/Process Safety Review.
- **Bombardier Transportation, Bath, New York** – this long-term project includes conducting extensive indoor air quality and industrial hygiene monitoring at this 250-employee railcar refurbishing operation, including hexavalent chromium, lead, volatile organic compounds, sound energy levels, and particulates. Training programs developed and presented include New Employee Orientation, Respiratory Protecting, Bloodborne Pathogens, Job Safety Analysis, Fall Protection and others.
- **Metro-North Railroad, New York, New York –** this client is a major transportation provider in the metro-New York area. Programs include 40-hour Hazardous Waste Operations and Emergency Response training, Chemical, Biological and Radiological Response training programs, Responding to Weapons of Mass Destruction training programs, and developing programs related to determining sound levels in locomotives and a wide variety of railroad right-of-way and maintenance shop activities.

Ten years as Manager, Health, Safety and Environment, Celltech Pharmaceuticals, Rochester, NY

- Developed and implemented programs that achieved consistent compliance with applicable **occupational safety and health regulations** relating to hazard communication, control of hazardous energy, personal protective equipment, respiratory protection, industrial vehicle safety, and contractor safety.
- Developed and implemented comprehensive programs that achieved consistent compliance with applicable **environmental regulations** relating to air emissions, wastewater discharges, solid and hazardous waste management, preventing and responding to spills and releases and stormwater management.
- Developed and delivered over 20 effective **training programs** for hundreds of manufacturing and laboratory personnel including Hazard Communication/Right-to-Know, Hazardous Energy Control (LOTO), Powered Industrial Vehicles, Chemical Hygiene, Hazardous Waste Management, and Confined Space Entry.
- Developed and implemented comprehensive **Safety Clearance Inspection and Corrective Action Programs** for manufacturing and laboratory environments that empowered workers to maintain a safe workplace.
- Developed and implemented a detailed **Risk Assessment Program**, to anticipate, recognize, evaluate and control occupational health and safety risk in over 15 job categories, including job hazard analyses, corrective action and rigorous follow-up, resulting in consistent reductions in personnel injury and illness.
- Coordinated a highly effective plant **Medical Emergency Response Team** that consistently responded to employee health emergencies in order to evaluate conditions and implement appropriate response measures.
- Oversaw the activities associated with an on-site **NYS Department of Environmental Conservation Voluntary Cleanup Program**, involving the design, installation and operation of a dual-phase extraction system to address the removal of chlorinated solvents in the groundwater.
- Maintained close liaison with **Worker's Compensation Insurance** carrier to foster clear understandings of incidents and appropriate follow-up, minimizing premium costs by 15% of 4 years.
- Performed **industrial hygiene monitoring** throughout the facility to determine exposure levels of over 25 contaminants in order to minimize risk to the workers and to protect the surrounding environment.

Over 13 years as Environmental Project Leader for environmental consulting companies.

- Worked with a variety of industrial and municipal clients on behalf of an international environmental engineering firm. Provided clients **with comprehensive regulatory compliance programs**, remedial investigations and development of health and safety-related programs.
- Prepared and negotiated **hazardous waste management** contracts; developed work plans and labor and materials budgets and managed projects through successful completion.
- Developed detailed **engineering reports and permit applications**, which were submitted to local, State and Federal regulatory agencies for issuance of applicable environmental permits.
- Developed **Phase I and Phase II Environmental Site Assessment** and **Corporate Environmental Regulatory Auditing** procedures that were adopted firm wide.
- Developed and coordinated **health and safety training** programs for use throughout the organization.

ATTACHMENT 2

EOS Remediation, LLC

EOS ZVI

SAFETY DATA SHEET

Section 1: Identification	
Product Name:	EOS ZVI
Chemical Description:	Mixture; carbonyl iron powder in vegetable oil
Manufacturer:	EOS Remediation 1101 Nowell Road Raleigh, NC 27607 (P): 919-873-2204
Recommended Use:	Groundwater Bioremediation (environmental applications)
Restricted Use:	Not for human consumption
24-Hour Emergency Contact:	ChemTel: United States (P): 800-255-3924 ChemTel: International (P): 813-248-0585

Section 2: Hazard(s) Identification	
Hazard Classification:	Irritant (eye and skin)
Signal Word:	Warning
Hazard Statement(s):	Potential eye and skin irritant.
Pictograms:	
Precautionary Statement(s):	Not for human consumption. Protect from freezing. Do not store near excessive heat or oxidizers. Avoid contact with eyes and skin. Wear protective gloves and eye protection.

Section 3: Composition/Information on Ingredients		
Common Name(s)	**CAS NO.**	**% by Weight**
Soybean Oil	8001-22-7	40 - 45
Emulsifiers Trade Secret[1,2]	Proprietary	5 - 10
Stabilizers Trade Secret[1,2]	Proprietary	1 - 5
Carbonyl Iron	7439-89-6	45 - 55

1 – The precise composition of this product is proprietary information. A more complete disclosure will be provided to a physician in the event of a medical emergency.
2 – The soluble substrates and emulsifiers are generally recognized as safe.

Section 4: First-Aid Measures	
Routes of Exposure	**Emergency First-Aid Procedures**
Inhalation	Remove to fresh air.
Eye Contact	Flush with water for 15 minutes; if irritation persists see a physician.
Dermal	Wash with mild soap and water.
Ingestion	Product is non-toxic. If nausea occurs, induce vomiting and seek medical attention.

Section 5: Fire-Fighting Measures	
Extinguishing Media:	CO_2, foam, dry chemical Note: Water, fog and foam may cause frothing and spattering.
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus and chemical resistant clothing. Use water spray to cool fire exposed containers.
Fire Hazard(s):	Burning will cause oxides of carbon.

Section 6: Accidental Release Measures	
Personal Precautions:	Avoid contact with eyes and skin. Do not consume.
Emergency Procedures:	N/A
Methods & Materials used for Containment:	Compatible granular absorbent
Cleanup Procedures:	Spread compatible granular absorbent over spill area and sweep using broom and pan; dispose in appropriate receptacle. Clean area with water.

Section 7: Handling and Storage	
Safe Handing & Storage:	Do not store near excessive heat (> 150°C) or oxidizers.
Other Precautions:	Consumption of food and beverages should be prevented in work area where product is being used. After handling product, always wash hands and face thoroughly with soap and water before eating, drinking, or smoking.

Section 8: Exposure Controls/Personal Protection		
Exposure Limits		
OSHA PEL:	Vegetable Oil Mist	15 mg/m^3 (total) 5 mg/m^3 (respirable)
ACGIH TLV:	NE	NE
NIOSH REL:	Vegetable Oil Mist	10 mg/m^3 (total) 5 mg/m^3 (respirable)
Personal Protective Measures		
Respiratory Protection:	Not normally required. P95 respirator if aerosols might be generated.	

Hand Protection:	Protective gloves are recommended
Eye Protection:	Recommended
Engineering Measures:	Local exhaust ventilation if aerosols are generated
Hygiene Measures:	Wash promptly with soap & water if skin becomes irritated from contact.
Other Protection:	Wear appropriate clothing to prevent skin contact.

