2021 REVISED CORRECTIVE MEASURES WORK PLAN

WALGREENS STORE NO. 02077

10 EAST CHESTER STREET

KINGSTON, NEW YORK

BCP SITE C356032

PREPARED FOR:

WALGREEN COMPANY

PREPARED BY:

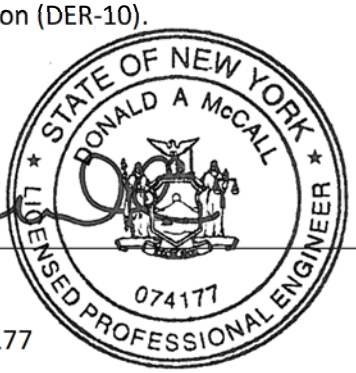
AECOM USA, INC.

257 WEST GENESEE STREET, SUITE 400

BUFFALO, NEW YORK 14202

MAY 4, 2021

I, Donald A. McCall, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Corrective Measure Work Plan was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance of Site Investigation and Remediation (DER-10).



Donald A. McCall
Professional Engineer
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May 4, 2021
Date

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ACRONYMS AND ABBREVIATIONS

BCP	Brownfield Cleanup Program
bgs	below ground surface
CAMP	Community Air Monitoring Plan
cis-1,2-DCE	cis-1,2-Dichloroethene
cm/sec	centimeters per second
CMWP	Corrective Measures Work Plan
COC	Chain of Custody
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
ELAP	Environmental Laboratory Approval Program
ft/year	feet per year
HASP	Health and Safety Plan
IC/EC	Institutional Control and Engineering Control
lbs	pounds
L/min	liters per minute
mg/L	milligrams per liter
NYSDEC	New York State Department of Environmental Conservation

NYSDOH	New York State Department of Health
ORP	Oxidation-Reduction Potential
PCE	Tetrachloroethene
PDB	Passive Diffusion Bag
PPE	Personal Protective Equipment
ppm	parts per million
PRR	Periodic Review Report
RI	Remedial Investigation
SMP	Site Management Plan
TCE	Trichloroethene
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VC	Vinyl Chloride
VOCs	volatile organic compounds
ZVI	zero valent iron
µg/L	micrograms per liter

1.0 INTRODUCTION

AECOM USA, Inc. (AECOM), on behalf of the Walgreen Company (Walgreens), is submitting this Revised Corrective Measures Work Plan (Revised CMWP) to the New York State Department of Environmental Conservation (NYSDEC) to address the potential off-site migration of groundwater with elevated concentrations of tetrachloroethene (PCE) from the property currently occupied by Walgreens' Store #02077 at 10 East Chester Street in Kingston, Ulster County, New York (Figure 1). The original CMWP, which was submitted to NYSDEC in February 2019, presented a remedial approach involving the injection of amendments into the subsurface to reduce chlorinated solvent concentrations in the groundwater at the site. In response to the submission, NYSDEC requested revisions to the injection program and installation of at least one additional monitoring well. Several rounds of discussion followed, and it was agreed that Walgreens would perform an additional round of groundwater sampling on-site prior to revising the work plan. The sampling was performed in March 2020 and a summary report was submitted to NYSDEC in August 2020. In addition, off-site investigation work was completed by the NYSDEC and both on-site and off-site groundwater sampling were conducted by the NYSDEC in 2020.

This Revised CMWP has been prepared in response to a February 17, 2021 request from NYSDEC and takes into consideration the March 2020 groundwater sampling data and the preliminary information generated from off-site investigation performed by NYSDEC. As discussed during the April 1, 2021 conference call held with Walgreens, NYSDEC, and AECOM, the overall remedial approach has remained unchanged and includes the injection of amendments into the subsurface to address elevated concentrations of PCE along the eastern property boundary. This Revised CMWP includes the installation of a monitoring well along Broadway to determine if groundwater contains elevated concentrations of PCE along the southern property boundary. During the call, Walgreens and AECOM also agreed to revisit prior site data to evaluate whether an area upgradient of the southern site boundary could be identified for targeted in-situ treatment. The record review is ongoing and an addendum to this work plan will be submitted if an area for targeted treatment is identified.

2.0 SITE BACKGROUND

The subject property (site) is located at 10 East Chester Street in Kingston, New York (see Figure 1). The site consists of approximately 1.0 acre of land and is currently occupied by Walgreens' Store No. 02077. The construction of the store was completed in 2010. The site is commercially zoned with surrounding properties that include a mix of commercial businesses and residential lots.

2.1 Site History

According to available information, portions of the site have historically been occupied by a dry cleaning facility, a vehicle fueling/service station, and a trolley barn that became a school bus maintenance garage. The portions of the site used for these operations are shown in Figure 2.

2.2 Brownfield Cleanup Program

The previous owner of the site, 10 East Chester Street LLC, entered into the New York State Brownfield Cleanup Program (BCP Site Number C356032) and completed investigation and remediation in accordance with the requirements of the BCP. Based on the results of the Brownfield Cleanup Program Remedial Investigation Report/Remedial Action Plan prepared by S&W Redevelopment of North America, LLC (S&W), dated August 2005, the constituents of potential concern at the site include VOCs associated with chlorinated solvents, (i.e., trichloroethene (TCE) and PCE) and petroleum products.

Site remedial activities included the removal of seven underground storage tanks (USTs) that contained petroleum products, excavation of impacted soil in the vicinity of the tanks, excavation of soil near floor drains in the former dry cleaning building, and in-situ chemical oxidation using potassium permanganate to remediate the groundwater. The remedial activities were conducted in accordance with the NYSDEC approved Remedial Action Plan prepared by S&W, dated August 2005 and the Remedial Design In-Situ Chemical Oxidation prepared by Sterns and Wheeler, LLC, dated October 2005.

S&W submitted a Final Engineering Report to the NYSDEC in November 2006. A Certificate of Completion was issued by the NYSDEC on December 14, 2006. This certificate stated "…that the remediation requirements set forth in ECL Article 27, Title 14, have been or will be achieved in accordance with the time frames, if any, established in the remedial work plan." The certificate also noted that the site is restricted to a "commercial" use and that the site remediation is also predicated on the use of

institutional or engineering controls. The use of groundwater underlying the site is prohibited without prior approval from the NYSDEC.

2.3 Site Management Plan and Annual Groundwater Monitoring

A Site Management Plan (SMP) was prepared by S&W, on behalf of 10 East Chester Street LLC, in December 2006. The SMP provides a detailed description of procedures required to manage remaining contamination at the site after completion of the Remedial Action. The SMP requires that all buildings constructed on site have a NYSDEC and New York State Department of Health (NYSDOH) approved active sub-slab depressurization system, maintenance of six-inches of concrete or asphalt pavement across the site, and annual groundwater monitoring. Any future excavation of soils at the site must be done in accordance with the SMP. The SMP also requires an annual certification that the engineering and institutional controls employed at the site are unchanged from the previous certification and that nothing has occurred that would impair the ability of such controls to protect the public health and environment.

During redevelopment activities in May and June 2008, monitoring wells MW-1S, MW-2S, and MW-3S were abandoned with approval from the NYSDEC. Replacement monitoring wells MW-1, MW-2 and MW-3 were installed by Bureau Veritas in February 2010. The locations of these wells are shown in Figure 2. Groundwater samples were collected from these three wells in March and May 2010. The monitoring well installation and groundwater sampling results for 2010 are summarized in the *Annual Groundwater Sampling Report* prepared by Bureau Veritas, dated September 29, 2010.

URS Corporation (URS became part of AECOM in 2014), on behalf of Walgreens, submitted *Annual Groundwater Sampling, Site Management Plan Review, and Institutional Control and Engineering Control (IC/EC) Certifications* to the NYSDEC in April 2011 and April 2012. URS collected a supplemental round of groundwater samples in August 2012 to verify recent data and to gather additional data to evaluate groundwater geochemistry. The recommendation was to continue annual groundwater sampling events using a low flow sampling methodology. The NYSDEC approved of this approach in January 2013. The NYSDEC accepted the PRR and IC/EC Certification for February 1, 2011 to March 31, 2011 and March 31, 2011 to October 26, 2012. URS submitted a *Periodic Review Report (PRR): Annual Groundwater Sampling, Site Management Plan Review, and IC/EC Certification* to the NYSDEC in December 2013. The NYSDEC did not approve the PRR dated December 2013 and *IC/EC Certification* and requested that a CMWP be submitted to address elevated concentrations of PCE in MW-3. Subsequent PRR and IC/EC Certifications that were submitted were not fully approved by NYSDEC due to continued presence of PCE at the site.

2.4 2014 Soil and Groundwater Investigation

URS conducted a review of previous investigative work at the site and identified some data gaps. In October 2014, URS performed an investigation to delineate shallow soil impacts above the water table along the former sewer line that connected the floor drains within the former dry cleaning facility to the sanitary sewer located in Broadway; in the area of the former 550-gallon waste oil UST; and along the western property boundary (along East Chester Street). As shown in Figure 2, ten soil borings (SB-1 thru SB-10) were advanced. Based on the investigation findings, URS concluded that there was not an on-going source of PCE in the shallow soil that was contributing to the groundwater concentrations in the areas investigated. The highest concentrations of PCE in the groundwater were detected on the upgradient (western) side of the site along the East Chester Street property boundary with the highest concentration found at soil boring SB-2. PCE concentrations in the groundwater were found to decrease southeast across the site in the direction of historical groundwater flow.

2.5 2016 Soil and Groundwater Investigation

Walgreens received a letter from the NYSDEC on April 9, 2015 requesting that a CMWP be submitted to address PCE contamination in on-site groundwater. URS and Walgreens held a teleconference with the NYSDEC on May 15, 2015 to discuss a mutually agreed upon path to move forward. NYSDEC, Walgreens, and AECOM agreed that additional delineation and data collection, particularly on the upgradient side of the site, was needed prior to submitting a CMWP.

AECOM submitted a work plan to further delineate soil and groundwater impacts and collect data for potential remedial design in June 2015. The scope of work included a task to evaluate if there is an upgradient source of PCE as the 1950 and 1957 Sanborn maps showed a historical dry cleaning operation approximately 300 feet west (upgradient) of the Walgreens site (see Figure 2). The NYSDEC and the NYSDOH approved the work plan in August 2015. The NYSDEC had suggested that source material might be bound in the silt and clay at the site and that PCE might be being released to the groundwater slowly over time. The approved work plan included sampling methodology to vertically delineate potential impacts in the soil and evaluate this potential conceptual site model.

As part of the approved work plan, three soil borings were to be advanced on the west side of East Chester Street in the sidewalk that borders 322 Broadway. However, drilling could not be conducted in the sidewalk due to the presence of underground utilities. Therefore, AECOM submitted a work plan

addendum, dated April 2016, which requested that the off-site soil borings be advanced on the 322 Broadway property. AECOM and Walgreens began discussions with the property owner for 322 Broadway to gain access to the property.

To move the project forward, three soil borings (SB-11, SB-12, and SB-13) were advanced on-site in April 2016 in the area of boring SB-2 (Figure 2), where the highest groundwater impacts were found during the October 2014 investigation. In addition, monitoring wells MW-4 and MW-5 were installed and surveyed, but were not developed or sampled at the time of installation.

