SITE MANAGEMENT PLAN

BROWNFIELD CLEANUP PROGRAM
185 MOUNT HOPE AVENUE
ROCHESTER, NEW YORK
(TOWER PROPERTY)
NYSDEC SITE ID C828124

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1.0 INTRODUCTION

Day Environmental, Inc. (DAY) prepared this Site Management Plan (SMP) for an approximate 1.106-acre property addressed as 185 Mt. Hope Avenue, Rochester, New York (Site). The SMP identifies the requirements and protocols to address the following project components:

- Limited in-situ treatment immediately outside of the source-area soil removal excavation;
- Institutional controls (ICs) and use restrictions (e.g., property development and groundwater use restrictions, etc.) for the Site, and the mechanisms to be used to ensure compliance with these requirements;
- Environmental management plan (i.e., soils management plan) for the characterization, handling, and disposal/re-use of residual contaminated media (e.g., soil, fill, groundwater) that is disturbed during any future site activities subsequent to the April 2008 remedial activities that involved a source-area soil removal, off-site disposal, and in-place bioremediation treatment prior to backfilling;
- Health and safety plan (HASP) when known or suspected contaminated soil, fill, or groundwater at the Site has the potential to be disturbed;
- Potential for vapor intrusion into any future buildings to be constructed on the Site, including requirements to mitigate such potential vapor intrusions through use of environmental engineering controls (e.g., sub-slab depressurization system, etc.) or other means; and
- Groundwater monitoring plan to track the remedial progress and effectiveness.

This SMP was developed to in accordance with the requirements and guidance provided in the following documents:

- Remedial Work Plan; Brownfield Cleanup Program; 185, Mount Hope Avenue, Rochester, New York (Tower Site); NYSDEC Site ID C828124" dated December 2007 as approved with modifications by the New York State Department of Environmental Conservation (NYSDEC) in a letter dated March 19, 2008.
- NYSDEC Site Management Plan Checklist dated October 2006.

1.1 Background

The Site is improved with an apartment building with an associated paved parking lot. Copies of a project locus map (Figure 1) and a site plan with select test locations (Figure 2) are provided at the end of the text of this report. The apartment building totals approximately 143,000 square feet and consists of a multi-level eight to twelve-story brick and concrete-block, slab-on-grade building constructed in 1975. The current and intended use of the property is residential. The apartment building houses 202 residential units. The units primarily are one bedroom and studio apartments.

Prior to the residential development in 1975, past uses of the Site included commercial and warehouse uses. Portions of a feeder canal and rail yards, and possibly a gasoline station, were also once located on the Site.

This SMP applies to the entire Site, which is shown on the attached Instrument Survey map dated September 24, 2007 (Passero Dwg. IS-1), and by the following metes and bounds description:

- Beginning on the Westerly right of way of Mt. Hope Avenue, (66' right of way), at the Southeasterly property corner of Tax Account No. 121.55-01-058; thence,
  1. South 34°59'13" West, along said right of way, a distance of 196.00 feet to a point; thence,
  2. North 55°00'47" West, a distance of 242.84 feet to a point; thence,
  3. North 26°12'58" East, a distance of 46.29 feet to a point; thence,
  4. North 34°59'13" East, a distance of 150.25 feet to a point; thence,
  5. South 55°00'47" East, a distance of 249.90 feet to the point of beginning, encompassing 48,145 square feet of land, more or less.

The Site is located in a mixed-use urban area. The Site is bounded to the north by open parkland, to the east by Mt. Hope Avenue with commercial and residential properties beyond, to the south by residential properties, and to the west by the Genesee Gateway Park with the Genesee River beyond.

The Site is located in an urban area that is serviced by the public water system. The Monroe County Department of Public Health (MCDPH) has no records of public or private drinking water wells or process water wells within a 0.25-mile radius of the Site. A review of a document titled "Ground Water Resources of Monroe County" (1935) revealed no groundwater supply wells on, or in the immediate area of, the Site.

The Site and surrounding area are generally level. The Genesee River is located approximately 130 feet west of the site. Surface water appears to flow off the Site toward Mount Hope Avenue to the east, and into the City of Rochester sewer system. Groundwater flows toward the southeast away from the Genesee River. This flow direction may be modified locally due to buried utilities, seasonal conditions, or other factors.

1.2 Previous Environmental Studies and Remediation

An October 24, 2000 Phase I Environmental Site Assessment (Phase I ESA) report prepared by DAY identified the following recognized environmental conditions (RECs) at the Site:

- **Historic Use of the Site:** Former uses at the Site include: rail yards, former Erie Canal feeder, and possibly a portion of a gasoline station.
- **Historic Use of Adjoining Properties:** Historic uses of adjoining properties include: gasoline stations to the north and possibly east of the Site (i.e., east of Mt. Hope Avenue); former railroad infrastructure to the west of the Site; and a former Erie Canal feeder, a rail yard, a tannery, iron cutting, and auto repair to the south of the Site.

Subsequent intrusive environmental studies conducted between 2000 and 2003 (refer to Figure 2) identified petroleum contamination in soil and groundwater on the northeastern portion of the Site. In August 2004, the NYSDEC assigned Spill File #0470234 due to the petroleum contamination that is present on the Site (i.e., 185 Mt. Hope Avenue). [Note: This spill file was closed by the NYSDEC on M ay 18, 2008].

A Remedial Investigation/Remedial Alternatives Analysis (RI/RAA) Report dated May 2007 was prepared by DAY. The primary objective of the remedial investigation was to perform environmental work at the Site in accordance with the requirements of the Brownfield Cleanup Program (BCP) to evaluate the nature and extent of contamination at the Site. Other objectives included: performing an exposure assessment; confirming and/or further delineating contamination in areas identified as RECs during previous studies; evaluating fate and transport of contaminants; identifying remedial alternatives; performing a detailed analysis of selected remedial alternatives; and selecting a remedial alternative.

A summary of environmental conditions at the Site is provided below.

- Surface Soil: Constituent concentrations detected in surface soil samples do not warrant further action.

- Subsurface Soil and Groundwater: Various test borings and groundwater monitoring wells were used to evaluate subsurface conditions at the Site (refer to Figure 2). Petroleum contamination was encountered in soil on the northeastern portion of the Site. Soil and groundwater on this portion of the Site contains petroleum-related constituents at concentrations that exceed applicable regulatory criteria. Total volatile organic compounds (VOCs) detected in soil samples and a round of groundwater samples during the previous Remediation Investigation are shown on Figure 3 and Figure 4, respectively. The results of a vapor intrusion evaluation and soil vapor evaluation suggest VOCs in subsurface soil and groundwater do not appear to be impacting indoor air inside the existing high-rise apartment on the Site. Buried utilities that were monitored do not appear to be acting as preferential migration pathways of VOCs at concentrations that would result in an adverse exposure to receptors. Groundwater was not detected in a downgradient monitoring well located on the opposite side of Mt. Hope Avenue. However, further actions appear warranted to address the northeast portion of the Site and the associated plume that is predominantly impacted with petroleum-related constituents.

- Fill Material: Fill material present at the Site may be contributing to a random distribution of detected constituents in subsurface soil and groundwater at the Site. NYSDEC Part 375 Track 2 soil cleanup objectives (SCOs) for Restricted Residential Use were exceeded for some polyaromatic hydrocarbon (PAH) semi-volatile organic compounds (SVOCs) and the metal mercury at one subsurface soil sample location. Also, groundwater samples collected from some well locations contained antimony, barium, cyanide and gamma-chlordane at concentrations that exceeded groundwater standards or guidance values. Further actions (i.e., a Site Management Plan) appear warranted to address these detected constituents on the Site.

In accordance with a Remedial Work Plan (RWP), the following remedial activities have been completed at the Site and are documented in a separate Final Engineering Report (FER):

- In April 2008, a source area removal of petroleum-contaminated soil was completed in the northeastern portion of the Site, which included the decommissioning (i.e., removal) of monitoring well MW-3. NYSDEC Part 364 permitted waste haulers transported the contaminated soil off-site. A total of 833.47 tons of non-hazardous petroleum contaminated soil was disposed at a regulated landfill.
- In April 2008, post-excavation soil sampling and analysis included the collection and testing of three soil samples from the bottom of the excavation at locations C-2, C-5, and C-9, and eight soil samples from near the base of sidewalls around the perimeter of the excavation at locations C-1, C-3, C-4, C-6, C-7, C-8, C-10 and C-11 (refer to Figure 5). The soil samples were analyzed for Target Compound List (TCL) VOCs and TCL SVOCs, including tentatively identified compounds (TICs), and the test results indicate the following:
  - Ten of eleven samples contain one or more VOC (i.e., acetone, benzene, ethylbenzene, xylene, and/or isopropyl benzene) at a concentration exceeding the Part 375 SCOs for Protection of Groundwater, and one sample contained the VOC xylene at a concentration exceeding its Part 375 SCO for Restricted Residential Use.
  - Three samples contained one or more SVOCs at concentrations exceeding Part 375 SCOs for Restricted Residential Use and/or for the Protection of Groundwater.
- A total of 300 pounds of Regenesis' Oxygen Release Compound-Advanced (ORC-Advanced®) was placed in the bottom of the source area soil removal excavation.
- The source area excavation was backfilled with select clean geotechnical fill consisting of #2 crusher, bank run, and topsoil.
- New groundwater monitoring well MWDAY-05 was installed south of the source-area excavation.
- In May 2008, a first round sampling and analysis of groundwater samples was completed at the seven monitoring wells associated with this Site. The groundwater samples were analyzed for TCL VOCs and TCL SVOCs, including TICs. Total TCL and TIC VOCs are shown on Figure 6, and the test results indicate the following:
  - Sample 012 from MWDAY-05 contained the five VOCs at concentrations exceeding groundwater standards or guidance values referenced in the NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 document titled "*Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*" (TOGS 1.1.1), June 1998 (as amended by an April 2000 addendum). Sample 013 from MWDAY-01 contained one VOC at a concentration that exceeded its NYSDEC TOGS 1.1.1 groundwater standard.
  - VOCs were not detected at concentrations above laboratory detection limits in the groundwater samples collected from the other five project monitoring wells.