NE – Not Established

Section 9: Physical and Chemical Properties			
Appearance:	Black	Explosive Limits:	NE
Odor:	Vegetable Oil	Vapor Pressure:	NE
Odor Threshold:	NE	Vapor Density:	Heavier than air
pH:	NE	Relative Density:	1.5 – 1.7
Melting Point/Freezing Point:	Liquid at room temperature	Solubility:	Easily soluble & dispersible
Boiling Point:	N/A	Partition coefficient:	NE
Flash Point:	>600°F (316°C)	Auto-ignition Temperature:	NE
Evaporation Rate:	NE	Decomposition Temperature:	N/A
Flammability (solid, gas):	NE	Viscosity:	2350 cP

NE – Not Established
N/A – Non-Applicable

Section 10: Stability and Reactivity	
Stability:	Stable
Incompatibility:	Strong acids and oxidizers
Hazardous Decomposition Products:	Thermal decomposition may produce oxides of carbon
Hazardous Reactions/Polymerization:	Will not occur
Conditions to Avoid:	Do not expose to temperatures above 150°C

Section 11: Toxicological Information		
Likely Routes of Exposure:		Ingestion, dermal and eye contact
Signs and Symptoms of Exposure:		None known
Health Hazards		
	Acute:	Potential eye and skin irritant
	Chronic:	None known
Carcinogenicity		
	NTP:	No
	IARC:	No
	OSHA:	No

Section 12: Ecological Information (non-mandatory)
There is no data on the ecotoxicity of this product.

Section 13: Disposal Considerations (non-mandatory)	
Waste Disposal Methods:	Dispose of according to Federal and local regulations for non-hazardous waste.

Section 14: Transport Information (non-mandatory)
The product is not covered by international regulation on the transport of dangerous goods.
No transport warning required.

Section 15: Regulatory Information (non-mandatory)
N/A

Section 16: Other Information	
Date of Preparation:	2 June 2016
Last Modified Date:	2 June 2016
The information contained herein is based on available data and is believed to be correct. However, EOS Remediation, LLC makes no warranty, expressed or implied, regarding the accuracy of this data or the results to be obtained thereof. This information and product are furnished on the condition that the person receiving them shall make his/her own determination as to the suitability of the product for his/her particular purpose.	

EOS Remediation, LLC

EOS PRO

SAFETY DATA SHEET

Section 1: Identification	
Product Name:	**EOS Pro**
Chemical Description:	Mixture; vegetable oil emulsion
Manufacturer:	EOS Remediation 1101 Nowell Road Raleigh, NC 27607 (P): 919-873-2204 www.eosremediation.com
Recommended Use:	Groundwater bioremediation (environmental applications)
Restricted Use:	Not for human consumption.
24-Hour Emergency Contact:	ChemTel: United States (P): 800-255-3924 ChemTel: International (P): 813-248-0585

Section 2: Hazard(s) Identification	
Hazard Classification:	Irritant (skin and eye)
Signal Word:	Warning
Hazard Statement(s):	Potential eye and skin irritant.
Pictograms:	
Precautionary Statement(s):	Not for human consumption. Do not store near excessive heat or oxidizers. Avoid contact with eyes and skin. Wear protective gloves and eye protection.

Section 3: Composition/Information on Ingredients		
Common Name(s)	**CAS NO.**	**% by Weight**
Soybean Oil	8001-22-7	59.8
Food Grade Emulsifiers Trade Secret[1,2]	Proprietary	10
Soluble Substrates Trade Secret[1,2]	Proprietary	4
Food Additives/Preservatives Trade Secret[1]	Proprietary	0.3
Nutrients/Extracts Trade Secret[1,2]	Proprietary	1
Water	7732-18-5	Balance

1 – The precise composition of this product is proprietary information. A more complete disclosure will be provided to a physician in the event of a medical emergency.
2 – The soluble substrates and emulsifiers are generally recognized as safe for food contact.

Section 4: First-Aid Measures	
Routes of Exposure	**Emergency First-Aid Procedures**
Inhalation	Remove to fresh air.
Eye Contact	Flush with water for 15 minutes; if irritation persists see a physician.
Skin Contact	Wash with mild soap and water.
Ingestion	Product is non-toxic. If nausea occurs, induce vomiting and seek medical attention.

Section 5: Fire-Fighting Measures	
Extinguishing Media:	CO_2, foam, dry chemical Note: Water, fog and foam may cause frothing and spattering.
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus and chemical resistant clothing. Use water spray to cool fire exposed containers.
Fire Hazard(s):	Burning will cause oxides of carbon.

Section 6: Accidental Release Measures	
Personal Precautions:	Avoid contact with eyes and skin. Do not consume.
Emergency Procedures:	N/A
Methods & Materials used for Containment:	Compatible granular absorbent
Cleanup Procedures:	Spread compatible granular absorbent over spill area and sweep using broom and pan; dispose in appropriate receptacle. Clean area with water.

Section 7: Handling and Storage	
Safe Handling & Storage:	Do not store near excessive heat or oxidizers.
Other Precautions:	Consumption of food and beverages should be prevented in work area where product is being used. After handling product, always wash hands and face thoroughly with soap and water before eating, drinking, or smoking.

Section 8: Exposure Controls/Personal Protection		
Exposure Limits		
OSHA PEL:	NE	
ACGIH TLV:	NE	
NIOSH REL:	NE	
Personal Protective Measures		
Respiratory Protection:	Not normally required. P95 respirator if aerosols might be generated.	
Hand Protection:	Protective gloves are recommended	
Eye Protection:	Recommended	
Engineering Measures:	Local exhaust ventilation if aerosols are generated	
Hygiene Measures:	Wash promptly with soap & water if skin becomes irritated from contact.	
Other Protection:	Wear appropriate clothing to prevent skin contact.	

Section 9: Physical and Chemical Properties			
Appearance:	White Liquid	Explosive Limits:	NE
Odor:	Vegetable Oil	Vapor Pressure:	NE
Odor Threshold:	NE	Vapor Density:	Heavier than air
pH:	Neutral	Relative Density:	0.96-0.98
Melting Point/Freezing Point:	Liquid at room temperature	Solubility:	Dispersible
Boiling Point:	212°F (100°C)	Partition coefficient:	NE
Flash Point:	>300°F (149°C)	Auto-ignition Temperature:	NE
Evaporation Rate:	NE	Decomposition Temperature:	N/A
Flammability (solid, gas):	NE	Viscosity:	500-1500 cP

NE – Not Established

Section 10: Stability and Reactivity	
Stability:	Stable
Incompatibility:	Strong acids and oxidizers
Hazardous Decomposition Products:	Thermal decomposition may produce oxides of carbon
Hazardous Reactions/Polymerization:	Will not occur
Conditions to Avoid:	None known

Section 11: Toxicological Information		
Likely Routes of Exposure:		Ingestion, dermal and eye contact
Signs and Symptoms of Exposure:		None known
Health Hazards		
	Acute:	Potential eye and skin irritant
	Chronic:	None known
Carcinogenicity		
	NTP:	No
	IARC:	No
	OSHA:	No

Section 12: Ecological Information (non-mandatory)
There is no data on the ecotoxicity of this product.

Section 13: Disposal Considerations (non-mandatory)	
Waste Disposal Methods:	Dispose of according to Federal and local regulations for non-hazardous waste. Recycle, if practical.

Section 14: Transport Information (non-mandatory)
The product is not covered by international regulation on the transport of dangerous goods.
No transport warning required.

Section 15: Regulatory Information (non-mandatory)
N/A

Section 16: Other Information	
Date of Preparation:	29 May 2014
Last Modified Date:	5 September 2014
The information contained herein is based on available data and is believed to be correct. However, EOS Remediation, LLC makes no warranty, expressed or implied, regarding the accuracy of this data or the results to be obtained thereof. This information and product are furnished on the condition that the person receiving them shall make his/her own determination as to the suitability of the product for his/her particular purpose.	