The off-site investigation activities at 322 Broadway could not be conducted in April 2016 as access with the adjacent property owner had not been secured. The April 2016 investigation concluded that the concentrations of PCE detected in the on-site soil are not indicative of source material on the Walgreens property and that the low concentrations of PCE detected in the on-site soil are likely due to the equilibrium partitioning of PCE in groundwater to the soil matrix rather than the partitioning of PCE from soil to groundwater. AECOM and Walgreens requested an extension from the NYSDEC to defer the development of the CMWP until the off-site investigation activities could be completed. The NYSDEC granted the extension request.

AECOM obtained access to conduct investigation activities at 322 Broadway in September 2016. The scope of work for the off-site investigation was governed by the Final Executed Limited Access Agreement between AECOM, 322 Broadway, LLC (property owner), and Carrols LLC (tenant). As shown in Figure 2, five soil borings (SB-14 thru SB-18) were advanced along the upgradient side (westerly) of 322 Broadway to determine if there is a source of PCE upgradient of 322 Broadway. The off-site investigation confirmed that PCE was present in the groundwater upgradient of the Walgreens site and likely upgradient of 322 Broadway. Walgreens requested that the NYSDEC notify the appropriate property owner(s) upgradient of 322 Broadway of this information and request that the property owner(s) conduct a site investigation to determine if there is a source of PCE present upgradient of 322 Broadway.

A teleconference was held between Walgreens, AECOM, and the NYSDEC in December 2016 to discuss the results of AECOM's investigation. The NYSDEC requested that Walgreens install a permanent monitoring well at 322 Broadway and have it surveyed to confirm the groundwater flow direction, better define the topographic clay layer across the properties, and to confirm the PCE concentrations observed in the grab groundwater samples. The NYSDEC requested that all monitoring wells (MW-1 through MW-5) on-site and any newly installed wells off-site at 322 Broadway be sampled at the same time.

2.6 2018 Site Investigation

AECOM worked with Walgreens, 322 Broadway, LLC, and Carrols LLC to develop the scope of work to address NYSDEC's requests. The final access agreement was signed in January 2018 for the newly defined scope of work. The scope of work completed in 2018 included the installation of monitoring well MW-6 at 322 Broadway, monitoring well development, and survey of the newly installed well and soil boring locations at 322 Broadway. Groundwater level measurements were collected from the available monitoring wells (MW-1 through MW-6).

Groundwater samples were collected from all wells (MW-1 through MW-6) following United States Environmental Protection Agency's (USEPA's) low-flow sampling protocol. During purging, AECOM measured temperature, pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity using a multi-parameter meter connected to an in-line flow-through cell. The groundwater samples collected from MW-1 through MW-5 were analyzed for Target Compound List (TCL) VOCs by USEPA Method 8260. Per the access agreement, the groundwater sample collected from MW-6 was only analyzed for PCE, TCE, and cis-1,2-DCE by USEPA Method 8260.

PCE was detected in the groundwater samples from MW-3, MW-4, and MW-6 at concentrations that exceed the NYSDEC groundwater standard of 5 micrograms per liter (µg/L). PCE was not detected in the groundwater samples from MW-1, MW-2, or MW-5.

TCE was detected in the groundwater sample collected from MW-3 at a concentration that exceeds the groundwater standard of 5 µg/L. TCE was detected in the groundwater sample collected from MW-6 at a concentration below the groundwater standard. TCE was not detected in the groundwater samples collected from MW-1, MW-2, MW-4, or MW-5.

The degradation products of PCE (e.g., TCE and cis-1,2-dichloroethene (DCE)) have shown slight increases in concentration at MW-3 over time. This, along with the anaerobic conditions as measured in the purge water, suggest that anaerobic biodegradation (reductive dechlorination) of PCE is likely occurring naturally at the site.

2.7 2019 Corrective Measure Work Plan

On November 8, 2018, the NYSDEC issued a letter to Walgreens indicating that a CMWP was required to address PCE-impacted groundwater migrating from the site. The NYSDEC stated that they

intended to investigate the off-site (upgradient) detection of PCE in the groundwater. Walgreens agreed to move forward with the development of the CMWP with the understanding that the NYSDEC will continue to work with Walgreens and keep them apprised of information obtained during their investigative work.

A CMWP was submitted to the NYSDEC in February 2019 with the objective to reduce the concentrations of chlorinated VOCs, specifically PCE, in the groundwater leaving the site along the eastern property boundary. AECOM identified an in-situ remedial approach as the corrective measure for the site. The CMWP proposed that a combination of amendments (PlumeStop® Liquid Activated Carbon™, AquaZVI™, HRC®, and BDI PLUS®) be injected into the subsurface in the saturated zone to reduce the concentrations of PCE in the groundwater. The CMWP proposed that injection points would be placed near the eastern property boundary to treat groundwater before it leaves the property. The selected amendments would use adsorption as the primary remediation technique and would further enhance in situ anaerobic bioremediation of the chlorinated compounds.

In response to the submission, NYSDEC requested revisions to the injection program and installation of at least one additional monitoring well. Several rounds of discussion followed, and it was agreed that Walgreens would perform an additional round of groundwater sampling on-site prior to revising the work plan. The sampling was performed in March 2020 and a summary report was submitted to NYSDEC in August 2020 and is discussed below. In addition, off-site investigation work was completed by the NYSDEC and both on-site and off-site groundwater sampling were conducted by the NYSDEC in 2020.

2.8 2020 Groundwater Monitoring

On March 12, 2020, AECOM collected groundwater samples from monitoring wells MW-1 through MW-5 and performed a site inspection. The results of the groundwater sampling were documented in the *Groundwater Analytical Results Summary Report March 2020*, submitted to NYSDEC on August 12, 2020.

As shown in Table 1, concentration of PCE (3,700 µg/L) in MW-4 was considerably higher than previously detected, while the concentration of PCE (110 µg/L) in MW-3 was generally consistent with the 2018 sampling event. The groundwater elevation at MW-5 in 2020 was low and not consistent with the historical groundwater flow maps. During the review of the 2018 groundwater level data, AECOM

assumed that the low groundwater level observed at MW-5 was an anomaly; however, the 2020 data suggested that groundwater flow beneath the site is more complex than previously understood. As shown in Figure 3, groundwater flow at the site is predominately from northwest to southeast across the site with some flow from the north, particularly along the eastern side of the site.

2.9 Conceptual Site Model

Figure 4 presents a west to east cross-section running from 322 Broadway across the Walgreens property. As shown in the cross-section, the area is underlain by fill material to a depth of approximately 5 feet bgs. The fill is underlain by approximately 5 to 10 feet of fine to medium sand layer with some silts. The sand is underlain by a clay/silty clay/clayey silt layer to an undetermined depth. The depth to groundwater ranges from approximately 5.8 feet bgs in the west to 9.6 feet bgs in the east.

There is an on-site dissolved-phase plume of chlorinated VOCs, specifically PCE and its daughter products. In its pure form, PCE is a dense non-aqueous phase liquid (DNAPL) that has a low solubility and a high density causing it to sink in the water column. An on-site DNAPL source has not been identified. It is possible that residual impacts in site soils are entering the groundwater. However, as summarized in Sections 2.4 through 2.6, residual source material was not encountered in the supplemental soil investigations that targeted the area of the former dry cleaner. In the dissolved-phase, PCE migrates in the direction of groundwater flow. As shown in Figure 3, groundwater flows southeasterly across the site, roughly parallel to Broadway, and then shifts in a more southernly direction near the eastern site boundary. Elevated concentrations of chlorinated VOCs were detected in groundwater grab samples from the upgradient 322 Broadway property and in groundwater following the installation of monitoring well MW-6.

The hydraulic gradient, as measured between MW-6 and MW-3 is 0.006. Based on hydraulic conductivity estimates for fine to medium silty sand that range from 5×10^{-4} centimeters per second (cm/sec) to 3×10^{-3} cm/sec and an assumed porosity of 20% for silty sand, groundwater velocities at the site are likely to range on the order of 1.5×10^{-5} cm/sec (approximately 15 feet per year (ft/year)) to 1×10^{-4} cm/sec (approximately 100 ft/year). Anaerobic biodegradation (reductive dechlorination) of PCE is likely occurring naturally in the groundwater at the site. DO concentrations are generally low and pH values are neutral, which is conducive for microbial activity.

3.0 OBJECTIVE

The objective of the corrective measure is to reduce elevated concentrations of PCE in groundwater migrating from the site to levels protective of human health and the environment. An addendum to this Revised CMWP may be prepared if the results of the records review indicates additional measures are warranted.

3.1 Remedy Selection

An in-situ remedial approach has been chosen as the corrective measure for the site. A combination of amendments will be injected into the subsurface in the saturated zone to reduce the concentrations of PCE in the groundwater. Because no specific source of the PCE has yet been identified, the injection points will be placed as a treatment wall near the eastern property boundary to treat groundwater before it leaves the property. The selected amendments will use adsorption as the primary remediation technique along with in-situ chemical reduction (ISCR). These amendments will also enhance in-situ anaerobic bioremediation of the chlorinated compounds that is likely already occurring.

3.2 Product Evaluation

Commercially-prepared PlumeStop® Liquid Activated Carbon™ and S-MicroZVI™ (S-MZVI), manufactured by Regenesis of San Clemente, California, are fast-acting, groundwater remediation reagents which can remediate a range of contaminants through adsorption, reduction, and bioremediation. The in-situ injection products and injection quantities that were proposed in 2019 were reviewed and updated based on the 2020 data. Regenesis' product information is described below and is provided in Appendix A.

PlumeStop has been proven to prevent contaminant migration across property boundaries in real world applications. The physical properties of PlumeStop are intended to not only reduce the PCE concentrations rapidly, but also to maintain the low concentrations for a much longer duration. These properties include low viscosity, to allow for enhanced control during injection; nanoscale particles, to allow penetration into small pore spaces; and activated carbon, to remove PCE through adsorption. Once injected, PlumeStop coats the aquifer soil particles with a thin layer of carbon. As the PCE compounds adsorbed to the carbon are destroyed through reduction and in-situ bioremediation, these carbon sites

are freed up to allow adsorption and remediation of additional PCE. The activated carbon in the PlumeStop will remain indefinitely. PlumeStop is a shipped in 400 pound drums or 2,000 pound totes.

S-MZVI is an in-situ chemical reduction reagent that promotes the destruction of organic pollutants including chlorinated hydrocarbons. S-MZVI is composed of liquid containing colloidal, sulfidated zero-valent iron (ZVI) particles suspended in an aqueous medium providing reactivity with PCE and TCE. S-MZVI destroys contaminants abiotically and stimulates enhanced bioremediation. S-MZVI is shipped in 400 pound drums.

4.0 IMPLEMENTATION OF CORRECTIVE MEASURE

The proposed scope of work for the corrective measure includes the installation of an additional monitoring well along Broadway, pre-injection groundwater sampling, remedial injections, post-injection groundwater sampling, and reporting. The following sections describe the implementation of the corrective measure for the site.

4.1 Key Personnel

The key personnel that have been involved with this project and the development of the CMWP are listed below.