- Sample 012 from MWDAY-05 contained one SVOC at a concentration that exceeded its NYSDEC TOGS 1.1.1 groundwater standard. Only the detected concentration of bis(2-ethylhexyl)phthalate detected in Sample 017 from MWDAY-04 exceeded its NYSDEC TOGS 1.1.1 groundwater standard. [Note: bis(2-ethylhexyl)phthalate is a common artifact attributable to disposable gloves used during sampling or analysis].
- For the groundwater samples collected from the other five project monitoring wells, SVOCs were either not detected at concentrations above reported analytical laboratory detection limits, or were detected at concentrations below NYSDEC TOGS 1.1.1 groundwater standards or guidance values.

In summary, the source-area soil removal was successful in removing accessible grossly contaminated petroleum-impacted soil from the Site. Analytical laboratory test results for post-excavation soil samples from the bottom and sidewalls of the excavation, and also for groundwater samples collected from Site monitoring wells, show petroleum contamination remains in soil and groundwater on the northeast portion of the Site at concentrations exceeding regulatory criteria.

1.3 Future Use of Site

It is understood that the Site will continue to be used as a high-rise apartment complex with associated paved parking lot. Renovations to the existing building are planned.

If changes in use are contemplated, the NYSDEC must first be contacted to evaluate their affect, if any, on the remedy for this Site, including existing institutional controls or the need for engineering controls.

1.4 Objectives

The SMP identifies the steps necessary to assure that the institutional controls required for the site are in-place, and to assure continued effectiveness of the remedy. Specifically, the objectives of this SMP are to:

- Identify the scope of in-situ treatment of soil and groundwater immediately outside the limits of the source-area soil removal excavation;
- Identify the institutional control plan for the Site;
- Identify the mechanisms for ensuring continued implementation and viability of the institutional controls;
- Identify the provisions to property handle, characterize and dispose/re-use contaminated soil, fill or groundwater should it be disturbed in the future; and
- Identify the provisions of a site monitoring plan.

These objectives are intended to allow continued use of the Site as a residential apartment complex with associated parking lot while remaining protective of human health and the environment to the satisfaction of the NYSDEC and the general public.

2.0 LIMITED IN-SITU TREATMENT

Based on the results of the post excavation soil samples and groundwater samples, and input from the NYSDEC project manager, treatment of contaminated soil and groundwater outside the footprint of the source area soil removal excavation on the northeast portion of the Site will be conducted as part of this SMP. In-situ chemical oxidation and aerobic bioremediation will be used to treat contamination where petroleum constituent concentrations were determined to require treatment based on the results of April 2008 post-excavation soil samples.

2.1 In-Situ Injection

Regenesis' RegenOx™ and Regenesis' ORC-Advanced® will be used to treat the contamination. The primary goals of the in-situ treatment would be: 1) rapidly reduce the mass of contaminants in the subsurface with use of RegenOx™; and 2) provide long-term treatment of residual contaminants with ORC-Advanced®.

- RegenOx™ is a solid alkaline oxidant that uses a sodium percarbonate complex with a multi-part catalytic formula. The product consists of an oxidizer complex ("Part A") and an activator complex ("Part B") that are mixed with water, combined aboveground, and then injected into the subsurface using common drilling or direct-push equipment, or mixed with impacted media that are then placed back in the excavation. Once in the subsurface, the product produces an effective surface-mediated oxidation reaction comparable to that of Fenton's Reagent, without a violent exothermic reaction. RegenOx™ destroys a wide range of contaminants (including petroleum constituents) in both soil and groundwater. Copies of the material safety data sheet (MSDS) for Part A and Part B of RegenOx™ are included as part of the HASP in Appendix A.
- ORC-Advanced® is a proprietary formulation of calcium oxy-hydroxide that produces a controlled release of oxygen for a period of up to 12 months. After being hydrated and injected into the subsurface, ORC-Advanced® utilizes its patented Controlled Release Technology (CRT™) to deliver its oxygen consistently over an extended period of time, which is used to accelerate the rate of naturally occurring aerobic contaminant biodegradation in groundwater and saturated soils. A copy of the MSDS for ORC-Advanced® is included as part of the HASP in Appendix A.

Using existing data from the RI/RAA report and also the post-excavation soil sample results referenced in Section 2.2.2, Regenesis was consulted regarding the amounts of RegenOx™ and ORC-Advanced® and number of injection points to be used for the in-situ application. With input from Regenesis, it is anticipated that 16 injection points will be used for the in-situ treatment, and it is planned that approximately 200 pounds of RegenOx™ (equal parts of Part A and Part B) and approximately 50 pounds ORC-Advanced® will be injected at each injection point to the extent possible. As such a total of 3,200 pounds of RegenOx™ and 800 pounds of ORC-Advanced® will be used for the in-situ treatment. Figure 5 shows the locations of the 16 injection points in relation to the source area soil removal excavation and post-excavation soil sample locations. As shown, the injection points are placed in proximity to post excavation soil sample locations C-1, C-7, C-8 and C-11, and also well MWDAY-05, where the highest concentrations of residual petroleum contamination were detected. With

input from the NYSDEC project manager, areas to be treated are based on the following information:

- The total concentrations of VOCs detected at sidewall sample locations C-1, C-7, C-8 and C-11 ranged between 1,587.7 ppm (C-8) and 3,585.0 ppm (C-11), which are indicative of grossly contaminated source area soil that had to be left in-place. In addition, the concentration of xylene (i.e., 130 ppm) detected in sample C-11 exceeded the Part 375 SCO of 100 ppm for Restricted Residential Use.

- The total concentrations of VOCs detected at the other sidewall sample locations ranged between 1.61 ppm (C-4) and 447.78 ppm (C-6), which are considered representative of residual non-source contaminated soil.

- The total concentrations of VOCs detected excavation bottom sample locations ranged between 1.17 ppm (C-5) and 714.8 ppm (C-6). The 300 pounds of ORC-Advanced® that was placed in the bottom of the excavation will enhance bioremediation of this residual contaminated soil immediately above bedrock in this area.

- A peak PID reading of 818 ppm was detected on soil during advancement of monitoring well MWDAY-05, and a total VOC concentration of approximately 6.6 ppm was detected in a groundwater sample collected from this monitoring well. This data and the well's proximity to soil sample location C-11, suggest well MWDAY-05 may be located within, or in proximity to, grossly contaminated source area soil that had to be left in-place.

If the total volumes of RegenOx^{TM} and ORC-Advanced® cannot be delivered at the 16 planned injection points, additional injection point(s) will be used in the same general area to use up the remaining material with input from the NYSDEC site representative.

The RegenOx^{TM} and ORC-Advanced® will be injected using the direct-push injection method in general accordance with Regenesis' RegenOx^{TM} In-Situ Chemical Oxidation Application Instructions included in Appendix B. Treatment of contamination above and below the water table was considered during the identification of injection point spacing, amount of water, etc. to be used. As a modification per Regenesis' technical personnel, the ORC-Advanced® will be mixed aboveground with RegenOx^{TM} Part A before being combined aboveground with RegenOx^{TM} Part B, and the resulting mixture consisting of these three components will then be injected into the subsurface. The injection pump selected, and the pump cleaning protocol, will be in accordance with the provisions set forth in Regenesis' instructions included in Appendix B.

2.2 Performance Monitoring

Approximately one month after completing the in-situ treatment application, soil performance monitoring will be performed to assist in evaluating the effectiveness of the in-situ treatment. The groundwater sampling and analysis included in Section 5.0 will also be used for monitoring the performance of the in-situ treatment application. The results of the performance monitoring will be used to document the environmental conditions in the in-situ treatment area.