EOS Remediation, LLC

CoBupH$_{Mg}$

SAFETY DATA SHEET

Section 1: Identification	
Product Name:	**CoBupH$_{Mg}$**
Chemical Description:	Mixture; colloidal buffer
Manufacturer:	EOS Remediation 1101 Nowell Road Raleigh, NC 27607 (P): 919-873-2204
Recommended Use:	Groundwater pH adjustment (environmental applications)
Restricted Use:	Not for human consumption.
24-Hour Emergency Contact:	ChemTel: United States (P): 800-255-3924 ChemTel: International (P): 813-248-0585

Section 2: Hazard(s) Identification	
Hazard Classification:	Potential Respiratory Tract Irritant; irritant (skin and eye)
Signal Word:	Warning
Hazard Statement(s):	Potential eye and skin irritant; Inhalation may aggravate any preexisting respiratory disease.
Pictograms:	
Precautionary Statement(s):	Prolonged/frequent skin contact may lead to dermatitis; Ingestion generally causes purging of the bowels. Keep from freezing. Keep below 100 F to avoid evaporation of free water, which could lead to increased viscosity.

Section 3: Composition/Information on Ingredients		
Common Name(s)	**CAS NO.**	**% by Weight**
Alkaline Buffer Patent Pending Trade Secret[1]	Proprietary	45-50
Dispersant Trade Secret[1]	Proprietary	1-2
Stabilizer Trade Secret[1]	Proprietary	0.5-1
Water	7732-18-5	47-53.5

1 – The precise composition of this product is proprietary information. A more complete disclosure will be provided to a physician in the event of a medical emergency.

Section 4: First-Aid Measures	
Routes of Exposure	**Emergency First-Aid Procedures**
Inhalation	Remove to fresh air; as with exposure to any environment without adequate personal protection, inhalation may aggravate any preexisting respiratory disease.
Eye Contact	Flush with water for 15 minutes; if irritation persists see a physician.
Dermal	Wash with mild soap and water; prolonged/frequent skin contact may lead to dermatitis.
Ingestion	Product is non-toxic. If nausea occurs, induce vomiting and seek medical attention.

Section 5: Fire-Fighting Measures	
Extinguishing Media:	Use media appropriate to primary source of fire. Otherwise, use CO_2, foam, dry chemical. Note: Water, fog and foam may cause frothing and spattering.
Special Fire Fighting Procedures:	Wear self-contained breathing apparatus and chemical resistant clothing. Use water spray to cool fire exposed containers.
Fire Hazard(s):	None known.

Section 6: Accidental Release Measures	
Personal Precautions:	Avoid contact with eyes and skin. Do not consume.
Emergency Procedures:	N/A
Methods & Materials used for Containment:	Compatible granular absorbent
Cleanup Procedures:	Spread compatible granular absorbent over spill area and sweep using broom and pan; dispose in appropriate receptacle. Clean area with water.

Section 7: Handling and Storage	
Safe Handling & Storage:	Keep container closed when not in use. Avoid contact with eyes. Keep from freezing. Keep below 100 F to avoid evaporation of free water, which could lead to increased viscosity.
Other Precautions:	Consumption of food and beverages should be prevented in work area where product is being used. After handling product, always wash hands and face thoroughly with soap and water before eating, drinking, or smoking.

Section 8: Exposure Controls/Personal Protection		
Exposure Limits		
OSHA PEL:	NE	
ACGIH TLV:	NE	
NIOSH REL:	NE	

Personal Protective Measures	
Respiratory Protection:	Not normally required. N95 respirator if aerosols might be generated.
Hand Protection:	Protective gloves are recommended
Eye Protection:	Recommended
Engineering Measures:	Local exhaust ventilation if aerosols are generated
Hygiene Measures:	Wash promptly with soap & water following skin contact. After handling product, always wash hands and face thoroughly with soap and water before eating, drinking or smoking.
Other Protection:	Wear appropriate clothing to prevent skin contact

Section 9: Physical and Chemical Properties			
Appearance:	Milky white aqueous suspension	Explosive Limits:	NE
Odor:	None	Vapor Pressure:	NE
Odor Threshold:	NE	Vapor Density:	N/A
pH:	10.5-11.5	Relative Density:	1.6
Melting Point/Freezing Point:	32° F (0°C)	Solubility:	Slightly Soluble
Boiling Point:	N/A	Partition coefficient:	NE
Flash Point:	Not flammable or combustible	Auto-ignition Temperature:	N/A
Evaporation Rate:	NE	Decomposition Temperature:	100-110°F (38°-43° C) (water will evaporate)
Flammability (solid, gas):	NE	Viscosity:	100-200 cP

NE – Not Established
N/A - Not Applicable

Section 10: Stability and Reactivity	
Stability:	Stable
Incompatibility:	ACID (Strong) - vigorous reaction, heat generated; MALEIC ANHYDRIDE - Alkali and other alkaline earth compounds, including magnesium compounds will cause explosive decomposition. PHOSPHORUS - when boiled with alkaline hydroxides yields mixed phosphine that may ignite spontaneously in air.
Hazardous Decomposition Products:	If container is left open at 100-110 F, water will evaporate causing product to become extremely viscous.
Hazardous Reactions/Polymerization:	Will not occur
Conditions to Avoid:	None known

Section 11: Toxicological Information		
Likely Routes of Exposure:		Ingestion, dermal and eye contact
Signs and Symptoms of Exposure:		Eye Contact: redness, tearing, conjunctivitis Skin Contact: drying, chapping, dermatitis
Health Hazards		
	Acute:	Ingestion generally causes purging of the bowels; Swallowing large amounts may lead to bowel obstruction. Potential eye and skin irritant.
	Chronic:	None known
Carcinogenicity		
	NTP:	No
	IARC:	No
	OSHA:	No

Section 12: Ecological Information (non-mandatory)
There is no data on the ecotoxicity of this product.

Section 13: Disposal Considerations (non-mandatory)	
Waste Disposal Methods:	Dispose of according to Federal and local regulations for non-hazardous waste.

Section 14: Transport Information (non-mandatory)
The product is not covered by international regulation on the transport of dangerous goods.
No transport warning required.

Section 15: Regulatory Information (non-mandatory)
N/A

Section 16: Other Information	
Date of Preparation:	29 May 2014
Last Modified Date:	5 September 2014
The information contained herein is based on available data and is believed to be correct. However, EOS Remediation, LLC makes no warranty, expressed or implied, regarding the accuracy of this data or the results to be obtained thereof. This information and product are furnished on the condition that the person receiving them shall make his/her own determination as to the suitability of the product for his/her particular purpose.	

EOS Remediation, LLC

BAC-9

SAFETY DATA SHEET

Section 1: Identification	
Product Name:	**BAC-9**
Chemical Description:	Non-toxic, naturally occurring, non-pathogenic, non-genetically altered anaerobic microbes in a water-based medium
Manufacturer:	CB&I 17 Princess Road Lawrenceville, NJ 08648 609-895-5340
Recommended Use:	Groundwater bioremediation (environmental applications)
Restricted Use:	Not for human consumption.
24-Hour Emergency Contact:	ChemTel: United States (P): 800-255-3924 ChemTel: International (P): 813-248-0585

Section 2: Hazard(s) Identification	
Hazard Classification:	Irritant (skin and eye)
Signal Word:	Warning
Hazard Statement(s):	Potential eye and skin irritant in hypersensitive humans.
Pictograms:	
Precautionary Statement(s):	Not for human consumption. Avoid contact with eyes and skin. Wear protective gloves and eye protection.