Name	Affiliation	Address	Telephone	Function
Jeff Groncki	Walgreens	106 Wilmot Road MS#1620 Deerfield, Illinois 60015	224-554-9417	Walgreens Environmental Compliance Manager
Parag Amin	NYSDEC	625 Broadway Albany, NY 12233	518-402-9648	NYSDEC Project Manager
Jennifer Gillies, PG (NY)	AECOM	10 Patewood Drive Building 6, Suite 500 Greenville, SC 29615	864-234-2240	AECOM Project Manager
Kevin Connare, PG	AECOM	257 W. Genesee Street Buffalo, NY 14202	716-923-1165	AECOM Senior Geologist

4.2 Health and Safety and Community Air Monitoring

Health and safety is of paramount importance to Walgreens and AECOM. The site-specific Health and Safety Plan (HASP) for groundwater sampling and remedial injection activities will be updated prior to mobilization to the site in accordance with applicable state and federal requirements, including COVID-19 compliance. A copy of the HASP will be maintained on-site and all work will be performed in accordance with the HASP. AECOM will host a safety meeting with our staff and subcontractors each morning prior to initiating any work. During the daily safety meeting, potential hazards associated with the work for that day will be discussed and mitigation measures will be implemented to reduce or eliminate the risk of the hazard occurring. Personnel that conduct the field activities will meet the appropriate training requirements as identified in 29CFR 1910.120. It is anticipated that field work will be performed with Level

D personal protective equipment (PPE), however, personnel involved with the mixing and injection of the remediation amendments may require additional PPE such as face shield and aprons.

Real time air monitoring for VOCs and particulates will be conducted at the perimeter of the Exclusion Zone during the remedial activities in accordance with the NYSDEC approved Community Air Monitoring Plan (CAMP).

4.3 Field Documentation

Field activities will be documented using field notebooks, photographs, and standard field forms. Field notebooks will serve as the primary record of activities at the site. All entries into the notebook will contain a variety of information including: date, time, weather, personnel, personnel affiliation, equipment being used, level of PPE, instrument calibration, drilling information, sampling/measurement data, quantities injected, and any other relevant information. If an incorrect entry is made, the information will be crossed out with a single strike mark and initialed. Field notes will be scanned and stored in an electronic project file after the injection work is complete.

4.4 Utility Clearance

Prior to intrusive activities, Dig Safely New York will be notified and a private utility locating service will be engaged to identify and mark out utilities. The utility location and geophysical survey will include the area of the proposed monitoring well and injection locations to identify potential issues with the proposed layout, if any. AECOM will maintain a safe distance from any subsurface utility or structure and modify proposed boring locations in the field as needed. The initial 5 feet of each boring will be cleared by hand-auguring, air extraction, or air knifing methods.

4.5 Well Installation

During a conference call on April 1,2021 to discuss NYSDEC's February 17, 2021 request that a CMWP be submitted, Walgreens agreed to install one well near the southeast corner of the property. A records review is being performed and an addendum will be provided for additional injections and monitoring points, if warranted.

The new monitoring well, MW-11, will be installed on the southern site boundary as shown in Figure 5. The well boring will be advanced using a Geoprobe while continuously collecting soil samples with a 5-foot long macrocore sampler. One soil sample will be collected for laboratory analysis from the

interval with the greatest apparent contamination (e.g., highest PID reading, odors, etc.). A second sample will be collected from the next apparently clean interval below the contamination. If no apparent contamination is encountered, one soil sample will be collected from the top of the clayey silt layer.

The boring will be advanced to a maximum depth of approximately 20 feet bgs or until the stratigraphy changes from silty sand to clayey silt. The sampling equipment will be decontaminated prior to each sample interval using an Alconox™ solution followed by a clean water rinse. A representative portion of each soil sample collected will be placed into a re-sealable plastic bag. After allowing soil vapors to gather in the headspace of the plastic bag, the soil sample will be field screened for the presence of total volatile organic vapors using a PID equipped with a 10.6 eV lamp. The PID will be calibrated using ambient air and a 100 part per million (ppm) isobutylene span gas prior to initiating site activities. PID readings and any signs of visual and/or olfactory contamination (odor, staining, NAPL) will be indicated in the field book.

Once the soil sampling is complete, the boring will be enlarged using hollow stem augers. The well will be constructed of 2-inch schedule 40 PVC well riser with a 10-foot length of 0.020 inch slot screen. The annular space will be backfilled with sand to 1 foot above the screen-riser joint. A 2-foot bentonite seal will be placed atop the sand and the remaining annular space will be backfilled with cement/bentonite grout. The well will be completed with a flush-mount road box.

All drill cuttings and decontamination water will be containerized in DOT-approved 55-gallon drums, labeled, dated, and staged at the site for subsequent waste characterization sampling prior to removal and proper off-site disposal.

The soil samples will be contained in laboratory-supplied glassware, labeled, placed on ice, and shipped to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) -certified laboratory under proper chain-of-custody (COC) documentation. Soil samples will be submitted for analysis of TCL VOCs by EPA Method 8260C. One duplicate sample, one matrix-spike sample, and one matrix-spike duplicate sample will also be collected for TCL VOC analysis. The analytical data generated will be reported by the laboratory with ASP Category B QA/QC deliverables. A limited data validation will be conducted on the laboratory analytical data.

4.6 Pre-Injection Groundwater Sampling

Groundwater samples will be collected following the USEPA's low-flow sampling protocol from the new well (MW-11), monitoring wells MW-1 through MW-5, and MW-7 one month prior to the injection event to establish baseline conditions. MW-7 is an off-site well that was installed by the NYSDEC in 2020. Monitoring well MW-11 will be sampled after well development and the results will be reviewed and evaluated to determine if modifications to the layout of the proposed injections, such as shifting the treatment wall, are warranted. During purging, AECOM will monitor temperature, pH, specific conductivity, DO, ORP, and turbidity using a multi-parameter meter connected to an in-line flow-through cell. Purging will be maintained at a pumping rate that minimizes drawdown to less than 0.3 feet. In all cases, the purge rate will not exceed one liter per minute (L/min). Samples will be collected once parameters have stabilized (within 10 percent for temperature, specific conductivity, DO and turbidity, within 0.1 pH units, and within 10 mV for ORP over three consecutive readings collected at three- to five-minute intervals).

Groundwater removed during purging and development activities will be containerized in DOT-approved 55-gallon drums, labeled, and dated, and staged at the site for waste characterization sampling prior to removal and disposal.

Groundwater samples will be collected into laboratory-supplied pre-preserved bottles. The sample bottles will be chilled on ice and transferred to the laboratory following proper COC procedures. The groundwater samples will be analyzed for TCL VOCs by EPA Method 8260C. The groundwater sample collected from MW-3 will also be analyzed for natural attenuation parameters (i.e., methane, total and ferrous iron, alkalinity, hardness, nitrogen-nitrate, nitrogen-nitrite, sulfate, and total organic carbon). AECOM will also collect one trip blank and one field duplicate for the same VOC analysis. The samples will be submitted to a NYSDOH ELAP-certified laboratory. The analytical data generated will be reported by the laboratory with ASP Category B QA/QC deliverables. A limited data validation will be conducted on the laboratory analytical data.

AECOM plans to monitor the groundwater quality at MW-3 using a passive diffusion bag (PDB) after the amendments have been injected into the subsurface. Sampling with a PDB is proposed because traditional sampling techniques could remove the amendments from the subsurface, thereby reducing their ability to continue to treat the groundwater and impacting the quality of the groundwater sample being collected. AECOM will deploy a PDB into monitoring well MW-3 after the baseline groundwater

sample is collected using low-flow sampling techniques. A groundwater sample will be collected from the PDB after it has been in the well for two weeks and it will be analyzed for TCL VOCs.

4.7 Hydraulic Conductivity Testing

Existing data indicates that the hydraulic conductivity of the upper water-bearing zone at the site ranges from approximately 5.2×10^{-4} cm/sec to 3.5×10^{-3} cm/sec. The hydraulic conductivity of the formation will dictate the rate at which the remediation materials can by injected into the formation (e.g., a lower hydraulic conductivity will result in a lower injection rate). Therefore, prior to implementation of the remedial injection program described below in Section 4.8, the hydraulic conductivity of the formation will be confirmed to verify that the proposed delivery method for the amendments will be conducive with site conditions.

Prior to deploying the PDB in MW-3, AECOM will perform hydraulic conductivity testing on wells MW-2 and MW-3 to confirm hydraulic conductivity conditions in the proposed injection area. The testing will consist of falling and rising head tests. As part of the test, a pressure transducer/data logger will be placed in the well. Once the transducer is in place, a solid slug (e.g., 1-inch diameter by 3-foot long solid PVC slug) will be placed in the well and the falling water level (head) recorded by the transducer. Once the water recovers to the previous static level, the slug will be removed, and the rising water level will be recorded by the transducer. The collected data will be analyzed using Aqtesolv, a commercially available software package. The Bouwer and Rice method will be used to calculate the rising and falling head values.

4.8 Remedial Injection Program

AECOM reached out to Regenesis, an industry leader in in-situ remediation, for technical guidance in developing an effective remedial injection program for the site in January 2019 and the plan was reviewed and revised in April 2021. Regenesis has had proven success in remediating chlorinated VOCs, including PCE and TCE, at multiple sites.

Regenesis will provide a qualified licensed drilling contractor to complete the remedial injections and to work in conjunction with Regenesis' technicians. Regenesis will provide the amendments, technicians, and equipment to effectively implement the injection program. AECOM will provide oversight of the field activities.

4.8.1 Application Design Summary

AECOM provided information from the conceptual site model for input into Regenesis' proprietary design calculator. The design parameters included the soil type for the targeted injection interval, depth to groundwater, depth to the low permeability clay layer, VOC concentrations in the groundwater, and other pertinent aquifer characteristics.

Regenesis' application design is provided in Appendix B. Regenesis in collaboration with AECOM determined that to achieve the objective of the remedy, they will create an approximately 75-foot long treatment wall perpendicular to the direction of groundwater flow. The treatment zone will consist of 13 injection points advanced near the eastern boundary of the site, in the vicinity of monitoring well MW-3, with an injection boring spacing of 6 feet. Figure 5 illustrates the locations of the 13 proposed injection locations.

The depth to groundwater near MW-3 is approximately 8 feet bgs and the depth to the lower permeability clay layer near MW-3 is approximately 14 to 15 feet bgs. The treatment interval will extend from 1 foot above the saturated zone (approximately 7 feet bgs) to a depth of 17 feet bgs, which is estimated to extend within the low permeability silty clay layer. Injection borings will be advanced using a direct push drill rig. Injections will be completed over a 10-foot treatment interval in five successive 2-foot intervals.

4.8.2 Amendment Quantities

Regenesis' design also indicated that the injection of two amendments (PlumeStop and S-MZVI) into the subsurface will produce the most optimal treatment results. The injection quantities determined for each amendment are provided below. The product details were previously described in Section 3.2.

Based on Regenesis' proprietary design calculator, the pore volume of the treatment zone contains 14,811 gallons of groundwater. Based on the concentration of chlorinated VOC compounds present in the groundwater, Regenesis calculated a target PlumeStop dose of 10,000 mg/L. Using the pore volume and PlumeStop dose, the Regenesis calculator estimated that 7,200 lbs (852 gallons) of PlumeStop will provide sufficient carbon to remediate the chlorinated constituents. To promote reduction and bioremediation of the VOC compounds, Regenesis recommended mixing 2,000 lbs (132 gallons) of S-MZVI to be injected along with PlumeStop.