Six test borings will be advanced within the in-situ treatment area at locations that will be selected with input from the NYSDEC site representative. Based on the results of the previous remedial investigation, it is anticipated that the test borings will be advanced to depths up to 19 feet below the ground surface. However, these depths will be modified based on observations made during advancement of the borings and with concurrence from the NYSDEC site representative. Soil samples will be collected throughout the entire depth of each test boring.

In accordance with applicable sections of the Quality Assurance Project Plan (QAPP) identified in the RWP, the recovered soil samples will be collected, observed, monitored, and documented using the following protocols:

- A subcontractor will be retained to provide vehicle-mounted direct-push soil sampling equipment to advance the test borings. However, if it is determined in the field that such equipment cannot adequately be advanced through the existing overburden soils, then a conventional rotary drill-rig will be used to advance test borings, and the NYSDEC will be consulted to approve any modifications to the drilling program.

- Sampling equipment will be used to collect soil samples in two-foot or four-foot intervals throughout the entire depth of the test borings. The soil samples will be collected in new disposable plastic liners. The recovered soil samples will be visually examined by a DAY representative for evidence of suspect contamination (e.g., staining, unusual odors) and screened with a photoionization detector (PID). Portions of the samples will be placed in containers for possible analytical laboratory testing. Different portions of the soil samples will be placed in sealable Ziploc®-type plastic baggies, and will be field screened the same day the samples are collected. The sample will be agitated and homogenized for at least 30 seconds and allowed to equilibrate for at least three minutes. The ambient headspace air inside the baggie above the soil sample will be screened for total VOC vapors with a RAE Systems MiniRAE 2000 PID equipped with a 10.6 eV lamp (or equivalent). The sampling port for the PID will be placed in the ambient air headspace inside the bag by opening a corner of the "locked" portion of the bag. The PID will monitor air inside the baggie for a period of at least 15 seconds and the peak readings measured will be recorded on a log sheet or log book.

- A DAY representative will record pertinent information for each boring on a test boring log. The recorded information will include:
  - Date, boring identification, and project identification.
  - Name of individual developing the log.
  - Name of drilling company.
  - Drill make and model.
  - Identification of any alternative drilling methods used.
  - Depths recorded in feet and fractions thereof (tenths of inches) referenced to ground surface.
  - The length of the sample interval and the percentage of the sample recovered.

- The depth of the first encountered water table, along with the method of determination, referenced to ground surface.
- Drilling and borehole characteristics.
- Sequential stratigraphic boundaries.
- Initial PID screening results of soil samples, and/or PID screening results of ambient headspace air above selected samples.

Each test boring will be backfilled with grout upon completion, and soil cuttings will be placed in New York State Department of Transportation (NYSDOT)-approved drums that will be characterized and disposed off-site in accordance with applicable regulations.

It is currently anticipated that Mitkem Laboratories, a Division of Spectrum Analytical, Inc. (Mitkem), which is a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory (NYSDOH ELAP ID #11522), will analyze the soil samples described in this section, and the groundwater samples described in Section 5.0, that are used for the performance monitoring. One soil sample from each test boring with the greatest field evidence of petroleum impact (i.e., elevated PID readings, staining, odors, etc.) will be selected and submitted to Mitkem under chain-of-custody control. The NYSDEC Site representative will provide input on the actual samples submitted for testing. The samples will be analyzed for TCL VOCs including TICs, and TCL SVOCs including TICs, using NYSDEC Analytical Services Protocol (ASP) Method OLM04.3 (refer to Table 1).

The components of the QAPP, included as an appendix in the RWP, will be implemented during the completion of the limited in-situ treatment.

The performance monitoring soil sample analytical laboratory test results will be summarized on data tables that also include a comparison to appropriate Part 375 SCOs. These performance monitoring soil sample analytical laboratory test results, and the analytical laboratory test results for one or more rounds of groundwater samples described in Section 5.0 that are collected after the in-situ treatment work, will be provided to the NYSDEC. The NYSDEC will provide input whether additional treatment is warranted.

3.0 INSTITUTIONAL CONTROL PLAN

This institutional control plan will be employed at the Site to address residual contamination that remains in soil, fill, or groundwater subsequent to the limited source area soil removal that was completed (refer to Section 2.2). The ICs provide mechanisms for: future handling, disposal, and re-use options of contaminated media; and protection against exposure to residual contamination. The ICs apply to the entire Site as described in Section 1.1 of this SMP. The ICs described in the following subsections shall be implemented and maintained.

3.1 Environmental Easement

In accordance with provisions of the NYSDEC BCP, an environmental easement is being developed for the Site. The environmental easement shall: limit use of the Site to restricted residential, commercial and industrial applications; require compliance with the SMP; restrict use of groundwater as a source of potable water or process water without necessary water quality treatment as determined by the NYSDOH; and, require the property owner to complete and submit to the NYSDEC the periodic certification that is intended to validate that the ICs (and also engineering controls if required in the future) implemented for the Site remain in-place, are unchanged, and continue to be effective. This environmental easement shall be recorded with the responsible municipal authority, and then be provided to the NYSDEC with proof of filing.

3.2 City Code Restricting Groundwater Use

Chapter 59 (Health and Sanitation), Article III (Nuisances and Sanitation) § 59-27 (Water Supply) of the current Charter and Code of the City of Rochester, New York states:

A. No person shall use for drinking purposes, or in the preparation of food intended for human consumption, any water except the potable water supply authorized for public use by the City of Rochester; and

B. Other water supplies, wells or springs used for cooling and washing purposes only, where food is prepared or sold for human consumption, shall be tested and approved by the Monroe County Health Director. All auxiliary water supplies used for commercial or industrial use shall have all hydrants and faucets conspicuously posted indicating that such water is not for drinking use, and such water supplies shall not be cross-connected or interconnected with the public water supply."

This City Code has been interpreted to represent an IC that prohibits groundwater within the city limits, including the Site, from being used as a source of potable water.

3.3 Addressing Potential Vapor Intrusion for New Structures

VOC vapors are present at this Site, and generally consist of petroleum-related compounds. Based on a vapor intrusion evaluation conducted as part of the previous remedial investigation, these VOC vapors were not found to be impacting indoor air of the existing building.

For any new enclosed structures, the potential for vapor intrusion shall be evaluated with input from the NYSDEC and the NYSDOH. If the evaluation indicates that vapor intrusion is a potential exposure pathway, a vapor mitigation system will be designed, approved by the NYSDEC and the NYSDOH, installed, and operated until such time that the NYSDEC approves its use can be terminated.

3.4 Environmental Management Plan

Subsurface soil, fill and groundwater at the Site contain concentrations of residual contaminants that exceed regulatory criteria. The objective of this Environmental Management Plan (EMP), also known as a soil management plan, is to set guidelines for management of soil and historic fill material during any future activities which would breach the cover system (i.e., overlying clean surface soil, uncontaminated subsurface soil, existing building, and paved surfaces). The EMP is a portion of the overall remedy, which addresses future disturbance/use of any residually contaminated media left on the site, after other elements of the remedy have been implemented. This EMP addresses environmental concerns related to soil and fill management. This plan is not intended to serve as a design document for construction activities. It is the owner's or developer's responsibility to incorporate the requirements for cover and soil management as set forth in this EMP for any Site activities that have the potential to breach the cover system or disturb/use any residually contaminated media at the Site.

3.4.1 Existing Cover System

The existing surface and near surface soil, asphalt-paved surfaces, concrete-paved surfaces, and the building itself, act as a cover system at the Site. This existing cover system prevents human contact with underlying historic fill material and subsurface soil that contain residual contamination, and also prevents contaminated runoff from the Site. Disturbances to this cover system shall be repaired with one or more of the components listed above or other cover materials approved by the NYSDEC and the NYSDOH. Any new soil, asphalt or concrete cover materials used to replace existing cover materials will meet the specifications outlined in Section 3.4.7.

3.4.2 Management of Soil/Fill, and Long-Term Maintenance of Cover System

The purpose of this section is to provide environmental guidelines for management of subsurface soils/fill and the repair/replacement of the cover system during any future intrusive work which breaches the cover system.

Site Preparation

As part of redevelopment or future intrusive on-site activities, the Site may require grading prior to cover system replacement. The fill material and any debris piles generated during intrusive activities shall be graded to the surface required for redevelopment. Trees, shrubs, roots, brush, masonry, rubbish, scrap, debris, pavement, curbs, fences, etc. shall be removed and properly disposed off-site or stockpiled on-site at an acceptable location in accordance with applicable solid waste regulations. Only exempt materials as defined in 6 New York Codes, rules and Regulations (6 NYCRR) Part 360-7.1(b)(1) are allowed for stockpiling. Prior to cover system replacement, protruding material shall be removed from the ground surface. Burning will not be allowed on-site.