Section 3: Composition/Information on Ingredients		
Common Name(s)	**CAS NO.**	**% by Weight**
Microbial consortium in water (comprised of microorganism of the genus *Dehalococcoides)*	N/A	100

Section 4: First-Aid Measures	
Routes of Exposure	**Emergency First-Aid Procedures**
Inhalation	Get medical attention if allergic symptoms develop.
Eye Contact	Flush eyes with plenty of water for at least 15 minutes.. Get medical attention if irritation occurs.
Skin Contact	N/A
Ingestion	Thoroughly rinse mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Get immediate medical attention.

Section 5: Fire-Fighting Measures	
Extinguishing Media:	CO_2, foam, dry chemical
Special Fire Fighting Procedures:	None
Fire Hazard(s):	None

Section 6: Accidental Release Measures	
Personal Precautions:	Avoid contact with skin or eyes.
Emergency Procedures:	N/A
Methods & Materials used for Containment:	Compatible granular absorbent
Cleanup Procedures:	Spread compatible granular absorbent over spill area and sweep using broom and pan; dispose in appropriate receptacle. Clean area with water.

Section 7: Handling and Storage	
Safe Handling & Storage:	Use personal protective equipment recommended in Section 8. Keep containers tightly closed in a cool, well-ventilated area. The DHC microbial consortium can be supplied in stainless steel kegs designed for maximum working pressure of 130 psi and equipped with pressure relief valves. The kegs are pressurized with Nitrogen up 15 psi. Do not exceed pressure of 15 psi during transfer of DHC microbial consortium from kegs. Do not open keg if content of the keg is under pressure.
Other Precautions:	BAC-9 may be stored for up to 3 weeks at a temperature range of 2-4°C without aeration. Avoid freezing.

Section 8: Exposure Controls/Personal Protection		
Exposure Limits		
OSHA PEL:	NE	
ACGIH TLV:	NE	
NIOSH REL:	NE	
Personal Protective Measures		
Respiratory Protection:	Not normally required. N95 respirator if aerosols might be generated.	
Hand Protection:	Protective gloves are recommended.	
Eye Protection:	Recommended. An eyewash station in the work area is recommended.	
Engineering Measures:	Local exhaust ventilation if aerosols are generated	
Hygiene Measures:	Wash promptly with soap & water following skin contact.	
Other Protection:	Wear appropriate clothing to prevent skin contact.	

Section 9: Physical and Chemical Properties			
Appearance:	Light greenish murky liquid	Explosive Limits:	N/A
Odor:	Musty	Vapor Pressure:	24 mm Hg
Odor Threshold:	N/A	Vapor Density:	N/A
pH:	6.0-8.0	Relative Density:	0.9-1.1
Melting Point/Freezing Point:	0°C	Solubility:	Soluble
Boiling Point:	100°C	Partition coefficient:	NE
Flash Point:	N/A	Auto-ignition Temperature:	N/A
Evaporation Rate:	0.9-1.1	Decomposition Temperature:	N/A
Flammability (solid, gas):	N/A	Viscosity:	NE

Section 10: Stability and Reactivity	
Stability:	Stable
Incompatibility:	Water-reactive materials
Hazardous Decomposition Products:	None
Hazardous Reactions/Polymerization:	None
Conditions to Avoid:	None

Section 11: Toxicological Information		
Routes of Exposure:		Ingestion, Eye Contact
Signs and Symptoms of Exposure:		Ingestion of large quantities may result in abdominal discomfort including nausea, vomiting, cramps, diarrhea, and fever. Skin may become irritated upon prolonged contact. Hypersensitive individuals may experience allergic reactions. May cause eye irritation unless immediately rinsed.
Health Hazards		
	Acute:	Irritation of the skin or eyes. Ingestion may result in abdominal discomfort.
	Chronic:	None
Carcinogenicity		
	NTP:	No
	IARC:	No
	OSHA:	No

Section 12: Ecological Information (non-mandatory)
Ecotoxicity: this material will degrade in the environment

Section 13: Disposal Considerations (non-mandatory)	
Waste Disposal Methods:	Dispose of according to Federal and local regulations for non-hazardous waste. Recycle, if practical.

Section 14: Transport Information (non-mandatory)
The product is not covered by international regulation on the transport of dangerous goods.
No transport warning required.

Section 15: Regulatory Information (non-mandatory)
N/A

Section 16: Other Information	
Date of Preparation:	15 August 2014
Last Modified Date:	5 September 2014
The information contained herein is based on available data and is believed to be correct. However, EOS Remediation, LLC makes no warranty, expressed or implied, regarding the accuracy of this data or the results to be obtained thereof. This information and product are furnished on the condition that the person receiving them shall make his/her own determination as to the suitability of the product for his/her particular purpose.	

APPENDIX C

REMEDIAL ALTERNATIVE COST ESTIMATES

Table C-1
No Further Action Remedial Alternative

Former Parkway Cleaners
Canandaigua, New York
NYSDEC Site Number C835028

This alternative assumes no further action will be taken at a cost of $0.00

Table C-2
Track 4 Restricted Commerical Use Remedial Alternative

Former Parkway Cleaners
Canandaigua, New York
NYSDEC Site Number C835028

Capital/Initial Costs - ISCR / Bioremediation/ Engineering Controls			
	Work Plans, HASP, QAPP, CPP	$	11,125.00
	Sub-slab depressurization system install and testing	$	32,380.00
	Residual Source Area Remediation	$	57,568.00
	Plume Remediation	$	17,960.55
	Site Management Plan	$	7,500.00
	Cover System Maintenance	$	3,000.00
	20% Contingency	$	25,907.00
	Year 1 Total	**$**	**155,440.55**

Operation/Maintenance/Annual Costs			
	Year 1 Quarterly Groundwater Monitoring ($6,750/yr. * 4Qtr)	$	27,000.00
	Year 2-4 Semi-Annual Groundwater Monitoring ($13,667/yr. * 3yrs)	$	41,000.00
	Years 5-29 Annual Groundwater Monitoring ($6,440/yr. * 25 yrs.)	$	161,000.00
	Year 30 Groundwater Monitoring	$	9,000.00
	Years 4-10 Dehalocccocides Testing	$	28,000.00
	Year 1 Air Monitoring	$	8,000.00
	Years 2-10 Air Monitoring	$	63,000.00
	Years 5-30 Periodic Review Reports	$	66,000.00
	20% Contingency	$	80,600.00
	Total Operation/Maintenance/Annual Costs	**$**	**484,000.00**

Closeout Costs			
	Final Engineering Report	$	25,000.00
	20% Contingency	$	5,000.00
	Total Closeout Costs	**$**	**30,000.00**
Estimated Total Project Cost		**$**	**669,440.55**

Present Worth Costs (includes 20% contingency)			
	Capital/Initial Costs	$	155,440.55
	Year 1 Groundwater Monitoring (0.9524)	$	30,857.76
	Year 2-4 Groundwater Monitoring (3.5460-0.9524)	$	42,535.04
	Years 5-29 Groundwater Monitoring (F =15.1411-3.5460)	$	89,606.93
	Year 30 Groundwater Monitoring (F= 0.2314)	$	2,499.12
	Years 4-10 Dehalococcoides Testing (F = 7.7217-2.723)	$	23,993.76
	Year 1 Air Monitoring (F=0.9524)	$	9,143.04
	Years 2-10 Air Monitoring (F=7.7217-0.9524)	$	56,862.12
	Years 5-30 Periodic Review Reports (F=15.3725-3.5460)	$	36,025.34
	Year 10 Closeout Costs (F=0.6139)	$	18,417.00
	Total Present Worth Costs	**$**	**465,380.66**

Notes

- F = Discount Factor of 5% at the nth year of project.
- Prevailing wage rates do not apply.
- Quantity of remedial amendments based on RI and supplemental study findings.