In order to achieve an effective distribution in the subsurface, Regenesis recommended adding mixing water for a total injection volume of 5,902 gallons. Based on thirteen injection points, approximately 454 gallons of PlumeStop/s-MZVI solution will be injected at each location. Assuming a uniform distribution over the 10-foot injection interval, it is anticipated that the injection rate will be approximately 45.4 gallons per foot.

4.8.3 Permitting, Utility Clearance, and Coordination

Prior to mobilization, AECOM will submit notification to the USEPA's Office of Groundwater and Drinking Water for input into their Underground Injection Control program database for injection of non-hazardous fluids into or above underground sources of drinking water. The USEPA typically issues a letter acknowledging receipt of the form.

Prior to commencing work, private and public (Dig Safe New York) utility locating services will be used. AECOM will maintain a safe distance from any subsurface utility or structure and modify the proposed injection location in the field as needed.

Property access and all field activities will be coordinated with the appropriate personnel from Walgreens. The NYSDEC will be notified of the proposed field schedule ten working days in advance of the proposed start date.

4.8.4 Injection Procedures

The following procedures will be implemented at each injection location.

- Each proposed injection location will be hand cleared to a depth of 5 feet bgs to avoid underground utilities and structures.
- Using a Geoprobe or similar rig, a leading retractable screen tip and drive rod assembly will be advanced to 17 feet bgs and retracted slightly.
- Regenesis will use prefabricated trailers equipped with tanks, pumps, metering, and manifold systems. The injection approach will consist of preparing batch mixes (e.g. 500 gallons) and using the manifold system to inject at multiple locations (e.g., five) simultaneously. This method expedites the injection schedule by simultaneously working on multiple locations while enabling continued injection at locations with lower acceptance rates.

- The PlumeStop/S-MZVI solution will be pumped into the treatment zone at a uniform rate of approximately 45.4 gallons per foot over each 2-foot increment while the rods are withdrawn. The rate of injection will be reduced if daylighting is observed at the surface.
- The injection process will be repeated over successive 2-foot intervals until a depth of 7 feet bgs is reached.
- Once injection is complete, the borehole will be backfilled with clean sand to approximately 5 feet bgs. Bentonite chips or granular bentonite will be placed above the sand to the surface.
- The ground surface will be restored in-kind to match existing site conditions.
- Soil cuttings will be containerized in DOT-approved 55-gallon drums, labeled, dated, and staged at the site for waste characterization sampling prior to removal and disposal.
- It is expected that the injection acceptance rate may vary throughout the treatment area. If needed, as a contingency, additional injection borings will be advanced in the treatment area to enable injection of the calculated treatment volumes.

4.8.5 Decontamination

All injection equipment will be cleaned with steam or hot high-pressure water at the drilling contractor's facility prior to mobilization to the site. AECOM will inspect the equipment upon arrival to the site to confirm the equipment is free of soil or other materials. Downhole equipment, such as drive points and rods, will also be cleaned between injection locations using an Alconox and water solution. Drilling equipment will be decontaminated as necessary prior to demobilization. Any decontamination fluids generated will be containerized in DOT-approved 55-gallon drums, labeled, dated, and staged at the site for waste characterization sampling prior to removal and disposal.

4.9 Post-Injection Groundwater Sampling and Quarterly Groundwater Sampling

The effectiveness of the injections will be evaluated beginning three months after injections are complete. Groundwater samples will be collected from MW-1, MW-2, MW-4, MW-5, MW-7, and MW-11 following the USEPA's low-flow sampling protocol for purging and sampling described above in Section 4.6. A groundwater sample will also be collected from the PDB deployed in MW-3 after the pre-injection groundwater sampling event. A new PDB will be deployed in MW-3 after the completion of the first post-injection sampling event to be sampled during the next quarterly event. AECOM will record temperature,

pH, specific conductivity, DO, ORP, and turbidity using a multi-parameter meter during purging (as appropriate) and prior to sample collection.

Groundwater removed during purging activities will be containerized in DOT-approved 55-gallon drums, labeled, dated, and staged at the site for waste characterization sampling prior to removal and disposal.

Groundwater samples will be collected into laboratory-supplied pre-preserved bottles. The sample bottles will be chilled on ice and transferred to the laboratory following proper COC procedures. The groundwater samples collected from MW-1 thru MW-5, MW-7, and MW-11 will be analyzed for TCL VOCs by EPA Method 8260. The groundwater sample collected from MW-3 will also be analyzed for natural attenuation parameters (methane, total and ferrous iron, alkalinity, hardness, nitrogen-nitrate, nitrogen-nitrite, sulfate, and total organic carbon). AECOM will also collect one trip blank and one field duplicate for the same VOC analysis. The samples will be submitted to a NYSDOH ELAP-certified lab on a standard turn-around time.

The first post-injection groundwater sampling event will serve as the beginning of routine quarterly groundwater sampling at the site that will be conducted for one year. The same protocol described above will be used to collect groundwater samples at the site approximately every 12 weeks for an additional three quarters.

4.10 Data Analysis and Reporting

AECOM will prepare a summary report that describes the activities conducted as part of the corrective measure following completion of the first post-injection groundwater sampling event. The summary report will be submitted to NYSDEC approximately six weeks after receiving the validated laboratory data for the first post-injection groundwater sampling event. A limited data validation will be conducted on the laboratory analytical data. The summary report will include:

- Figure depicting the actual injection locations,
- Boring log and soil sampling results for MW-11,
- Information regarding the injection program and methods,
- Injection intervals and quantities of amendments injected,
- Table of pre-injection and post-injection groundwater purging data,

- Groundwater elevations and a figure depicting groundwater flow direction,
- Table of pre-injection and post-injection groundwater analytical results with comparison to NYSDEC Class GA groundwater standards,
- Evaluation of effectiveness three months after injections; and
- Copies of the laboratory analytical reports.

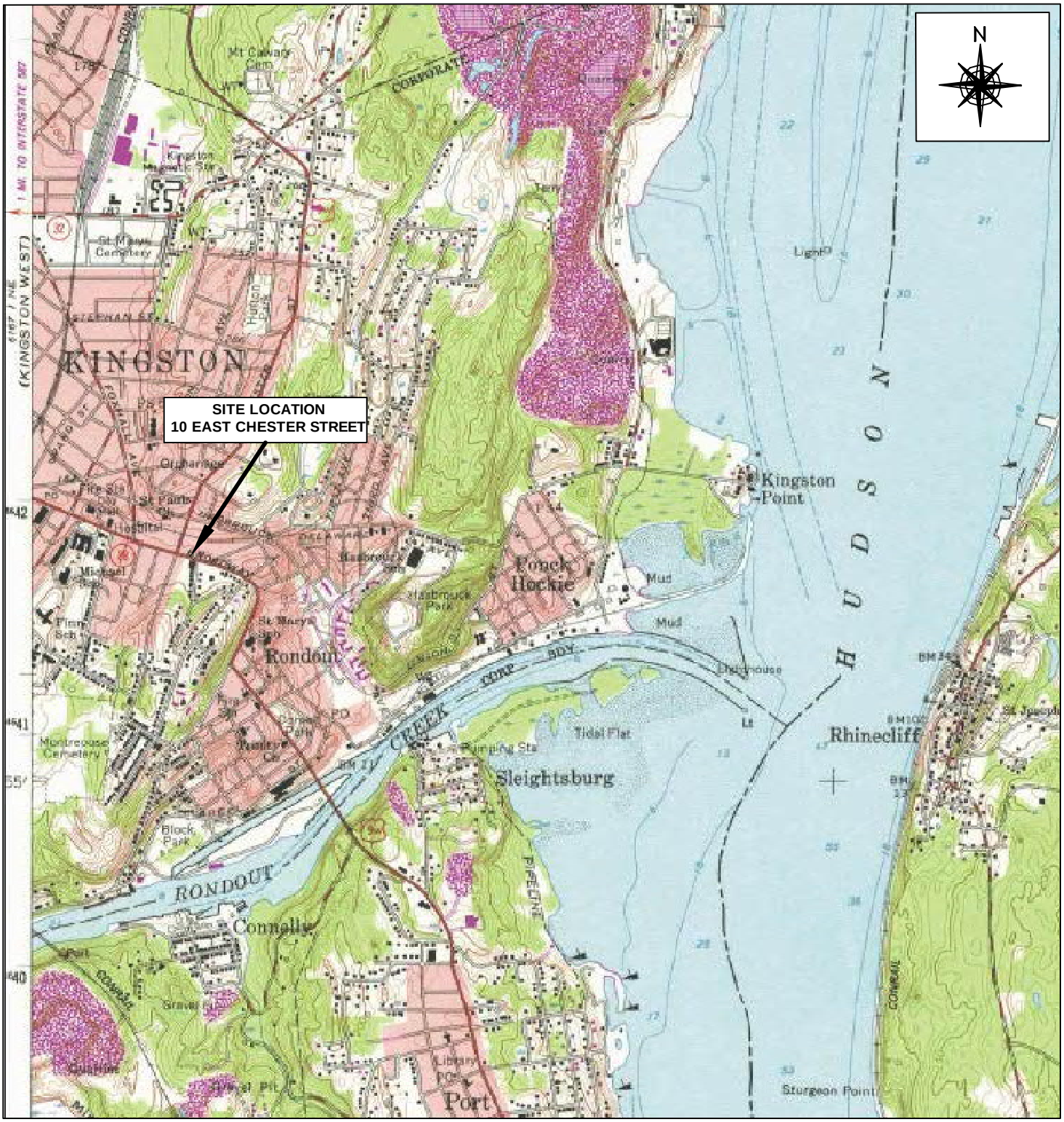
An additional letter report will be submitted after the completion of the last quarterly post-injection groundwater sampling event. The report will include a summary of the pre-injection and post-injection groundwater analytical results and will evaluate the effectiveness of the injections on achieving the remedial objective for the site. The report will be provided to NYSDEC approximately six weeks after receiving validated laboratory data. A limited data validation will be conducted on the laboratory analytical data.

5.0 PROJECT SCHEDULE

The following timeline is a tentative schedule for implementation of the activities outlined above upon approval of this Revised CMWP by the NYSDEC. Walgreens and AECOM are currently conducting a records review to evaluate if additional area(s) for treatment can be identified. An addendum to this Revised CMWP will be submitted, if warranted. AECOM will begin implementing the activities described in this plan after NYSDEC approves the plan and funding is secured.