Excavation and Grading Below the Cover System

During construction activities at the Site, the excavation of soil/fill material may be necessary, such as: construction or repair of building basements, footers, and additions; construction or repair of buried utilities; or other activities). For excavation work below the cover system, a Professional Engineer's representative with construction/remediation experience, representing the subject property owner or developer shall monitor soil/fill excavations or disturbances. The Professional Engineer (P.E.) shall also provide a stamped/signed certification that excavation work below the cover system and subsequent repair/replacement of the cover system was conducted in a manner consistent with this EMP. This P.E. certification shall be included in the annual certification report required in Section 4.0 of this document.

During any intrusive work that involves penetrating cover system and disturbing underlying historical fill or soil that may contain residual contamination, the soil/fill shall be observed for staining and will be field screened for the presence of VOCs with a PID.

Excavated soil/fill may be used on-site as fill below the cover system. Soil/fill that is excavated as part of Site activities that will not be used as fill below the cover system shall be further characterized prior to transportation off-site for disposal at a permitted facility.

3.4.3 Description of Impacted Soil and Fill Material

Based on the previous studies completed at the Site, the petroleum impact identified generally consists of gasoline that is associated with historic leakage from a former on-site or off-site underground storage tank (UST) system(s). This petroleum-impacted soil and/or fill may appear stained black and/or gray, and petroleum-like odors may be detected on the material. In addition, screening the ambient air above this material should result in positive responses on a PID.

Heterogeneous fill material generally consisting of reworked soil (e.g., silt, sand, gravel, and clay) with lesser amounts of brick, cinders, roots, wood, ash, and concrete is present over most of the Site from the ground surface to depths ranging between approximately 2.0 feet and 12.0 feet. NYSDEC Part 375 SCOs for Restricted Residential Use were exceeded for some PAH SVOCs and the metal mercury at one subsurface fill sample location (i.e., at sample location 004 at a depth interval of 4-8 feet from test boring SBDAY-02 shown on Figure 2).

Stained soil is soil that is observed to be discolored, tinted, dyed, unnaturally mottled, or has a sheen. Soil/fill screening and sampling is described in Section 3.4.4. Excavated soil/fill that is visibly stained or produces elevated PID readings [i.e., sustained 25 parts per million (ppm) or greater] will be considered potentially contaminated and stockpiled on the property for further assessment. The potentially contaminated soil/fill will be stockpiled (maximum 75 cubic yard piles) on polyethylene sheeting and then sampled for re-use, treatment, or disposal. The stockpiled, potentially contaminated soil/fill will also be completely covered using polyethylene sheeting to reduce the infiltration of precipitation and the migration of dust. Sampling and analysis will be completed in accordance with the protocols outlined in Section 3.4.4

3.4.4 Characterization of Site Soil and Fill Material

A soil and fill material characterization flowchart for materials from the Site is provided in Appendix C. For excavated soil/fill with evidence of contamination (i.e., visual staining or elevated PID measurements), one composite sample and a duplicate sample shall be collected for each 75 cubic yards of stockpiled soil/fill. For excavated soil/fill that does not exhibit evidence of contamination but must be sent for off-site disposal, one composite sample and a duplicate sample shall be collected for 2,000 cubic yards of stockpiled soil, and a minimum of one sample shall be collected for volumes less than 2000 cubic yards.

A composite sample shall be collected from five locations within each stockpile. A duplicate composite sample shall also be collected. PID measurements shall be recorded for each of the five individual locations. One discrete grab sample shall be collected from the individual location with the highest PID measurement. If none of the five individual sample locations exhibit PID readings, a discrete grab sample will be collected from one location that will be selected at random. As shown on Table 1, the composite sample shall be analyzed by a NYSDOH ELAP-certified laboratory for TCL SVOCs and Target Analyte List (TAL) metals, and the grab sample shall be analyzed for TCL VOCs.

Additional characterization sampling for off-site disposal may be required by the disposal facility. This may include, but is not limited to, one or more of the following sets of parameters: pH, pesticides, polychlorinated biphenyls (PCBs), cyanide, or toxicity characteristic leaching procedure (TCLP) parameters. To potentially reduce off-site disposal requirements/costs, the owner may also choose to characterize each stockpile individually.

Soil samples shall be composited in the field, or at the NYSDOH ELAP-certified laboratory, by placing equal portions of fill/soil from each of the five composite sample locations into a pre-cleaned, stainless steel (or Pyrex glass) mixing bowl. The soil/fill shall be thoroughly homogenized using a stainless steel scoop or trowel and transferred to pre-cleaned jars provided by the laboratory. Sample jars shall then be labeled and a chain-of-custody form will be prepared.

3.4.5 Disposal or Re-Use of Impacted On-Site Soil and Fill Material

As shown on the soil and fill material characterization flow chart in Appendix C, impacted soil/fill that has been characterized and found to meet the NYSDEC Part 375 SCOs for Restricted Residential Use, may be re-used as sub-grade, excavation sub-grade backfill, or cover, if appropriate. On-site soil/fill shall not be re-used as backfill in landscaping berms to be used for the planting of trees and shrubs. If the analysis of the soil/fill samples reveals concentrations of one or more constituent exceed NYSDEC Part 375 SCOs for Restricted Residential Use, the soil shall not be used as backfill or cover on-site, and additional analyses may be necessary to further classify the material for disposal purposes. To the extent necessary, the owner shall be responsible for further characterization (i.e., hazardous waste vs. non-hazardous waste) of any material that is found to contain one or more constituents in excess of the NYSDEC Part 375 SCOs for Restricted Residential Use. Stockpiled soil cannot be transported on or off-site until the analytical results and disposal facility approvals are received.

Impacted soil/fill containing one or more constituent in excess of the NYSDEC Part 375 SCOs for Restricted Residential Use shall be transported off-site to a permitted waste management facility.

3.4.6 Use of Material for Sub-Grade

Sub-grade material used to backfill excavations or placed to increase site grades or elevation shall meet the following criteria.

- Excavated on-site soil/fill, which appears to be visually impacted shall be sampled and analyzed in accordance with Section 3.4.4. Analytical results shall indicate that the contaminants, if any, are present at concentrations below NYSDEC Part 375 SCOs for Restricted Residential Use.
- Excavated on-site soil/fill, which does not appear to be visually impacted, is free of fill, and does not exhibit peak PID readings above 25 ppm, does not require analytical testing and can be re-used as sub-grade.
- Off-site borrow soils shall be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.
- Off-site soils intended for use as site backfill cannot otherwise be defined as a solid waste in accordance with 6 NYCRR Part 360-1.2(a).
- If the owner designates an off-site source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.
- Virgin off-site soils shall be subject to collection of one representative composite sample per source. Such samples are to be analyzed for TCL VOCs, TCL SVOCs, PCBs, pesticides, TAL metals, and cyanide (refer to Table 1). The soil will be acceptable for use as backfill provided that the analytical laboratory test results for each constituent meet the standards, criteria and guidance (SCG) values. As an alternative, commercial bagged soil purchased at a store (e.g., from a home and garden store) can be used at the Site and does not require analytical laboratory testing.
- Non-virgin off-site soils shall be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-site non-virgin soil source area and both samples of the first 1,000 cubic yards meet SCG values, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided earlier samples met the SCG values. The samples of non-virgin soils are to be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide (refer to Table 1). The soil will be acceptable for use as backfill provided that the analytical laboratory test results for each constituent meet the SCG values.

3.4.7 Cover System Specifications

Required cover system specifications for this project are provided below.

Soil

Cover soil material shall meet the following criteria.

- Excavated on-site soil/fill that exceeds NYSDEC Part 375 SCOs for Restricted Residential Use or exhibits nuisance odors, shall not be used as cover material.
- Off-site borrow soils shall be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.
- Off-site soils intended for use as site cover cannot otherwise be defined as a solid waste in accordance with 6 NYCRR Part 360-1.2(a).
- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.
- Virgin off-site soils shall be subject to collection of one representative composite sample per source. The sample shall be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide (refer to Table 1). The soil will be acceptable for use as cover material provided that all parameters meet the NYSDEC Part 375 SCOs for Restricted Residential Use. As an alternative, commercial bagged soil purchased at a store (e.g., from a home and garden store) can be used at the Site and does not require analytical laboratory testing.
- Non-virgin off-site soils shall be tested via collection of one composite sample per 500 cubic yards of material from each source area. Each sample shall be analyzed for TCL VOCs, TCL SVOCs, pesticides, PCBs, TAL metals, and cyanide (refer to Table 1). If more than 1,000 cubic yards of soil are borrowed from a given off-site non-virgin soil source area and both samples of the first 1,000 cubic yards meet the NYSDEC Part 375 SCOs for Restricted Residential Use, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided each earlier sample met the NYSDEC Part 375 SCOs for Restricted Residential Use.
- The topsoil used for the final cover shall be fertile, friable, natural loam surface soil, capable of sustaining plant growth, and free of clods or hard earth, plants or roots, sticks or other extraneous material harmful to plant growth.
- Grassed areas shall be seeded with a sustainable perennial mixture with appropriate erosion control measures taken until the perennial grasses are established.
- To reduce the disturbance of the surface cover material, clean soil berms shall be constructed in areas where shallow-rooted trees and shrubs shall be planted. The berms will be of sufficient thickness to allow the excavation of only clean fill deep enough to plant the tree or shrub root ball. The berm material shall contain sufficient organic material to allow three and/or shrub growth, and will be of sufficient strength to support threes and/or shrubs at their maximum height.