Table C-3
Track 1 Unrestricted Use Remedial Alternative

Former Parkway Cleaners
Canandaigua, New York
NYSDEC Site Number C835028

Capital/Initial Costs			
Building Demolition ($7.50/ft^2 + Mob/Demob)		$	33,000.00
Utility Decommissioning		$	20,000.00
Work Plan, HASP, QAPP, CPP		$	31,000.00
Surface Soil Excavation and Disposal (Excavation, Non-Haz Transport and Disposal and Backfill)		$	5,000.00
Subsurface Soil Removal (Excavation, Transport and Disposal of ~30,350 ft^3)			
Excavation Dewatering		$	25,000.00
Clean Backfill removal and replacement		$	5,000.00
Non-Hazardous Material used as cover at landfill (94% of total volume)		$	70,000.00
Non-Hazardous Material requiring burial at landfill (5% of total volume)		$	5,000.00
Characteristic Hazardous Material (1% of total Volume)		$	2,000.00
Oversight Costs (Crew and Equipment)		$	6,500.00
Chemical Reduction Treatability Study		$	8,000.00
In-Situ Remediation (~88,284 gallons of groundwater)			
KMnO4 (10,560)		$	30,000.00
Injection Rig and Crew and Oversight		$	41,000.00
Building Construction ($115/ft^2)		$	403,000.00
20% Contingency		$	137,000.00
	Capital/Initial Costs Total	**$**	**821,500.00**

Operation/Maintenance/Annual Costs			
Year 1-2 Quarterly Groundwater Monitoring (Cumulative Annual Costs)		$	65,000.00
Years 3-9 Semi-Annual Groundwater Monitoring (Cumulative Annual Costs)		$	167,000.00
Year 10 Groundwater Monitoring		$	11,000.00
Years 5-10 Periodic Review Reports ($2,667/yr. * 6 yrs.)		$	16,000.00
20% Contingency		$	52,000.00
	Total Operation/Maintenance/Annual Costs	**$**	**311,000.00**

Closeout Costs			
Final Engineering Report		$	25,000.00
20% Contingency		$	5,000.00
	Total Closeout Costs	**$**	**30,000.00**
	Estimated Total Project Cost	**$**	**1,162,500.00**

Present Worth Costs (includes 20% contingency)			
Capital/Initial Costs		$	821,500.00
Year 1-2 Groundwater Monitoring (F=1.8594)		$	72,516.60
Years 3-9 Groundwater Monitoring (F = 7.1078-1.8594)		$	150,254.19
Year 10 Groundwater Monitoring (F= 0.6139)		$	8,103.48
Years 5-10 Periodic Review Reports (F=7.7217-3.546)		$	13,362.24
Year 10 Closeout Costs (F=0.6139)		$	18,417.00
	Total Present Worth Costs	**$**	**1,084,153.51**

Notes

F = Discount Factor of 5% at the nth year of project.
Quantity of chemical oxidation amendments based on RI findings and should be refined (i.e., treatability study) before implementation.

- Prevailing wage rates do not apply.

APPENDIX D

REMEDIAL VENDOR DESIGN SUMMARIES, REMEDIAL AMENDMENT SPECIFICATION AND VENDOR CUT SHEETS

EOS Remediation, LLC **Site: Parkway AOC #1**

919-873-2204 **www.eosremediation.com**

Design Summary: Input parameters for the volume estimate are outlined below. When a parameter was unknown with no laboratory or field information provided by the client, a default value was used. A safety factor of 2 is used in our calculations. If your assumptions are different from those included in this table, or you obtain more information following a pilot test, please let us provide another estimate as the product(s) or volume proposed for this site could change.

Treatment Type	Value	Units	Default	Site Value
Barrier or Source Treatment	Source Area			
EOS Product	EOS ZVI			
Length of treatment area parallel to groundwater flow, 'x'	45	ft		√
Width of treatment area perpendicular to groundwater flow, "y"	11	ft		√
Treatment thickness, "z"	14	ft		√
Nominal soil type	Silty Sand			√
Estimated Porosity (total)	0.28			√
Effective Porosity	0.17			√
Soil bulk density	119	pcf	Calculated	
Biogeochemical				
pH of groundwater	7.40	SU		√
Acid demand of aquifer material	0.0	OH^- meq/Kg		√
Acidity of groundwater	0.0	OH^- meq/L		√
Acidity values based on laboratory data	No			
Geohydrology				
Hydraulic Conductivity	1	ft/d		√
Hydraulic Gradient	0.005	ft/ft		√
Seepage Velocity	0.029	ft/d	Calculated	
Contact time	60	days	√	
Design Life per application	3	yrs.	√	
Analytical				
Dissolved Oxygen (DO)	1	mg/L		√
Nitrate Nitrogen (NO_3^- - N)	0	mg/L		√
Sulfate (SO_4^{2-})	0	mg/L		√
Tetrachloroethene (PCE), C_2Cl_4	6.9	mg/L		√
Trichloroethene (TCE), C_2HCl_3	3.45	mg/L		√
cis-1,2-dichloroethene (c-DCE), $C_2H_2Cl_2$	6.8	mg/L		√
Vinyl Chloride (VC), C_2H_3Cl	0.6	mg/L		√
Carbon tetrachloride, CCl_4	0	mg/L		√
Chloroform, $CHCl_3$	0	mg/L		√
sym-tetrachloroethane, $C_2H_2Cl_4$	0	mg/L		√
1,1,1-Trichloroethane (TCA), CH_3CCl_3	0	mg/L		√
1,1-Dichloroethane (DCA), $C_2H_4Cl_2$	0	mg/L		√
Chloroethane, C_2H_5Cl	0	mg/L		√
Perchlorate, ClO_4^-	0	mg/L		√
Hexavalent Chromium, Cr[VI]	0	mg/L		√
Pentachlorophenol	0	mg/L		√
User added	0	mg/L		
User added	0	mg/L		
Estimated Amount of $Fe2^+$ Formed	10	mg/L	√	
Estimated Amount of Manganese (Mn^{2+}) Formed	5	mg/L	√	
Estimated Amount of CH_4 Formed	5	mg/L	√	
Target Amount of DOC to Release	60	mg/L	√	
Design				
Design Factor	3	times	√	
Stoichiometric Hydrogen Demand	3.5	lbs	Calculated	
Effective treatment thickness for substrate, "z_e"	100%		√	
Maximum Oil Retention	0.0030		√	
DOC Released	86	lbs	Calculated	
Base Required for Sediment	0	OH^- eq	Calculated	
Base Required for Aquifer	0	OH^- eq	Calculated	
Mass to be treated	825,450	lbs	Calculated	
Estimated total groundwater volume treated over design life	20,822	gal	Calculated	
Calculated Substrate Requirement				
Substrate Requirement Based on Hydrogen Demand and Carbon Loss	**104**	**lbs**		
Substrate Requirement Based on Oil Entrapment by Aquifer Material	**6,069**	**lbs**		
EOS ZVI Requirement			**8**	**Drums**
CoBupH-Mg (buffer) Recommended	**24**	**lbs**	**1.0**	**Pails**
Quantity of Dechlorinating Consortium BAC-9	**3**	**L**		