- Conduct subcontractor coordination and permitting (approximately 4 weeks)
- Install monitoring well (approximately 2 weeks)
- Conduct pre-injection groundwater sampling, perform hydraulic conductivity testing, and deploy PDB (approximately 2 weeks)
- Review the data generated from the new monitoring well and utility location, update the CSM, if warranted, and modify, if necessary, the proposed injection layout (approximately 1 to 4 weeks)
- Implement injection program (approximately 2 weeks)
- Conduct post-injection groundwater sampling (approximately 3 months after injections complete)
- Prepare Summary Report of injection program (approximately 6 weeks after validated analytical data received)
- Conduct quarterly groundwater sampling (approximately every 12 weeks following post-injection sampling event for three additional events)
- Prepare Letter Report summarizing post-injection groundwater data (approximately 6 weeks after validated analytical data received)

FIGURES



TARGET QUAD
NAME: KINGSTON EAST
MAP YEAR: 1980
PHOTO REVISED FROM: 1963
SERIES: 7.5
SCALE: 1:24000

SITE NAME: 10 EAST CHESTER STREET
ADRESS: 10 EAST CHESTER STREET
KINGSTON , NEW YORK 12401
LAT/LONG: 41.926/-73.9918

Title: SITE LOCATION MAP

Location: 10 EAST CHESTER STREET
KINGSTON, NEW YORK 12401

Client: WALGREENS STORE #02077

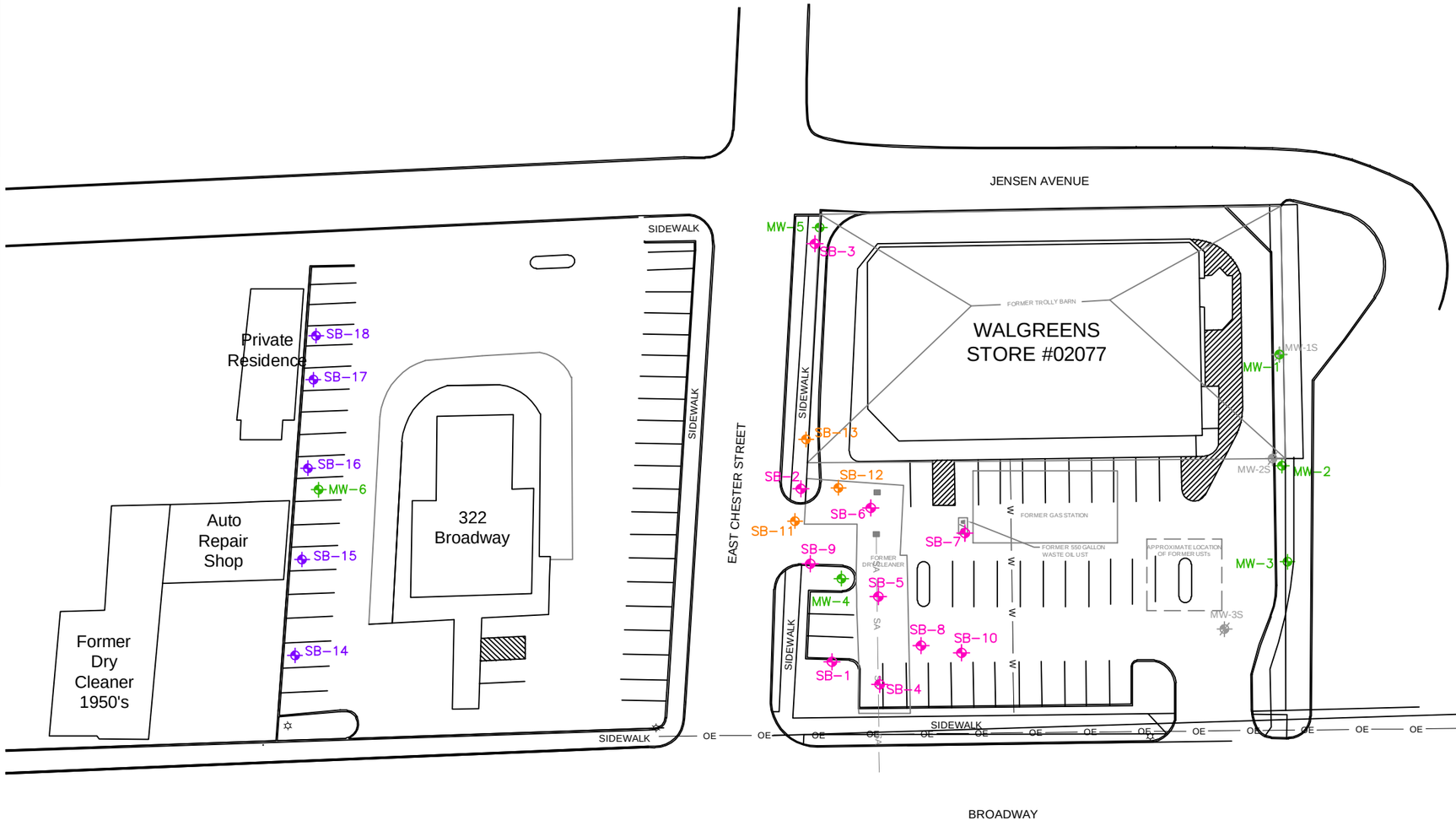
AECOM
40 British American Boulevard
Latham, New York 12110

Drafter: KP	Date: April 2021
Drg. Size: 8.5 x 11	Job No.: 60562248

FIGURE 1

C:\Users\karen.peppin\Desktop\backup work hd 2014-06-12\karen desktop 4\walgreens\2021 Rev CWP\Rev Figures\KINGSTON - Figure 1 Site Location Map May 2018.dwg User:karen.peppin Apr 21, 2021 - 10:19pm

NORTH



LEGEND:

- CURB
- ABANDONED MONITORING WELL LOCATION
- EXISTING MONITORING WELL LOCATION
- STREET LIGHT
- OE — OVERHEAD ELECTRIC
- W — WATER LINE
- SA — FORMER SEWER LINE
- FORMER FLOOR DRAIN
- W/O — FORMER 550 GALLON WASTE OIL UST
- SB–1 THRU SB–10, OCTOBER 2014
- SB–11 THRU SB–13, APRIL 2016
- SB–14 THRU SB–18, SEPTEMBER 2016

NOTE: Locations of known utilities are approximate

0 45 90

SCALE IN FEET

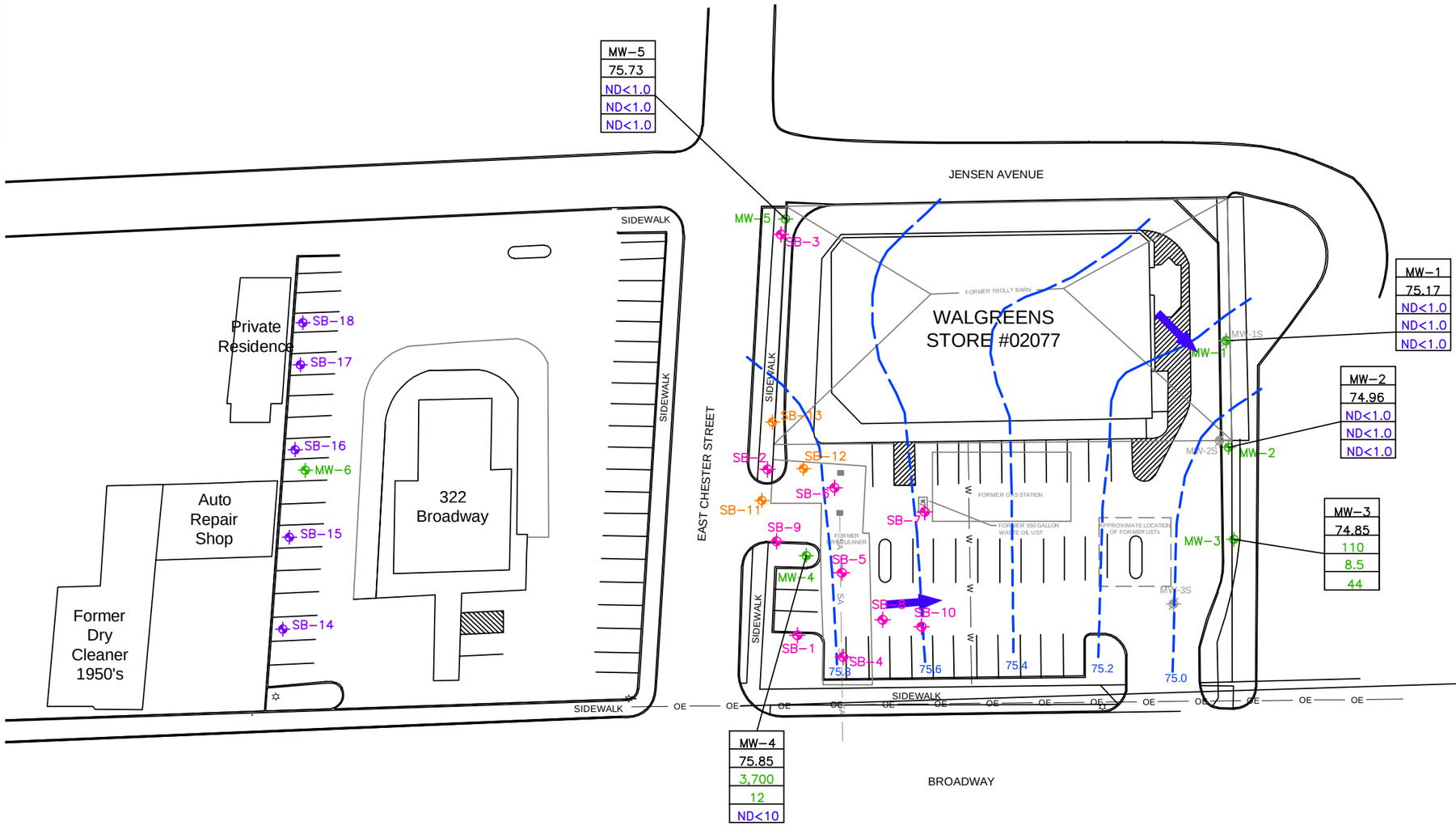
Title:	SITE MAP AND SAMPLING LOCATIONS
Location:	10 EAST CHESTER STREET KINGSTON, NEW YORK 12401
Client:	WALGREENS STORE 02077

AECOM
40 British American Boulevard
Latham, New York 12110

Drafter: KP	Date: April 2021
Drg. Size: 11 x 17	Job No.: 60562248

FIGURE 2

NORTH



LEGEND:

- CURB
- ABANDONED MONITORING WELL LOCATION
- EXISTING MONITORING WELL LOCATION
- STREET LIGHT
- OE — OVERHEAD ELECTRIC
- W — W — WATER LINE
- SA — FORMER SEWER LINE
- FORMER FLOOR DRAIN
- W/O — FORMER 550 GALLON WASTE OIL UST

MW-3	Sample ID
75.79	Groundwater Elevation (3/12/2020)
110	Tetrachloroethene (PCE) µg/L
19	Trichloroethene (TCE) µg/L
37	cis-1,2-Dichloroethene (cis-1,2-DCE) µg/L

- INFERRED GROUNDWATER FLOW DIRECTION
- GROUNDWATER CONTOUR
- SB-1 THRU SB-10, OCTOBER 2014
- SB-11 THRU SB-13, APRIL 2016
- SB-14 THRU SB-18, SEPTEMBER 2016

Concentrations in Green exceed the New York State Department of Environmental Conservation (NYSDEC) Groundwater (GW) Standard Technical and Operational Guidance Series (TOGS) 1.1.1, 2004.

Groundwater Samples were collected from all wells on 3/12/2020.