Asphalt

It is expected that asphalt shall continue to be used at the Site for the parking lot and access road. Where asphalt will represent a cover in terms of remedial action, a minimum cross-sectional thickness of 6 inches of material (asphalt and clean sub-base material) is required for protection from exposure to the underlying soil/fill material. The actual cross section of the asphalt cover (i.e., thickness of the asphalt and sub-base material) shall be determined based on the intended use of the area.

Concrete

It is anticipated that concrete will continue to be used at the Site for building structures, utilities, footings, sidewalk foundations, or signs. Concrete may also be used instead of asphalt for roads and parking lots. Where concrete will represent a cover in terms of remedial action, a minimum cross-sectional thickness of 6 inches of material (concrete and clean sub-base material) is required for protection from exposure to the underlying soil/fill material. Type and thickness of concrete and sub-base material shall be determined based on intended use of the area.

3.4.8 Erosion Control

Prior to construction activities being implemented at the Site, State and Federal laws shall be examined to determine if coverage under the NYSDEC State Pollution Discharge Elimination System (SPDES) General Permit for Storm Water Discharges from Construction Activities (Construction Storm Water General Permit) is required. As of December 9, 2002, federal and state laws require that the project obtain coverage under the NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities disturbing one or more acres of land. The Site is 1.106 acres in size. Requirements for coverage under the Construction Storm Water General Permit include the submittal of a Notice of Intent form and the development of a Storm Water Pollution Prevention Plan (SWPPP).

If a SWPPP is warranted, it shall fulfill the general permit requirements and address issues such as erosion prevention, sedimentation control, hydraulic loading, pollutant loading, ecological protection, physical site characteristics that impact design, and site management planning. Descriptions of proposed features and structures at the Site shall include a description of structure placement, supporting engineering data and calculations, construction scheduling, and references to established detailed design criteria. The SWPPP shall conform to all requirements as established by applicable regulatory agencies.

Proven soil conservation practices shall be incorporated in the construction and development plans to mitigate soil erosion, off-site sediment migration, and water pollution from erosion. The use of appropriate temporary erosion control measures such as silt fencing and/or hay bales shall be required around all soil/fill stockpiles and unvegetated soil surfaces during redevelopment activities. Stockpiles shall be graded and compacted as necessary for positive surface water runoff and dust control. Stockpiles of soil/fill shall be placed a minimum of 50 feet from the property boundaries.

To the extent required as part of Site redevelopment or construction activities, temporary erosion and sedimentation control measures and facilities shall be employed during active construction stages. Prior to any construction activity, temporary erosion and sediment control measures shall be installed and maintained until such time that permanent erosion control measures are installed and effective. If temporary erosion and sedimentation control measures are required, they shall be identified and implemented prior to starting the redevelopment or construction activities

If deemed required under current regulations, permanent erosion control measures and facilities shall be incorporated during site redevelopment for long-term erosion protection. Permanent measures and facilities will be installed as early as possible during construction phases. Parking and building systems associated with redevelopment shall not include dry wells or other subsurface injections/disposal piping or facilities.

The remedial construction activities shall involve the maintaining the current cover system, or re-installing new cover system components, including asphalt, concrete, or topsoil over the entire site. Permanent erosion control measures shall incorporate a combination of design features to limit overall erosion and sediment problems to practical design limits, and the placement of permanent facilities during site restoration for long term erosion protection.

3.4.9 Dust Control

Particulate monitoring shall be performed during sub-grade excavation, grading, and handling activities in accordance with the HASP included in Appendix A. This shall include particulate monitoring along the perimeter of the work zone in accordance with the Community Air Monitoring Plan (CAMP) that is included as Section 8.3 of the HASP. The particulate monitoring shall be conducted in accordance with NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4031 (Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites), which has been incorporated into Section 8.0 of the HASP.

If particulate concentrations exceed action levels outlined in the HASP, dust suppression shall be required during those site activities that are causing the elevated concentrations of particulates. As per TAGM 4031 and the HASP, dust suppression techniques that may be used at the Site include applying water on roadways, wetting equipment and excavation faces, spraying water on buckets during excavation and dumping, covering materials that are being hauled, restricting equipment speeds; covering excavated areas, exposed areas and stockpiles of fill and/or petroleum-contaminated material after excavation or disturbance activity ceases, establishing vegetative cover immediately after placement of cover soil, and reducing the excavation size and/or number of excavations. The use of atomizing sprays is recommended so that excessively wet areas will not be created but fugitive dust will be suppressed. Dust suppression techniques shall be utilized until air monitoring indicates that particulate levels are within an acceptable range.

If warranted, the surface of unvegetated or disturbed soil/fill areas shall be wetted with water or other dust suppressive agents to control dust during construction. Any petroleum-contaminated soil, and any fill material left exposed during extended interim periods (greater than 90 days) prior to placement of final cover shall be covered with a temporary cover system (i.e., tarps, spray type cover system, etc.) or planted with vegetation to control fugitive dust to the extent practicable.

3.4.10 Management of Construction Water

Pumping of groundwater and/or stormwater that has accumulated in an excavation(s), if necessary, shall be done in such a manner as to prevent the migration of particulates, soil/fill, or unsolidified concrete materials, and to prevent damage to the existing sub-grade. Water pumped from excavations shall be managed in accordance with applicable regulations in order to prevent endangerment of public health, property, or any portion of the construction.

In areas where ground water may be contaminated, the ground water in excavations shall be field screened for VOCs and observed for any noticeable sheens. Water in the excavations shall not be discharged to the ground surface if:

- Staining or PID measurements above background are observed in the excavation; or
- A sheen is present on the water surface.

If any of these conditions exist, the water pumped from the excavations shall be containerized and analyzed in accordance with the Surface Water and Ground Water Quality Standards and guidance values set forth in the NYSDEC TOGS 1.1.1, and the local sewer authority discharge permit. If the water meets the surface water and groundwater quality standards, it may be discharged to the ground surface. If the water does not meet the surface water and ground water quality standards, it may be discharged to the local sewer authority under a discharge permit. If the water quality is such that the local sewer authority discharge permit requirements will be exceeded, or the local sewer authority will not approve the discharge to a sewer, it shall be transported off-site for proper disposal or treated on-site via a treatment system that has been approved by NYSDEC and the local sewer authority. If treated, further testing and approval is required prior to discharge to the local sewer authority.

Runoff from surface discharges shall be controlled. No discharges shall enter a surface water body without proper permits.

3.4.11 Access Controls

Access to soil and fill material on the property shall be controlled until final cover is placed to prevent direct contact with sub-grade materials. Excavated sub-grade material that is stockpiled on site will be temporarily covered to limit access to that material.

3.4.12 Operation, Maintenance, and Monitoring

Operation, maintenance and monitoring (OM&M) is required for the cover system at the Site, and is the responsibility of the property owner. Erosion of the soil cover system will be reduced by maintaining a vegetative cover. Cover materials shall be examined at least quarterly, and at shorter time intervals if breaches in the cover system are noticed. The OM&M shall consist of performing the following duties:

- Visually observe the cover system at the Site to evaluate their condition (e.g., vegetative cover, paved roads, buildings, paved parking lots, etc. for sloughing, cracks, settlement, erosion, distressed vegetation, damaged fencing, gates or signs.

- Repair any deficiencies found.
- Document the observations and any resulting repairs.

3.5 Health and Safety Plan

Invasive work performed at the property shall be performed in accordance with applicable local, state, and federal regulations to protect worker health and safety. A site-specific HASP dated June 2008 for the Site is included in Appendix A. This HASP outlines policies and procedures that can protect workers and the public from potential environmental hazards posed during future site activities including redevelopment activities that have the potential to disturb impacted soil, fill, or groundwater. If intrusive work is expected to breach the cover system at the property, then contractors performing redevelopment or maintenance activities can implement the provisions of this HASP, or develop their own site-specific, activity-specific HASP written in accordance with 29 Code of Federal Regulations (CFR) 1926.65, which would require approval from the NYSDEC, the NYSDOH, and the MCDPH prior to implementing the project.

During activities that have the potential to disturb contaminated soil, fill, or groundwater (e.g., repairs to/replacement of buried utilities, etc.), air monitoring for particulates and VOCs shall be conducted. Further details pertaining to the required air monitoring are provided in the HASP. The air monitoring will be required on-site for protection of Site workers, and along the perimeters of the Site as part of the CAMP as specified in the HASP. Air monitoring readings shall be recorded in a logbook and will be available for review by the NYSDEC, NYSDOH, and MCDPH.

3.6 Quality Assurance Project Plan

Pertinent components of the Quality Assurance Project Plan, or QAPP, that was included in the RWP shall be implemented as part of this SMP. This includes, but is not limited to, the Quality Assurance/Quality Control (QA/QC) protocols provided in the following subsections.