EOS Remediation, LLC **Site: Parkway AOC #** 3

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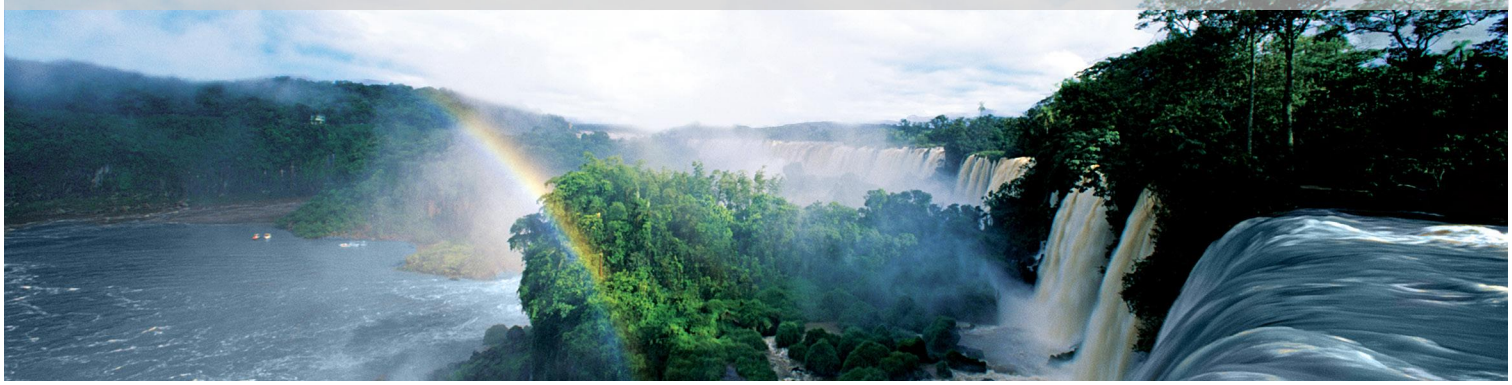
Design Summary: Input parameters for the volume estimate are outlined below. When a parameter was unknown with no laboratory or field information provided by the client, a default value was used. A safety factor of 2 is used in our calculations. If your assumptions are different from those included in this table, or you obtain more information following a pilot test, please let us provide another estimate as the product(s) or volume proposed for this site could change.

Treatment Type	Value	Units	Default	Site Value
Barrier or Source Treatment	Source Area			
EOS Product	EOS Pro			
Length of treatment area parallel to groundwater flow, 'x'	50	ft		√
Width of treatment area perpendicular to groundwater flow, "y"	35	ft		√
Treatment thickness, "z"	10	ft		√
Nominal soil type	Silty Sand			√
Estimated Porosity (total)	0.28			√
Effective Porosity	0.17			√
Soil bulk density	119	pcf	Calculated	
Biogeochemical				
pH of groundwater	7.40	SU		√
Acid demand of aquifer material	0.0	OH^- meq/Kg		√
Acidity of groundwater	0.0	OH^- meq/L		√
Acidity values based on laboratory data	No			
Geohydrology				
Hydraulic Conductivity	1	ft/d		√
Hydraulic Gradient	0.005	ft/ft		√
Seepage Velocity	0.029	ft/d	Calculated	
Contact time	60	days	√	
Design Life per application	3	yrs.	√	
Analytical				
Dissolved Oxygen (DO)	1	mg/L		√
Nitrate Nitrogen (NO_3^- - N)	0	mg/L		√
Sulfate (SO_4^{2-})	0	mg/L		√
Tetrachloroethene (PCE), C_2Cl_4	0	mg/L		√
Trichloroethene (TCE), C_2HCl_3	0	mg/L		√
cis-1,2-dichloroethene (c-DCE), $C_2H_2Cl_2$	2.1	mg/L		√
Vinyl Chloride (VC), C_2H_3Cl	1.2	mg/L		√
Carbon tetrachloride, CCl_4	0	mg/L		√
Chloroform, $CHCl_3$	0	mg/L		√
sym-tetrachloroethane, $C_2H_2Cl_4$	0	mg/L		√
1,1,1-Trichloroethane (TCA), CH_3CCl_3	0	mg/L		√
1,1-Dichloroethane (DCA), $C_2H_4Cl_2$	0	mg/L		√
Chloroethane, C_2H_5Cl	0	mg/L		√
Perchlorate, ClO_4^-	0	mg/L		√
Hexavalent Chromium, Cr[VI]	0	mg/L		√
Pentachlorophenol	0	mg/L		√
User added	0	mg/L		
User added	0	mg/L		
Estimated Amount of $Fe2^+$ Formed	10	mg/L	√	
Estimated Amount of Manganese (Mn^{2+}) Formed	5	mg/L	√	
Estimated Amount of CH_4 Formed	5	mg/L	√	
Target Amount of DOC to Release	60	mg/L	√	
Design				
Design Factor	2	times	√	
Stoichiometric Hydrogen Demand	2.9	lbs	Calculated	
Effective treatment thickness for substrate, "z_e"	25%		√	
Maximum Oil Retention	0.0030		√	
DOC Released	95	lbs	Calculated	
Base Required for Sediment	0	OH^- eq	Calculated	
Base Required for Aquifer	0	OH^- eq	Calculated	
Mass to be treated	521,117	lbs	Calculated	
Estimated total groundwater volume treated over design life	50,989	gal	Calculated	
ZVI				
Calculated Substrate Requirement				
Substrate Requirement Based on Hydrogen Demand and Carbon Loss	**106**	**lbs**		
Substrate Requirement Based on Oil Entrapment by Aquifer Material	**3,595**	**lbs**		
EOS Pro Requirement			**9**	**Drums**
CoBupH-Mg (buffer) Recommended	**0**	**lbs**	**0.0**	**Pails**
Quantity of Dechlorinating Consortium BAC-9	**8**	**L**		

EOSZVI

Water-mixable oil and zero valent iron (ZVI) slurry formulation to enhance anaerobic reductive dechlorination



Water-mixable vegetable oil based substrate containing 50% micro-scale carbonyl iron, soy bean oil, surfactant and stabilizer, providing a long-lasting source for anerobic remediation of DNAPL

Product Advantages

- Waterless concentrate, easy to use formulation
- Effective on DNAPL
- Abiotic and biotic pathways for recalcitrant contaminants
- Highest iron to carbon ratio on the market; greater than 1:1

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EOS Remediation

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EOSZVI

Description

EOSZVI is a patent-pending water-mixable vegetable oil based organic substrate with the highest concentration of micron-scale zero valent iron (ZVI) available. This unique product combines the proven reactivity of ZVI with a long lasting source of electron donor for enhanced *in situ* anaerobic, abiotic, and biotic remediation. EOSZVI is shipped as a waterless concentrate; simply add water in the field to instantly create an injection-ready solution.