NOTE: Locations of known utilities are approximate

0 45 90

SCALE IN FEET

Title: MARCH 2020 GROUNDWATER MONITORING SUMMARY

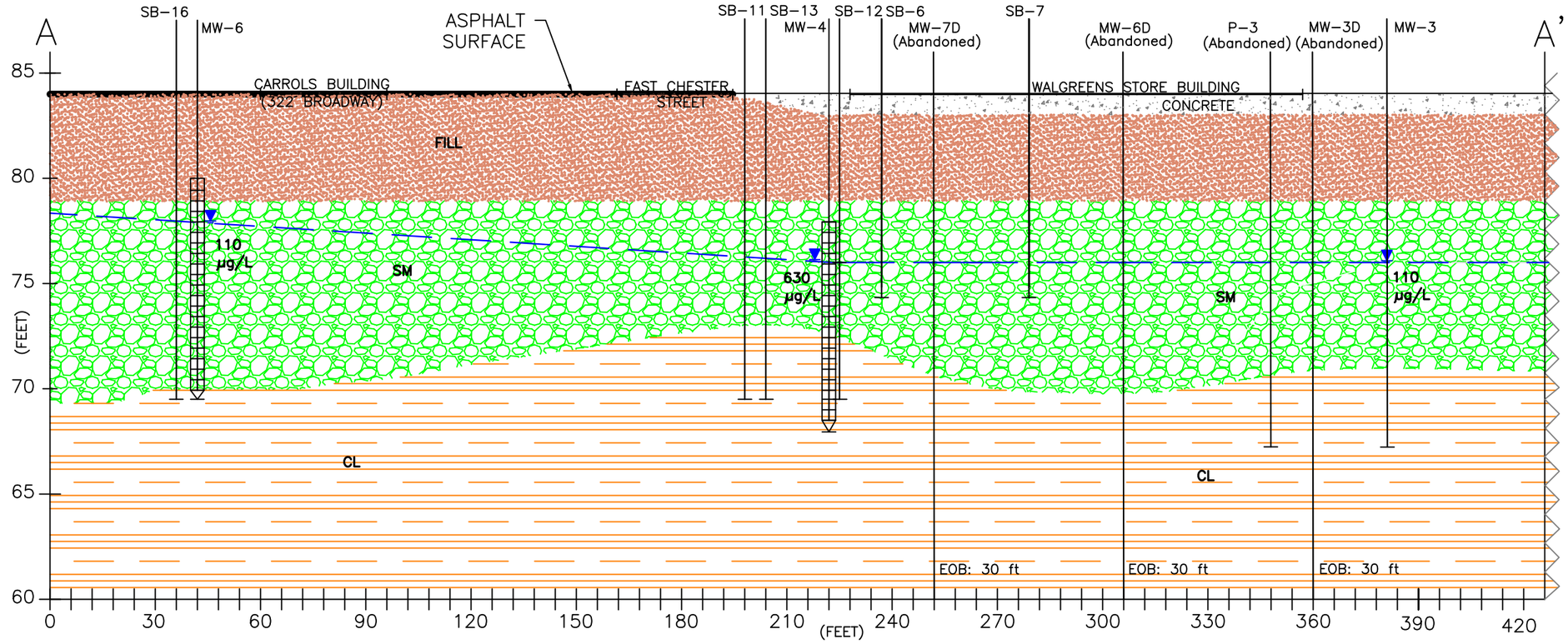
Location: 10 EAST CHESTER STREET KINGSTON, NEW YORK 12401

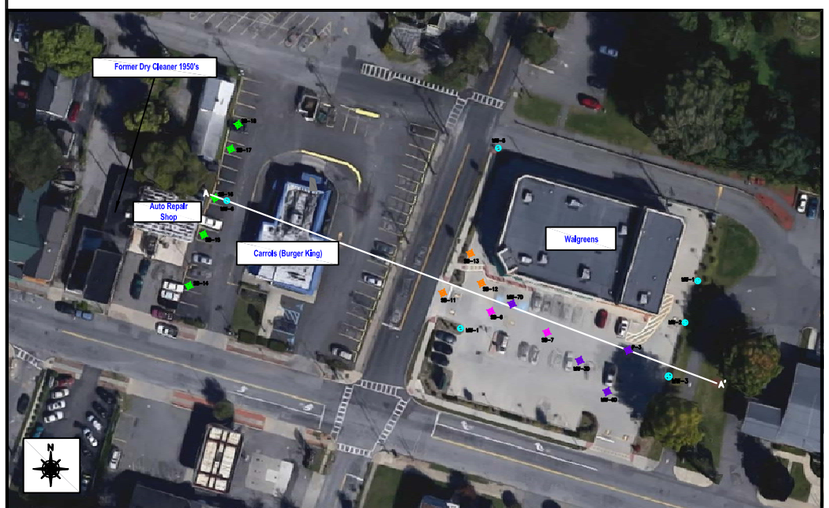
Client: WALGREENS STORE 02077

AECOM
AECOM
40 British American Boulevard
Latham, New York 12110

Drafter: KP	Date: April 2021
Drg. Size: 11 x 17	Job No.: 60562248

FIGURE 3





LOCATION MAP

SCALE IN FEET

0 APPROXIMATE 100

LEGEND

- Grab Groundwater Sampling Location, September 2016
- Soil Boring and Grab Groundwater Sampling Location, April 2016
- Soil Boring and Grab Groundwater Sampling Location, October 2014
- Monitoring Well, Groundwater Sample Collected in March 2018
- Historic Monitoring Well, Abandoned, Approximate Location

LEGEND

- APPROXIMATE WATER TABLE
- DEPTH OF GROUNDWATER
- Fill – Fine to Medium Sand, some Gravel, some brick
- SM – Fine to Medium Sands, some Silt
- Concrete
- CL – Clay, Silty Clay, Clayey Silt

NOTES

ft: feet
EOB: End of Boring
µg/L – Micrograms per liter
630 µg/L – Tetrachloroethene concentration in groundwater.
Monitoring wells surveyed in March 2018.
For illustratation purposes.
Groundwater levels measured on March 5, 2018.
Groundwater samples also collected on March 5, 2018.

Title:	CROSS-SECTION A-A'
Location:	10 EAST CHESTER STREET AND 322 BROADWAY KINGSTON, NEW YORK 12401

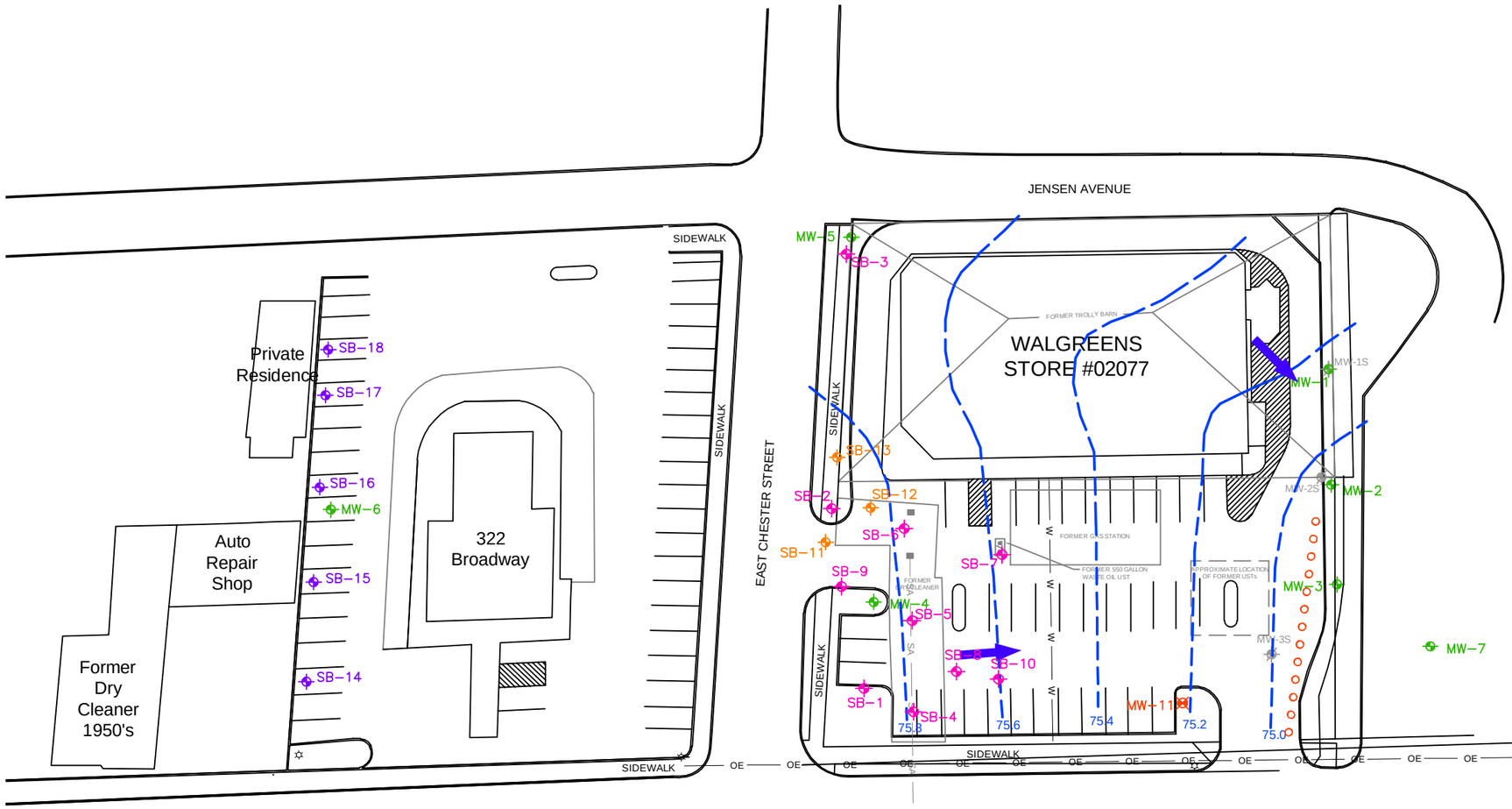
AECOM
AECOM
40 British American Boulevard
Latham, New York 12110

Drafter: CLS	Date: May 2018
Drg. Size: 11 x 17	Job No.: 60562248

FIGURE 4

P:\25368188 Walgreens Kingston, NY\2012\figures\KINGSTON – Cross Sections May 2018.dwg User:carrie.szczepanski May 24, 2018 – 1:41pm

NORTH



LEGEND:

- CURB
- ABANDONED MONITORING WELL LOCATION
- EXISTING MONITORING WELL LOCATION
- STREET LIGHT
- OE — OVERHEAD ELECTRIC
- W — WATER LINE
- SA — FORMER SEWER LINE
- FORMER FLOOR DRAIN
- W/O — FORMER 550 GALLON WASTE OIL UST
- SB–1 THRU SB–10, OCTOBER 2014
- SB–11 THRU SB–13, APRIL 2016
- SB–14 THRU SB–18, SEPTEMBER 2016
- PROPOSED INJECTION BORING LOCATION
- PROPOSED MONITORING WELL

NOTES:

1. Locations of known utilities are approximate.
2. Location of MW–7, installed by NYSDEC in 2020, is approximate.
3. Proposed injection boring locations are approximate and may be modified based on field conditions.