3.6.1 Decontamination Procedures

In order to reduce the potential for cross-contamination during collection of samples, the following procedures shall be implemented to ensure that the data collected (primarily the laboratory data and groundwater quality measurement data) is acceptable.

It is anticipated that most of the materials used to assist in obtaining samples will be disposable one-use materials (e.g., sampling containers, bailers, rope, pump tubing, latex gloves, etc.). When equipment must be re-used (e.g., static water level indicator, oil/water interface meter, drilling equipment, etc.), it will be decontaminated between each use by at least one of the following methods:

- Steam clean the equipment; or
- Rough wash in tap water; wash in mixture of tap water and alconox-type soap; double rinse with deionized or distilled water; and air dry and/or dry with clean paper towel.

When deemed necessary, a temporary decontamination pad will be constructed for decontamination of equipment. Any decontamination pad will be removed following completion of associated activities. Decontamination liquids and disposable equipment and personal protective equipment will be containerized in NYSDOT-approved 55-gallon drums and left on-site until the disposal method is determined.

3.6.2 Sample Handling and Custody Requirements

During sampling activities, personnel shall wear disposable latex or nitrile gloves. Between the collection of samples, personnel performing the sampling will discard used latex gloves and put on new gloves to preclude cross-contamination between samples. As few personnel as possible will handle samples or be in charge of their custody prior to shipment to the analytical laboratory.

New laboratory-grade sample containers shall be used to collect soil and groundwater samples. Sufficient volume (i.e., as specified by the analytical laboratory) will be collected to ensure that the laboratory has adequate sample to perform the specified analyses (refer to QAPP in RWP for information on sufficient sample volumes).

Samples shall be preserved as specified by the analytical laboratory for the type of parameters and matrices being tested. Sample holding times and preservation protocols will be adhered to (refer to QAPP in RWP for information on sample preservation and holding times).

Chain-Of-Custody

Samples that are collected for subsequent testing shall be handled using chain-of-custody control. Chain-of-custody documentation will accompany samples from their inception to their analysis, and copies of chain-of-custody documentation will be included with the laboratory's report. The chain-of-custody will include the date and time the sample was collected, the sample identity and sampling location, the requested analysis, and any request for accelerated turnaround time.

Sample Labels

Sample labels for field samples and quality control samples with adhesive backing shall be placed on sample containers in order to identify the sample. Sample information will be clearly written on the sample labels using waterproof ink. Sufficient sample information will be provided on the label to allow for cross-reference with the field sampling records or sample logbook.

The following information will be provided on each sample label:

- Name of company;
- Initials of sampler;
- Date and time of collection;
- Sample identification;
- Intended analyses; and
- Preservation required.

Custody Seals

Custody seals are preprinted adhesive-backed seals that are designed to break if disturbed. Seals will be signed and dated before being placed on the shipping cooler. Seals shall be placed on one or more location on each shipping cooler as necessary to ensure security. Shipping tape will be placed over the seals on the coolers to ensure that the seals are not accidentally broken during shipment. Sample receipt personnel at the laboratory will check and document whether the seals on the shipping coolers are intact when received.

Transportation of Samples

Samples shall be handled, packaged and shipped in accordance with applicable regulations, and in a manner that does not diminish their quality or integrity. Samples will be delivered to the laboratory no later than 48 hours from the day of collection.

3.6.3 Analytical Quality Assurance/Quality Control

Characterization samples collected during site redevelopment activities and future construction activities, and groundwater samples, shall be analyzed using the most recent NYSDEC ASP, consistent with Section 2 of DER-10, the Technical Guidance for Site Investigation and Remediation.

The laboratory proposed to perform the analyses shall be certified through the New York State Department of Health ELAP to perform Contract Laboratory Program (CLP) analysis and Solid Waste and Hazardous Waste Analytical testing on all media to be sampled. The laboratory will maintain this certification for the duration of the project.

The analytical laboratory test results for characterization samples and groundwater monitoring samples shall be reported in NYSDEC ASP Category B deliverable reports. Analytical laboratory test results for soil samples will be reported on a dry-weight basis. The analytical laboratory will analyze samples using the lowest practical quantitation limits (PQLs) possible.

Procedures for laboratory instrumentation calibration, laboratory analyses, reporting of data, internal quality control, and corrective actions shall be followed as per NYSDEC ASP, the laboratory's Quality Assurance Plan, and the QAPP included in the RWP. Where appropriate, trip blanks, field blanks, field duplicates, and matrix spike/matrix spike duplicates shall be performed at a rate of 5% (1 per up to 20 samples) and will be used to assess the quality of the data. The laboratory's in-house QA/QC limits will be utilized whenever they are more stringent than those suggested by the EPA or ASP methods.

A data usability summary report (DUSR) shall be completed on some of the analytical laboratory data for groundwater samples. The DUSR will be conducted in accordance with the provisions set forth in Appendix 2B of the Draft DER-10 Technical Guidance for Site Investigation and Remediation dated December 25, 2002. The findings of the DUSR will be incorporated in an annual monitoring report(s). The person performing the DUSR must be pre-approved by the NYSDEC.

3.7 Notification and Reporting

For projects with potential disturbance of <10 cubic yards of impacted soil, fill, or groundwater, the owner or other entities directly involved with the project can implement the SMP without notifying the NYSDEC. However, the NYSDEC shall be notified at the address below at least 60 days in advance of projects that will disturb ≥10 cubic yards of impacted soil, fill material, or groundwater in order to allow the NYSDEC time for review and any necessary revisions of the SMP.

The following minimum notification and reporting requirements shall be followed by the property owner prior to and following site development, as appropriate:

- If buried drums or USTs are encountered during soil excavation activities, excavation will cease and the NYSDEC will be immediately notified.

- If the cover system has been breached, the following will be included in the annual institutional control certification report (refer to Section 4.0):
  - A certification that the work was performed in accordance with this SMP.
  - Plans showing areas or cover breach/repair and depth of any sub-grade soil or fill removal.
  - Copies of daily inspection reports for soil-related issues.
  - Description of any erosion control measures.
  - A text narrative describing the excavation activities performed, the health and safety monitoring performed in accordance with the HASP (both site specified and Community Air Monitoring), the quantities and locations of soil/fill excavated, the disposal locations for the soil/fill, the soil sampling locations and results, a description of any problems encountered, the location and acceptability test results for backfill sources, the repair of any breached cover system, and other pertinent information necessary to document that the site activities were carried out in accordance with the SMP.
  - Although unlikely for this Site, if the disturbed area exceeds one acre, plans showing before and after survey elevations on a 100-foot grid system to document the thickness of the clean soil cover system must also be included in the annual certification.

Notification contact is as follows:

NYSDEC
Regional Hazardous Waste Remediation Engineer
Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, New York 14414-9516
(585) 226-2466

4.0 INSTITUTIONAL CONTROL CERTIFICATION

Periodic certification by the property owner shall be prepared by a professional engineer or environmental professional that is acceptable to the NYSDEC. Initially, periodic certification will be provided every year. After five years, a request can be made by Conifer Hamilton, LLC or Genesee Hamilton, L.P. to reduce the frequency of review and certification. Each certification report for a specific year is due within 30 days of the anniversary of the start of the institutional controls. The certification is intended to: validate that the ICs (and also engineering controls if required in the future) that are implemented for the Site remain in place and are unchanged from the previous certification; that the controls have been maintained and continue to be effective, and that no circumstances have occurred that impair the ability of the controls to protect public health and the environment, or constitute a violation or failure to comply with the SMP for the Site. The institutional control certification reports will also include any groundwater monitoring information, test results, tables, figures that are generated during the reporting period (refer to Section 5.0).

5.0 GROUNDWATER MONITORING PLAN

Groundwater sampling and analytical laboratory testing (i.e., a groundwater monitoring program) will be implemented to track remedial progress and effectiveness. It is anticipated that this groundwater monitoring program will use monitoring wells MWDAY-01 through MWDAY-05, MW-URS3, and MW-URS4. The locations of these wells are shown on Figure 6. This well field provides an upgradient to downgradient transect of monitoring points across the plume.

It is anticipated that the groundwater monitoring program will be conducted for a period of up to five years; however, the Department will determine based on the data, if additional monitoring is required. It is anticipated that the seven wells will be sampled on a bi-annual basis during the 1st and 2nd years, and on an annual basis for the 3rd through 5th years (i.e., total of 7 sampling events). As part of this monitoring program, groundwater will be tested for parameters that evaluate the presence and concentration of Site contaminants, and to determine the extent and potential movement of the contamination plume.

With approval from regulatory agencies and after adequate monitoring data are available for evaluation, the duration and frequency of subsequent groundwater monitoring events, the number of wells sampled during subsequent monitoring events, and the test parameters for samples collected during subsequent monitoring events, may be modified based on the test results of samples from previous monitoring events.