EOSZVI benefits:

- Ideal for DNAPL sites
- Quickly reduces ORP of aquifers
- Highest ratio of ZVI to carbon on the market; greater than 1:1
- Employs the proven EOS® technology
- Larger droplet size for greater oil retention
- Excellent for barrier and fractured rock applications
- Can be used with other EOS® products
- Carbonyl iron particle size average 3-4µm

Domestic supply made in the USA with US farmed soybeans.

Chemical & Physical Properties

Oil Concentrate: EOSZVI	Typical
Micron-scale Carbonyl Iron (ZVI) (% by wt.)	50
Stabilizer (% by wt.)	2
Refined and Bleached US Soybean Oil (% by wt.)	41
Slow Release Organics (% by wt.)	7
Specific Gravity	~1.6
Viscosity (cP)	2,350
Organic Carbon (% by wt.)	48

Packaging

Shipped in 5-gallon pails (net 50 lbs. each), 55-gallon drums or 275-gallon IBC totes.

Handling & Storage

EOSZVI is shipped as concentrated oil and iron slurry that is diluted with water in the field to prepare a solution for easy injection. EOSZVI can be distributed with commonly available pumps. Dilution ratios for EOSZVI typically range from 1:1 to 5:1 (water: EOSZVI) depending on site conditions. EOSZVI injections should be followed with additional chase water to maximize distribution of EOSZVI into the formation.

EOSZVI as shipped, has a shelf-life of ≥ 2 years depending on storage conditions.

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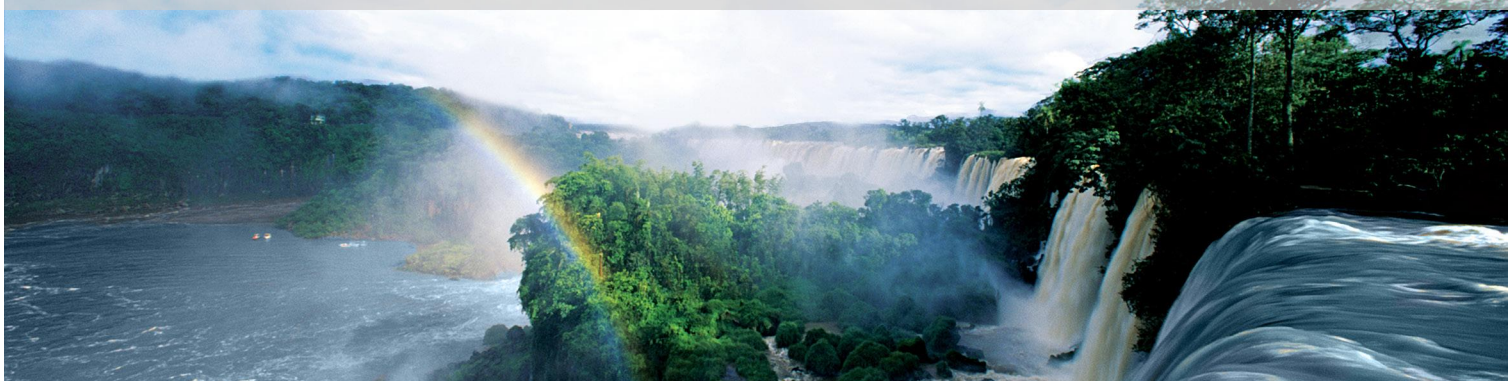
EOSPRO

Engineered formula of emulsified vegetable oil, nutrients and vitamins optimizes distribution and contaminant degradation



Enriched emulsified vegetable oil used to stimulate anaerobic bioremediation of chlorinated solvents and other recalcitrant chemicals in contaminated groundwater

USDA CERTIFIED BIOBASED PRODUCT
PRODUCT 95%

Product Advantages

- Vitamin B12 and micronutrients
- Slow and fast release substrates
- Engineered for effective transport
- Third party validated
- Food-grade and USDA certified
- 74% fermentable carbon
- Regulatory acceptance

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EOS PRO

Description

EOS$_{PRO}$ is a nutrient-enriched, DoD-validated, emulsified vegetable oil (EVO). EOS$_{PRO}$ is engineered to quickly stimulate microbial activity while providing long-term nourishment to enhance anaerobic bioremediation of chlorinated solvents, nitrates, perchlorate, energetics, acid mine drainage, and other recalcitrant chemicals in contaminated groundwater. EOS$_{PRO}$ can also be used to reduce redox sensitive metals and radionuclides. The negative surface charges on the droplets combined with small droplet size promote effective transport in the subsurface.

EOS$_{PRO}$ benefits include:

- Vitamin B-12 and micro-nutrients
- Rapidly-biodegradable substrates to "jump start" bacterial growth
- Slow release biodegradable substrates to promote long-term biological activity
- Engineered for effective transport in the subsurface
    - Small oil droplet size
    - Negative surface charge
- Extensive third-party validation

EOS$_{PRO}$ incorporates the patented EOS® technologies that clients have trusted for more than a decade. Domestic supply made in the USA with US farmed soybeans.

Chemical & Physical Properties

Oil Emulsion Concentrate: EOS$_{PRO}$	Typical
Refined and Bleached US Soybean Oil (% by wt.)	59.8
Rapidly Biodegradable Soluble Substrate (% by wt.)	4
Other Organics (emulsifiers, food additives, etc.) (% by wt.)	10
Specific Gravity	0.96 - 0.98
pH (Standard Units)	6 - 7
Median Oil Droplet Size (microns)	1.0
Organic Carbon (% by wt.)	74
Mass of Hydrogen Produced (lbs. H_2 per lbs. EOS$_{PRO}$)	0.25

Packaging

Shipped in 55-gallon drums, 275-gallon IBC totes or bulk tankers (40,000 lbs.)

Handling & Storage

EOS$_{PRO}$ is shipped as a ready-to-use concentrated emulsion that can be diluted with water in the field to prepare a high quality suspension for easy injection. EOS$_{PRO}$ has a low viscosity and can be distributed with commonly available pumps or by continuous metering with a diluter (e.g., Dosatron™). Dilution ratios for EOS$_{PRO}$ typically range from 4:1 to 20:1 (water: EOS$_{PRO}$) depending on site conditions. EOS$_{PRO}$ injections should be followed with additional chase water to maximize distribution of EOS$_{PRO}$ into the formation.

EOS$_{PRO}$ can be injected with EOS$_{QR}$, CoBupH$_{Mg}$ or BAC-9. Call us for more details.

For best performance, use EOS$_{PRO}$ as shipped, within 60 days of delivery and store at a temperature between 40°F (4°C) to 100°F (38°C).