0 45 90

SCALE IN FEET

Title: PROPOSED INJECTION BORING LOCATION PLAN

Location: 10 EAST CHESTER STREET KINGSTON, NEW YORK 12401

Client: WALGREENS STORE 02077

AECOM
40 British American Boulevard
Latham, New York 12110

Drafter: KP	Date: April 2021
Drg. Size: 11 x 17	Job No.: 60562248

FIGURE 5

TABLE

TABLE 1
HISTORICAL GROUNDWATER ANALYTICAL RESULTS

WALGREENS STORE 02077
BCP SITE NUMBER C356032
KINGSTON, NEW YORK

Well	Sample Date	Depth to Water (feet bgs)	Volatile Organic Compound Concentration (µg/L)*									Sample Turbidity (NTU)
			Benzene	Ethylbenzene	Isopropylbenzene	Toluene	Total Xylenes	1,2-Dichloroethane	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	
MW-1	3/13/2010[A]	NA	ND	ND	ND	ND	53.5	3.6	0.79	ND	ND	4.9**
	5/4/2010[A]	NA	1.7	130	20	1.7	126.4	3.0	ND	ND	ND	374**
	3/9/2011[B]	8.14	0.59	43	8.4	0.64	18.4	ND	ND	ND	ND	206
	2/16/2012[B]	9.74	0.23	10.5	12.2	ND	ND	ND	ND	ND	ND	>800
	8/8/2012[C]	9.26	ND	9.0	13	ND	2.8	ND	ND	ND	ND	8
	11/8/2013[C]	9.77	ND	1.1	4.7	ND	ND	0.48	ND	ND	ND	4.56
	10/13/2014[C]	9.66	1.5	18	2.6	13	62	0.65	2.9	ND	ND	11.7
	11/4/2015[C]	9.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	21.7
	3/5/2018[C]	8.18	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.37
	3/12/2020[C]	9.57	ND	ND	ND	ND	ND	ND	ND	ND	ND	88
MW-2	3/13/2010[A]	NA	ND	0.97	86	ND	63.5	ND	3.5	5.3	16	2.93**
	5/4/2010[A]	NA	ND	1.1	45	ND	29.5	ND	2.8	10	17	10**
	3/9/2011[B]	8.18	ND	4	19	ND	11.6	ND	6.4	0.6	14	800
	2/16/2012[B]	9.64	0.28	10.3	27.6	ND	38.5	ND	3.6	0.34	1.0	>800
	8/8/2012[C]	9.17	ND	1.9	6.1	ND	5.5	ND	3.1	ND	0.47	1.1
	11/8/2013[C]	9.63	0.43	5.3	16	ND	11	ND	5.2	ND	ND	0.46
	10/13/2014[C]	9.63	ND	4.1	16	ND	5.6	0.29	4.2	ND	ND	0.0
	11/4/2015[C]	9.27	ND	2.0	24	ND	3.6	0.27	4.0	ND	ND	0.0
	3/5/2018[C]	8.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	19.7
	3/12/2020[C]	9.51	ND	ND	27	ND	1.6 J	ND	ND	ND	ND	2.43
MW-3	3/13/2010[A]	NA	ND	ND	ND	ND	ND	ND	1	1,000	7.7	7.41**
	5/4/2010[A]	NA	ND	ND	ND	ND	ND	ND	ND	2,200	5	10**
	3/9/2011[B]	8.37	ND	ND	ND	ND	ND	ND	1.5	840	11	>800
	2/16/2012[B]	9.56	ND	ND	ND	ND	ND	ND	2.6	1,040	11.2	>800
	8/8/2012[C]	9.11	ND	ND	ND	ND	ND	ND	ND	200	9.5	1.0
	11/8/2013[C]	9.50	ND	ND	ND	ND	ND	ND	3.0	2,000	7.0	0.3
	10/13/2014[C]	9.58	ND	ND	ND	ND	ND	ND	ND	1,200	ND	0.1
	11/4/2015[C]	9.25	ND	ND	ND	ND	ND	ND	20	1,800	39	0.0
	3/5/2018[C]	8.48	ND	ND	ND	ND	ND	ND	37	110	19	5.18
	3/12/2020[C]	9.42	ND	ND	ND	ND	ND	ND	45	120	8.5	1.51
MW-4	3/5/2018[C]	7.53	ND	ND	ND	ND	ND	ND	ND	630	ND	106.3
	3/12/2020[C]	8.11	ND	ND	ND	ND	ND	ND	ND	4,000	12	32.1
MW-5	3/5/2018[C]	7.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	130.7
	3/12/2020[C]	7.87	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.99

Notes:
*The maximum of the reported values (i.e., normal sample, duplicates, and dilutions) is listed.
**Turbidity value recorded during submersible pump purging; the sample was subsequently collected with a bailer.
ND = Not Detected
NA: Not Available
A: At least three well volumes purged with a submersible pump, sample collected with a bailer.
B: Three well volumes purged with a bailer and sample collected with a bailer.
C: Low-flow purging and sampling.
MW-4 and MW-5 were sampled for the first time in March 2018, so there is limited historical data for comparison.

APPENDIX A

PRODUCT INFORMATION

PlumeStop® Liquid Activated Carbon™ Technical Description

PlumeStop Liquid Activated Carbon is an innovative groundwater remediation technology designed to rapidly remove and permanently degrade groundwater contaminants. PlumeStop is composed of very fine particles of activated carbon (1-2µm) suspended in water through the use of unique organic polymer dispersion chemistry. Once in the subsurface, the material behaves as a colloidal biomatrix, binding to the aquifer matrix, rapidly removing contaminants from groundwater, and expediting permanent contaminant biodegradation.

This unique remediation technology accomplishes treatment with the use of highly dispersible, fast-acting, sorption-based technology, capturing and concentrating dissolved-phase contaminants within its matrix-like structure. Once contaminants are sorbed onto the regenerative matrix, biodegradation processes achieve complete remediation at an accelerated rate.

Distribution of PlumeStop in water

To see a list of treatable contaminants with the use of PlumeStop, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Water - CAS# 7732-18-5
- Colloidal Activated Carbon ≤2.5 - CAS# µm 7440-44-0
- Proprietary Additives

Properties

- Physical state: Liquid
- Form: Aqueous suspension
- Color: Black
- Odor: Odorless
- pH: 8 - 10

Storage and Handling Guidelines

Storage
Store in original tightly closed container
Store away from incompatible materials
Protect from freezing

Handling
Avoid contact with skin and eyes
Avoid prolonged exposure
Observe good industrial hygiene practices
Wash thoroughly after handling
Wear appropriate personal protective equipment

PlumeStop® Liquid Activated Carbon™ Technical Description

Applications

PlumeStop is easily applied into the subsurface through gravity-feed or low-pressure injection.

Health and Safety

Wash hands after handling. Dispose of waste and residues in accordance with local authority requirements. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: PlumeStop SDS.

REGENESIS

www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

REGENESIS

Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier PlumeSTOP®

Other means of identification None.

Recommended use Soil and Groundwater Remediation.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673

Telephone 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Water	7732-18-5	>75
Colloidal activated carbon ≤2.5 µm	7440-44-0	<25
Proprietary additives		≤2

Composition comments All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact Rinse with water. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed Direct contact with eyes may cause temporary irritation.

Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media	Carbon dioxide, alcohol-resistant foam, dry chemical, water spray, or water fog.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon monoxide, carbon dioxide, sodium oxides, metal oxides.
Special protective equipment and precautions for firefighters	Use protective equipment appropriate for surrounding materials.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials. Use water spray to keep fire-exposed containers cool.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Avoid contact with spilled material. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	This product is miscible in water. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid contact with skin and eyes. Avoid prolonged exposure. Observe good industrial hygiene practices. Wash thoroughly after handling. Wear appropriate personal protective equipment (See Section 8).
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Protect from freezing.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)	TWA	2.5 mg/m3	Respirable.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear approved chemical safety goggles.
Skin protection	
Hand protection	Rubber, neoprene or PVC gloves are recommended. Wash hands after handling.
Other	Avoid contact with the skin. Wear suitable protective clothing.
Respiratory protection	Not normally needed. In case of insufficient ventilation, wear suitable respiratory equipment. If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Aqueous suspension.
Color	Black.
Odor	Odorless.
Odor threshold	Not available.
pH	8 - 10
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not flammable.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	1 - 1.2
Solubility(ies)	
Solubility (water)	Miscible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Keep from freezing.
Incompatible materials	Strong oxidizing agents. Water reactive materials.

Hazardous decomposition products	Combustion may produce: carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Prolonged inhalation may be harmful.
Skin contact	Prolonged or repeated skin contact may result in minor irritation.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity Not expected to be acutely toxic.

Components	Species	Test Results
Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)		
Acute		
Inhalation		
LC50	Rat	> 8500 mg/m³, air
Oral		
LD50	Rat	> 2000 mg/kg, (Female)

Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	Expected to be temporarily highly mobile in soil.
Other adverse effects	None known.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not established.

15. Regulatory information

US federal regulations

All components are listed on or exempt from the U.S. EPA TSCA Inventory List.
This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Colloidal activated carbon ≤2.5 µm (CAS 7440-44-0)

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

Not Listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 26-February-2015

Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

HMIS® ratings

Health: 0
Flammability: 0
Physical hazard: 0

NFPA ratings

Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

REGENESIS
Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier	**PlumeSTOP® Nutrients**
Other means of identification	None.
Recommended use	Soil and Groundwater Remediation.
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name	Regenesis
Address	1011 Calle Sombra San Clemente, CA 92673
Telephone	949-366-8000
E-mail	CustomerService@regenesis.com
Emergency phone number	CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.

Label elements

Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Dusts may irritate the respiratory tract, skin and eyes.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2). Apply extinguishing media carefully to avoid creating airborne dust.

Unsuitable extinguishing media None known.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Use water spray to cool unopened containers. Avoid dust formation.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Avoid the generation of dusts during clean-up. Collect dust using a vacuum cleaner equipped with HEPA filter. This product is miscible in water. Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Practice good housekeeping.

Conditions for safe storage, including any incompatibilities Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
PlumeSTOP® Nutrients (as dust)	TWA	3 mg/m3	Respirable particles.
		10 mg/m3	Inhalable particles.

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Ensure adequate ventilation, especially in confined areas. Local exhaust is suggested for use, where possible, in enclosed or confined spaces.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles). Unvented, tight fitting goggles should be worn in dusty areas.
Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of inadequate ventilation, use MSHA/NIOSH approved dust respirator.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Solid.
Form	Powder.
Color	White.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	The product is non-combustible.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Completely soluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.

Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use. Ammonia fumes may be released upon heating.
Conditions to avoid	Contact with incompatible materials. Excessive heat.
Incompatible materials	Strong oxidizing agents. Bases.
Hazardous decomposition products	Ammonia fumes may be released upon heating.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system.
Skin contact	Dust or powder may irritate the skin.
Eye contact	Dust may irritate the eyes.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Dusts may irritate the respiratory tract, skin and eyes.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Prolonged skin contact may cause temporary irritation.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	This product is completely water soluble and will disperse in soil.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Ammonium sulfate	7783-20-2	40-50

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Ammonium sulfate (CAS 7783-20-2)

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Ammonium sulfate (CAS 7783-20-2)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 07-January-2016

Revision date -

Version # 01

HMIS® ratings
Health: 1
Flammability: 0
Physical hazard: 0

NFPA ratings

Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

S-MicroZVI Specification Sheet

S-MicroZVI Technical Description

S-MicroZVI™ is an *In Situ* Chemical Reduction (ISCR) reagent that promotes the destruction of many organic pollutants and is most commonly used with chlorinated hydrocarbons. It is engineered to provide an optimal source of micro-scale zero valent iron (ZVI) that is both easy to use and delivers enhanced reactivity with the target contaminants via multiple pathways. S-MicroZVI can destroy many chlorinated contaminants through a direct chemical reaction (**see Figure 1**). S-MicroZVI will also stimulate anaerobic biological degradation by rapidly creating a reducing environment that is favorable for reductive dechlorination.