It is anticipated that each groundwater monitoring event will include collecting groundwater samples from the seven groundwater monitoring wells for water quality measurements and analytical laboratory testing using the low-flow purge and sample protocol outlined in the QAPP that was included as an appendix of the RWP, and is restated below:

- Static water level measurements will be obtained from each well using an oil/water interface meter. DAY will also look for light non-aqueous phase liquid (LNAPL) by using visual observations and the oil/water interface meter at each well location. DAY will document the results of this work in the field.

- Subsequent to obtaining static water level measurements and monitoring the wells for free LNAPL, the following low-flow purge and sample techniques will be used to collect a groundwater sample from each well:

    - A portable bladder pump connected to new disposable polyethylene tubing will be lowered and positioned at or slightly above the mid-point of the water column within the well screen when the screened interval is set in relatively homogeneous material. When the screened interval is set in heterogeneous materials, the pump will be positioned adjacent to the zone of highest hydraulic conductivity (as defined by geologic samples). Care will be taken to install and lower the bladder pump slowly in order to minimize disturbance of the water column.

    - The pump will be connected to a control box that is operated on compressed gas (nitrogen, air, etc.) and is capable of varying pumping rates. An in-line flow-through cell attached to a Horiba U-22 water quality meter (or similar equipment) will be connected to the bladder pump effluent tubing to measure water quality data.

- The pump will be started at a pumping rate of 100 ml/min or less (for pumps that can not achieve a flow rate this low, the pump will be started at the lowest pump rate possible). The water level in the well will be measured and the pump rate will be adjusted (i.e., increased or decreased) until the drawdown is stabilized. In order to establish the optimum flow-rate for purging and sampling, the water level in the well will be measured on a periodic basis (i.e., every one or two minutes) using an electronic water level meter or an oil/water interface meter. When the water level in the well has stabilized (i.e., use goal of <0.33 ft of constant drawdown), the water level measurements will be collected less frequently.
- While purging the well at the stabilized water level, water quality indicator parameters will be monitored on a three to five minute basis with the Horiba U-22 water quality meter (or similar equipment). Water quality indicator parameters will be considered stabilized when the parameter readings listed below are generally achieved after three consecutive readings:
  - pH ($\pm$ 0.1);
  - specific conductance ($\pm$ 3%);
  - dissolved oxygen ($\pm$ 10 %);
  - oxidation-reduction potential ($\pm$ 10 mV);
  - temperature ($\pm$ 10%); and
  - turbidity [$\pm$ 10%, when turbidity is greater than 10 nephelometric turbidity units (NTUs)]
- Following stabilization of the water quality parameters, the flow-through cell will be disconnected and a groundwater sample will be collected from the bladder pump effluent tubing. The pumping rate during sampling will remain at the established purging rate or it may be adjusted downward to minimize aeration, bubble formation, or turbulent filling of sample containers. A pumping rate below 100 ml/min will be used when collecting VOC samples.
- The procedures and equipment used during the purging and groundwater sampling, and the field measurement data obtained, will be documented in the field and recorded on Monitoring Well Sampling Logs.
- During sampling, the following parameters will be measured using a water quality meter(s) and will later be presented on Monitoring Well Sampling Logs:
  - Dissolved Oxygen
  - Conductivity
  - Oxidation/Reduction Potential (redox)
  - pH
  - Temperature
  - Turbidity

As shown on Table 1, each round of groundwater samples from the seven wells will be tested for TCL VOCs and TCL SVOCs, including TICs, using NYSDEC ASP Method OLM04.3, or other acceptable method approved by the NYSDEC.

Using the static water level measurements from the seven wells, and the surveyed well elevations, groundwater elevations for each monitoring event will be calculated, and a potentiometric groundwater contour map will be developed for each monitoring event.

The detected concentrations of VOCs and SVOCs for each groundwater monitoring event will be compared on a summary table to TOGS 1.1.1 groundwater standards and guidance values. The test results will also be evaluated on a cumulative basis.

Until the ground monitoring is no longer required by the NYSDEC, information, test results, tables and figures will be provided in the respective annual institutional control certification reports (refer to Section 4.0).

6.0 REFERENCES

Previous Reports and Work Plans

Phase I Environmental Site Assessment, 151 to 435 Mount Hope Avenue and 562 Ford Street, Rochester, New York; October 24, 2000; Day Environmental, Inc.

Phase II Environmental Study Data Package, 151 to 435 Mount Hope Avenue and 562 Ford Street, Rochester, New York; October 2000; Day Environmental, Inc.

Phase II Environmental Study Data Evaluation Report, 151, 171, 173, 175, 177, 191, 425, and 435 Mount Hope Avenue and 562 Ford Street, Rochester, New York; February 2002; Day Environmental, Inc.

Phase II Report; Environmental Site Assessment of River Park Commons Apartment Complex, Rochester, New York; June 2003; URS Corporation.

Remedial Investigation/Remedial Alternatives Analysis Report; Brownfield Cleanup Program; 185 Mount Hope Avenue, Rochester, New York (Tower Property); NYSDEC Site ID C828124; May 2007; Day Environmental, Inc.

Remedial Work Plan; Brownfield Cleanup Program; 185 Mt. Hope Avenue, Rochester, New York (Tower Property); NYSDEC Site ID C828124; December 2007; Day Environmental, Inc.

Regulatory Documents

NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 document titled "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" (TOGS 1.1.1) dated June 1998, including April 2000 Addendum Table 1.

NYSDEC 6 NYCRR Part 375 Environmental Remediation Programs; effective December 14, 2006.

City of Rochester, New York Charter and Code; Chapter 59 (Health and Sanitation), Article III (Nuisances and Sanitation) § 59-27 (Water Supply).

NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, December 2002.

NYSDEC Site Management Plan (SMP) Checklist, October 2006.

NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4031 (Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites), October 1989

29 CFR 1926.65, Safety and Health Regulations for Construction, Hazardous Waste Operations and Emergency Response, February 13, 1996

Part 364, Waste Transporter Permits, Amended May 12, 2006

6 NYCRR Part 360-1.2(a), Solid Waste Management Facilities, General Provisions, Definition for Solid Waste and Related terms, Revised Effective May 12, 2006

6 NYCRR Part 360-7.1(b)(1), Construction and Demolition Debris Landfills; Applicability, Exemptions, and Definitions; Revised Effective November 24, 1999

Reference Materials

Ground Water Resources of Monroe County; 1935; R.M. Leggette, L.O. Gould and B.H. Dollen.

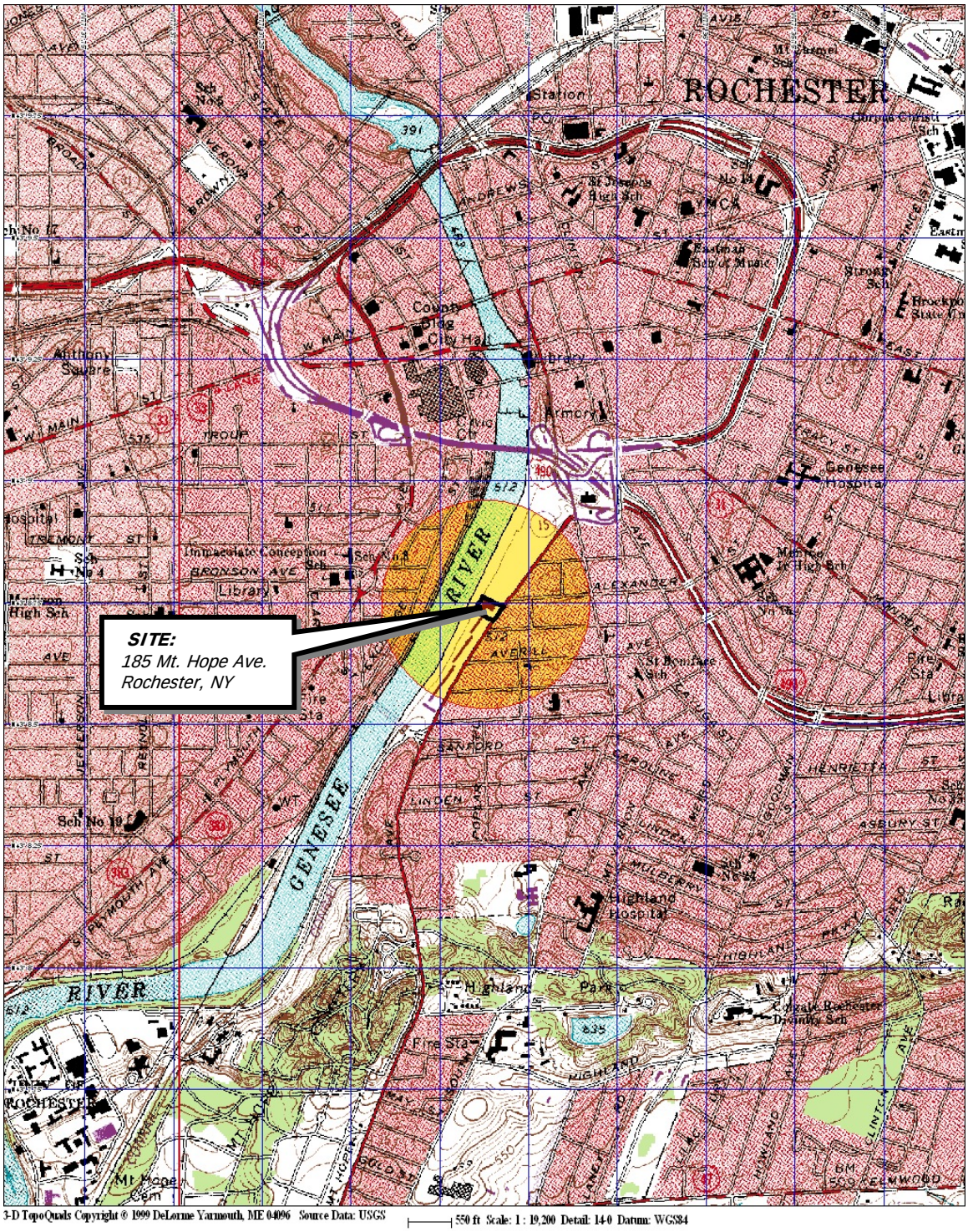
USGS topographic map for the Rochester East, New York quadrangle, 1995.