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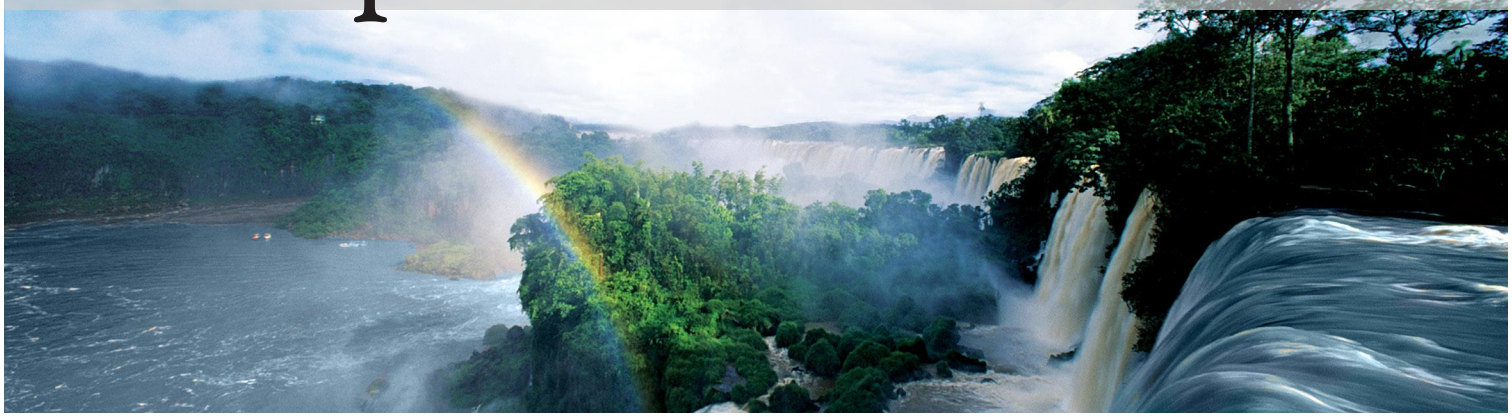
CoBupHMg

Long-lasting pH control and adjustment of aquifers for enhanced bioremediation and metals immobilization



A safe, easy-to-use, long-lasting, colloidal buffer that can be mixed with any EOS® emulsified oil product or used alone

Product Advantages

- Long-term pH adjustment
- Minimized risk of overshooting pH
- Can be combined with EOS® electron donors
- Ships in small containers
- Easily diluted with water in the field

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CoBupH$_{Mg}$

Description

CoBupH$_{Mg}$ is a premium colloidal suspension of alkaline solids providing long-term, slow release adjustment of pH in acidic aquifers to optimum levels for biodegradation and immobilization of some dissolved metals. CoBupH$_{Mg}$'s patented formulation provides:

- Equilibrium pH of ~10 in a 10:1 dilution (DI water:CoBupH$_{Mg}$), minimizing the risk of overshooting the pH by buffer addition
- Micron scale, negatively charged particles promote distribution from the injection point
- Can be used in combination with our emulsified oil products.

Chemical & Physical Properties

Alkaline Colloidal Suspension Concentrate: CoBupH$_{Mg}$	Typical
Alkaline Buffer (% by wt.)	45
Dispersant (% by wt.)	1
Stabilizer (% by wt.)	0.5
Specific Gravity	1.37
pH (Standard Units) - 10:1 dilution (DI water: CoBupH$_{Mg}$)	~10
Mean Particle Size (µm)	0.6
OH- equivalence (eq. OH- per lb. CoBupH$_{Mg}$)	7±0.5

Packaging

Shipped in 5-gallon pails (50 lbs.)

Handling & Storage

CoBupH$_{Mg}$ is shipped as a ready-to-use concentrated suspension of alkaline solids that can be easily diluted with water in the field. CoBupH$_{Mg}$ has a low viscosity and is amenable to pumping with commonly available pumps. Before dilution, agitate to ensure product is adequately mixed. Dilution ratios typically range from 1:1 to 4:1 (water: CoBupH$_{Mg}$) depending on site conditions; CoBupH$_{Mg}$ injections should be followed with additional chase water to maximize distribution.

For best performance, use CoBupH$_{Mg}$ within 60 days of delivery and store at a temperature of 40°F (4°C) to 100°F (38°C).

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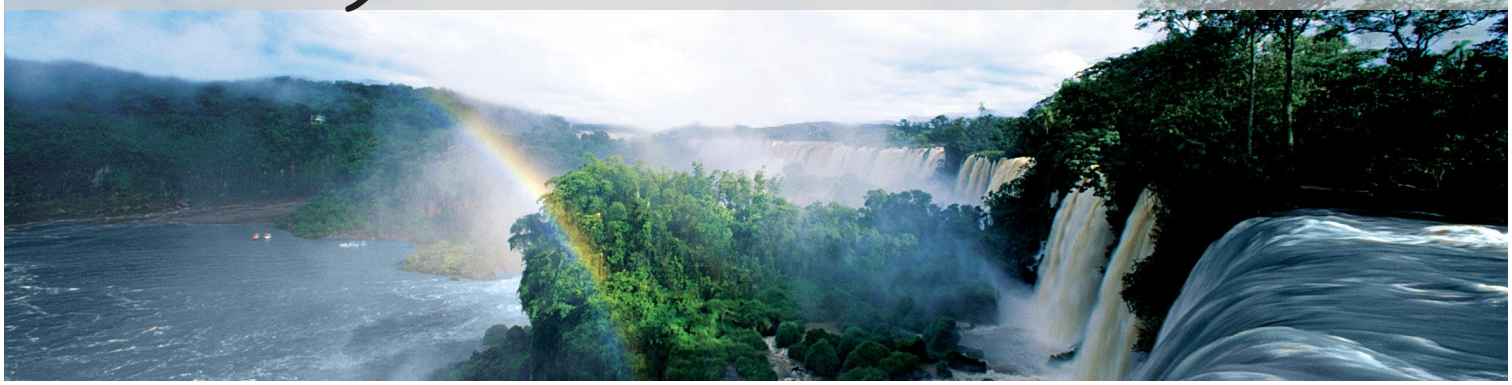
BAC-9

A microbial consortium of *Dehalococcoides mccartyi* enriched to degrade PCE and TCE completely to ethene



Enriched bioaugmentation culture capable of degrading chlorinated solvents to innocuous compounds via halorespiration

Product Advantages

- High cell concentration: 10^{11} Cells/L
- Direct injection for in situ treatment of chlorinated ethenes
- Degrades: PCE, TCE, cis & trans-DCE, VC, Freon 113, mixed plumes containing 1,1,1-TCA & 1,1,2-TCA, dichloroethane isomers, CT, chloroform, and bromine compounds

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BAC-9

Description

BAC-9 is an enriched bioaugmentation culture capable of degrading chlorinated solvents to innocuous compounds efficiently via halorespiration.

Applications:

- Direct injection for *in situ* treatment of chlorinated ethenes
- Inoculation of on-site bioreactors
- Degrades: tetrachloroethylene (PCE), trichloroethene, (TCE), dichloroethene isomers (cis & trans-DCE), vinyl chloride (VC), Freon 113, mixed plumes containing trichloroethane (1,1,1-TCA & 1,1,2-TCA), dichloroethane isomers, carbon tetrachloride (CT), chloroform, and bromine compounds (carbon tetrabromide, bromoform, ethylene dibromide (EDB) and bromoethane)

Chemical & Physical Properties

Bioaugmentation Culture: BAC-9	Typical
Microbial consortium including *Dehalococcoides mccartyi* and enzymes in a water-based medium	10^{11} Cells/L

Packaging

Shipped in 19 liter pressurized soda keg. Orders greater than 19 liters are concentrated up to 10-fold to significantly reduce shipping and supply costs for your project. Actual volumes and concentration factor will be written on a hang tag attached with the keg.

See the EOS® website for an instructional video on BAC-9 handling and injection procedure.

Handling & Storage

BAC-9 is shipped overnight direct to your site in a chilled cooler. Your BAC-9 delivery includes: instruction manual, delivery cylinder (request 1, 2 or 3.5 liter) with quick connects and ¼" ID tubing hose barbs. An inert gas (Nitrogen or Argon) cylinder, regulator, and additional tubing to reach the injection point are required but not included.

BAC-9 must be stored at 4°C (40°F) and can remain usable for up-to three weeks from delivery.

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