S-MicroZVI is Best in Class For

- ☑ Longevity
- ☑ Kinetics
- ☑ Transport

Sulfidated ZVI

S-MicroZVI is composed of colloidal, sulfidated zero-valent iron particles suspended in glycerol using proprietary environmentally acceptable dispersants. The passivation technique of sulfidation, completed using proprietary processing methods, provides unparalleled reactivity with chlorinated hydrocarbons like PCE and TCE and increases its stability and longevity by minimizing undesirable side reactions. In addition to superior reactivity, S-MicroZVI is designed for easy handling that is unmatched by any ZVI product on the market. Shipped as a liquid suspension, S-MicroZVI requires no powder feeders, no thickening with guar, and pneumatic or hydraulic fracturing is not mandatory. When diluted with water prior to application, the resulting suspension is easy to inject using either direct push or permanent injection wells.

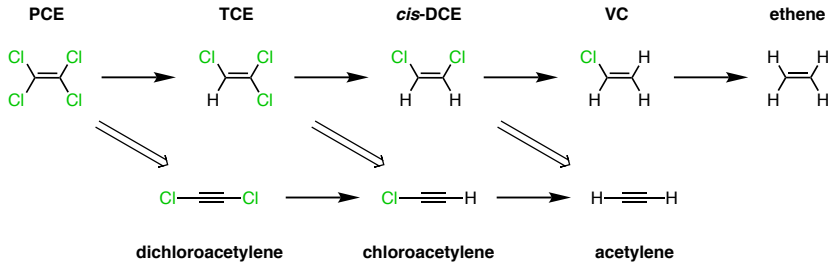


Figure 1: *Chlorinated ethene degradation pathways and products. The top pathway with single line arrows represent the reductive dechlorination (hydrogenolysis) pathway. The lower pathway with downward facing double line arrows represent the beta-elimination pathway.*

To see a list of treatable contaminants, view the S-MicroZVI treatable contaminants guide.

S-MicroZVI
Sulfidated Zero-Valent Iron

S-MicroZVI Specification Sheet

Chemical Composition

Iron, powders CAS 7439-89-6
Iron (II) sulfide CAS 1317-37-9
Glycerol CAS 56-81-8

Properties

Physical State: Liquid
Form: Viscous metallic suspension
Color: Dark gray
Odor: Slight
pH: Typically 7-9 as applied
Density: 15 lb/gal

Storage and Handling Guidelines

Storage:

- Use within four weeks of delivery
- Store in original containers
- Store at temperatures below 95F°
- Store away from incompatible materials

Handling:

- Never mix with oxidants or acids
- Wear appropriate personal protective equipment
- Do not taste or swallow
- Observe good industrial hygiene practices

Applications

S-MicroZVI is diluted with water on site and easily applied into the subsurface through low-pressure injections. S-MicroZVI can also be mixed with products like 3-D Microemulsion® or PlumeStop® prior to injection.

Health and Safety

The material is relatively safe to handle; however, avoid contact with eyes, skin and clothing. OSHA Level D personal protection equipment including: vinyl or rubber gloves and eye protection are recommended when handling this product. Please review the Safety Data Sheet for additional storage, and handling requirements here: S-MicroZVI SDS.

REGENESIS®

www.regenesis.com

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Tel: +1 949.366.8000

European Offices (UK, Ireland, Belgium and Italy)
Email: europe@regenesis.com
Tel: +44 (0)1225 61 81 61

SAFETY DATA SHEET

1. Identification

Product identifier **S-MicroZVI or S-MZVI**

Other means of identification None.

Recommended use Remediation of contaminants in soil and groundwater.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673 USA

General information 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number For Hazardous Materials Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at:

USA, Canada, Mexico 1-800-424-9300

International 1-703-527-3887

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information Contact with acids liberates very toxic gas.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Glycerol	56-81-5	40 - 50
Zero valent iron	7439-89-6	30 - 50
Iron(II) sulfide	1317-37-9	1 - 4

Composition comments All concentrations are in percent by weight unless otherwise indicated.
Components not listed are either non-hazardous or are below reportable limits.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash off with soap and water. Get medical attention if irritation develops and persists.

Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Combustion products may include: carbon oxides, iron oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	This material will not burn until the water has evaporated. Residue can burn. When dry may form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid prolonged exposure. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Glycerol (CAS 56-81-5)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear safety glasses with side shields (or goggles).

Skin protection	
Hand protection	Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.
Skin protection	
Other	Wear suitable protective clothing.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Viscous metallic suspension.
Color	Dark gray
Odor	Slight.
Odor threshold	Not available.
pH	7 - 8 (When mixed with water) 10 (As shipped)
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	3000 cP (77 °F (25 °C))
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Contact with acids will release highly flammable and highly toxic hydrogen sulfide gas. Can react with some acids with the evolution of hydrogen.
Conditions to avoid	Contact with incompatible materials. Avoid drying out product. May generate combustible dust if material dries.
Incompatible materials	Strong oxidizing agents. Acids.

Hazardous decomposition products No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation Spray mist may irritate the respiratory system. For dry material: Dust may irritate respiratory system.

Skin contact Prolonged or repeated exposure may cause minor irritation.

Eye contact Direct contact with eyes may cause temporary irritation.

Ingestion May cause discomfort if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity Not expected to be acutely toxic.

Components	Species	Test Results
Glycerol (CAS 56-81-5)		
Acute		
Dermal		
LD50	Rabbit	> 18700 mg/kg
Oral		
LD50	Rat	27200 mg/kg

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Further information Contains an ingredient known to produce adverse effects in a small percentage of hypersensitive individuals exhibited as respiratory distress and allergic skin reactions.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Glycerol (CAS 56-81-5)			
Aquatic			
Acute			
Crustacea	EC50	Daphnia magna	> 10000 mg/l, 24 Hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Partition coefficient n-octanol / water (log Kow)

Glycerol (CAS 56-81-5)	-1.76

Mobility in soil No data available.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Glycerol (CAS 56-81-5)	Other Flavoring Substances with OSHA PEL's

US state regulations

US. Massachusetts RTK - Substance List

Glycerol (CAS 56-81-5)

US. New Jersey Worker and Community Right-to-Know Act

Glycerol (CAS 56-81-5)

US. Pennsylvania Worker and Community Right-to-Know Law

Glycerol (CAS 56-81-5)

US. Rhode Island RTK

Glycerol (CAS 56-81-5)

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Zero valent iron (CAS 7439-89-6)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 27-December-2018

Revision date -

Version # 01

HMIS® ratings Health: 1
Flammability: 1
Physical hazard: 0

NFPA ratings

Disclaimer Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

APPENDIX B

REGENESIS DESIGN TOOL FOR PLUMESTOP INJECTIONS

REGENESIS

Project Info		
Walgreens Store 02077		
Kingston, NY		
East Barrier		
Prepared For:		
AECOM		
Target Treatment Zone (TTZ) Info	**Unit**	**Value**
Barrier Length	ft	75
Top Treat Depth	ft	7.0
Bot Treat Depth	ft	17.0
Vertical Treatment Interval	ft	10.0
Treatment Zone Volume	ft^3	6,000
Treatment Zone Volume	cy	222
Soil Type	---	sand
Porosity	cm^3/cm^3	0.33
Effective Porosity	cm^3/cm^3	0.20
Treatment Zone Pore Volume	gals	14,811
Treatment Zone Effective Pore Volume	gals	8,977
Treatment Zone Pore Volume	liters	56,067
Treatment Zone Effective Pore Volume	liters	33,980
Fraction Organic Carbon (foc)	g/g	0.002
Soil Density	g/cm^3	1.7
Soil Density	lb/ft^3	108
Soil Weight	lbs	6.5E+05
Hydraulic Conductivity	ft/day	10.0
Hydraulic Conductivity	cm/sec	3.53E-03
Hydraulic Gradient	ft/ft	0.003
GW Velocity	ft/day	0.15
GW Velocity	ft/yr	55
Sources of Hydrogen Demand	**Unit**	**Value**
Dissolved Phase Contaminant Mass	lbs	1
Sorbed Phase Contaminant Mass	lbs	2
Competing Electron Acceptor Mass	lbs	11
Total Mass Contributing to H2 Demand	**lbs**	**14**
Mass Flux and HRC Demand	**Unit**	**Value**
Groundwater Mass Flux through TTZ	L/day	637
Stoichiometric HRC Demand	lbs	76
Mass Flux HRC Demand	lbs	293
Total HRC Demand	**lbs**	**368**
Application Dosing	**Unit**	**Value**
PlumeStop to be Applied	**lbs**	**7,200**
S-MZVI to be Applied	**lbs**	**2,000**

PlumeStop® Application Design Summary

East Barrier

PlumeStop + S-MZVI	
Treatment Type	**Barrier**
Distance Perpendicular to Flow (ft)	75
Spacing Within Rows (ft)	6
Number of Rows	1
DPT Injection Points	**13**
Top Application Depth (ft bgs)	7
Bottom Application Depth (ft bgs)	17
PlumeStop to be Applied (lbs)	**7,200**
PlumeStop to be Applied (gals)	852
In Situ Chemical Reduction - S-MZVI	
S-MZVI to be added to PlumeStop (lbs)	**2,000**
S-MZVI to be added to PlumeStop (gals)	132
PlumeStop + S-MZVI Volume Totals	
Mixing Water (gal)	4,900
Total Application Volume (gals)	**5,902**
Injection Volume per Point (gals)	454

Technical Notes

Injection Radius for Soil Coverage (ft-est.avg.)

3.8

PlumeStop Inject. Conc. (mg/L)

10,000

Special Instructions:

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the Government.

Prepared by: Alana Miller

Date: 4/14/2021

Purchasing Information

Walgreens Store 02077	--	East Barrier
PlumeStop Required	**lbs**	**7,200**
S-MZVI to be Applied	**lbs**	**2,000**
Estimated Total Product Cost	**$**	**$54,903**
Estimated RRS Application Cost	**$**	**$41,000**
Total Estimated Project Cost**	**$**	**$95,903**
Estimated RRS Days to Apply	**--**	**3**

***Note that the combined tax and freight costs are preliminary estimates only. Please contact your local sales manager or Customer Service at 949-366-8000 to obtain a shipping quote. You will be asked to provide a ship-to address and estimated time of delivery.**

Currently Available Packaging Options

Package Type***	# of packages	lbs required
PlumeStop-2,000 lb reinf. plastic totes	4	8,000
PlumeStop-400 lb poly drums	18	7,200
S-MZVI-400 lb poly drums	5	2,000

****Total Project cost is only an estimate; actual project cost may change as the final scope and/or RRS proposal are developed.**

*****Available Package Types are subject to change.**