USGS topographic map for the Rochester West, New York quadrangle, 1995.

7.0 ACRONYMS

ASP	Analytical Services Protocol
BCP	Brownfield Cleanup Program
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
CLP	Contract Laboratory Protocol
CRT	Controlled Release Technology
DAY	Day Environmental, Inc.
DUSR	Data Usability Summery Report
ELAP	Environmental Laboratory Approval Program
EMP	Environmental Management Plan
FER	Final Engineering Report
HASP	Health And Safety Plan
IC	Institutional Control
LNAPL	Light Non-Aqueous Phase Liquid
MCDPH	Monroe County Department of Public Health
Mitkem	Mitkem Laboratories, a Division of Spectrum Analytical, Inc.
MSDS	Material Safety Data Sheet
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OM&M	Operation, Maintenance, and Monitoring
ORC	Oxygen Release Compound
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
P.E.	Professional Engineer
Phase I ESA	Phase I Environmental Site Assessment
PID	Photoionization Detector
PPM	Parts Per Million
PQL	Practical Quantitation Limit
QAPP	Quality Assurance Project Plan
REC	Recognized Environmental Condition
RI/RAA	Remedial Investigation/Remedial Alternatives Analysis
RWP	Remedial Work Plan
SCG	Standard, Criteria and Guidance
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SPDES	State Pollution Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
SWPPP	Storm Water Pollution Prevention Plan
TAGM	Technical and Operational Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TOGS	Technical and Operational Guidance Series
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

FIGURES

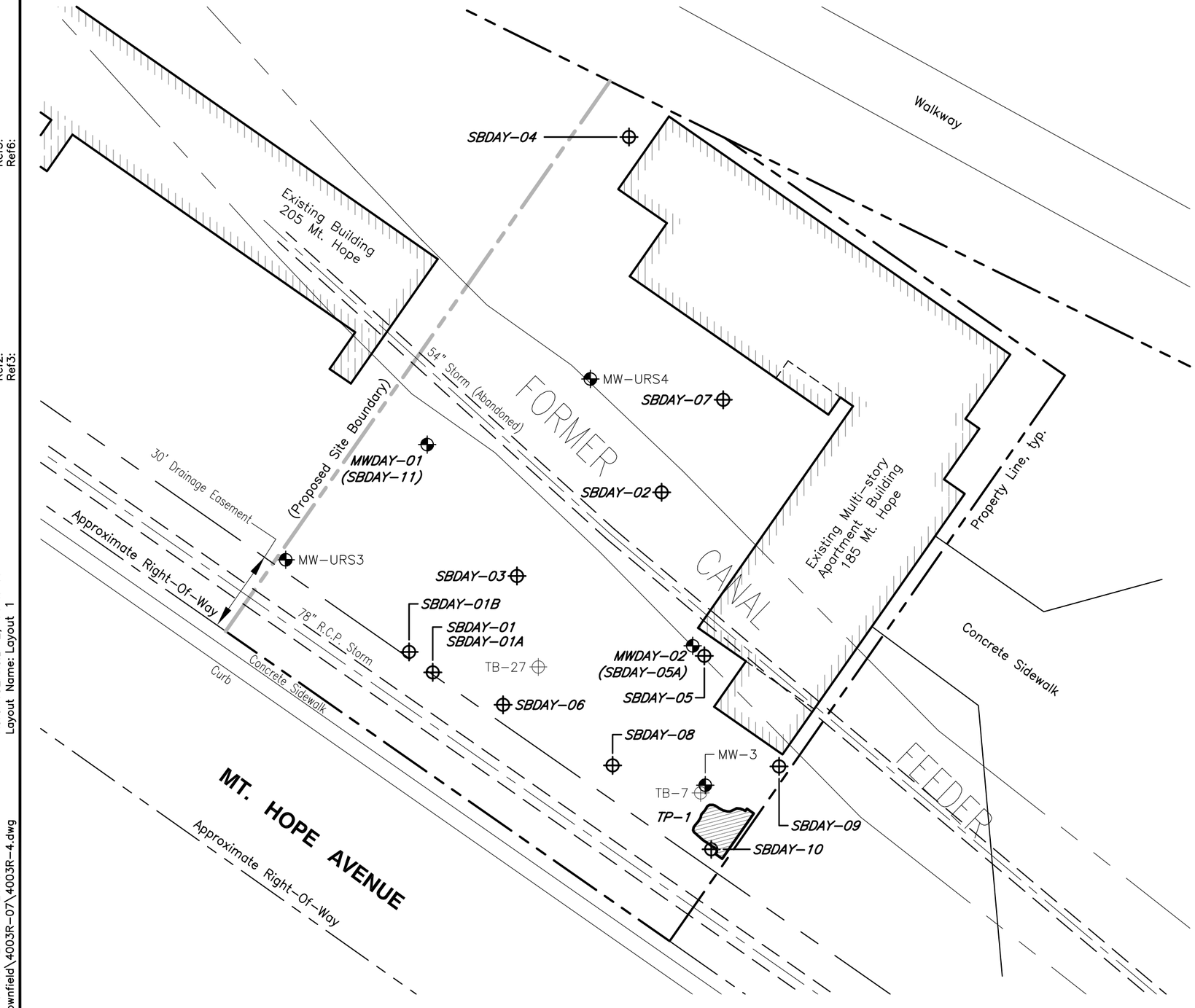


Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad maps Rochester East (NY) 1995 and Rochester West (NY) 1995. Site Lat/Long: N43d-8.75' – W77d-36.62'

DATE **11-05-2007** DRAWN BY **RJM** SCALE **1" = 2000'**	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14623-2700	PROJECT TITLE **185 MT. HOPE AVENUE** **ROCHESTER, NEW YORK** **BROWNFIELD CLEANUP PROGRAM** DRAWING TITLE **PROJECT LOCUS MAP**	PROJECT NO. **4003R-07** **FIGURE 1**

Ref4:
Ref5:
Ref6:

Ref1:
Ref2:
Ref3:



Site Plan
1"= 40'

N

LEGEND:

MWDAY–01	Monitoring Well Location Installed February 2005
MW–URS3	Monitoring Well Location Installed Prior To February 2005
SBDAY–08	Test Boring Location Installed February 2005
TB–7	Test Boring Location Installed Prior To February 2005
TP–1	Test Pit Location Installed August 2005

NOTES:

1. This drawing was adapted from a drawing by the City of Rochester, DCD–Housing & Project Development, titled "River Park Commons" dated August 28, 2000, untitled partial utitility plan from Conifer Reality and from an instrument survey performed by James M. Parker, Land Surveyor, on September 13, 2000. No boundary survey was performed.
2. Former Canal Feeder located using select Sanborn Maps provided by Environmental Risk Information & Imaging Services. Location should be considered approximate.
3. Location of 54" abandoned storm sewer from an as–built drawing by Teetor–Dobbins P.C., tiltled "Relocation Of Storm Drain Plan & Profile Sheet 2 of 3", drawing No. 2, dated June 1973. Accuracy of location should be to the degree implied by the method used.

FIELD VERIFIED BY	DATE
JAD	11-2007
DRAWN BY	DATE DRAWN
RJM	11-6-2007
SCALE	DATE ISSUED
1" = 40'	11-6-2007

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
185 MT. HOPE AVENUE
ROCHESTER, NEW YORK

BROWNFIELD CLEANUP PROGRAM

DRAWING TITLE
Site Plan with Select Remedial Investigation Test Locations

PROJECT NO.
4003R-07

FIGURE 2

Time Plotted: Mon Jun 2 09:10 2008
File Name: Brownfield\4003R–07\4003R–4.dwg

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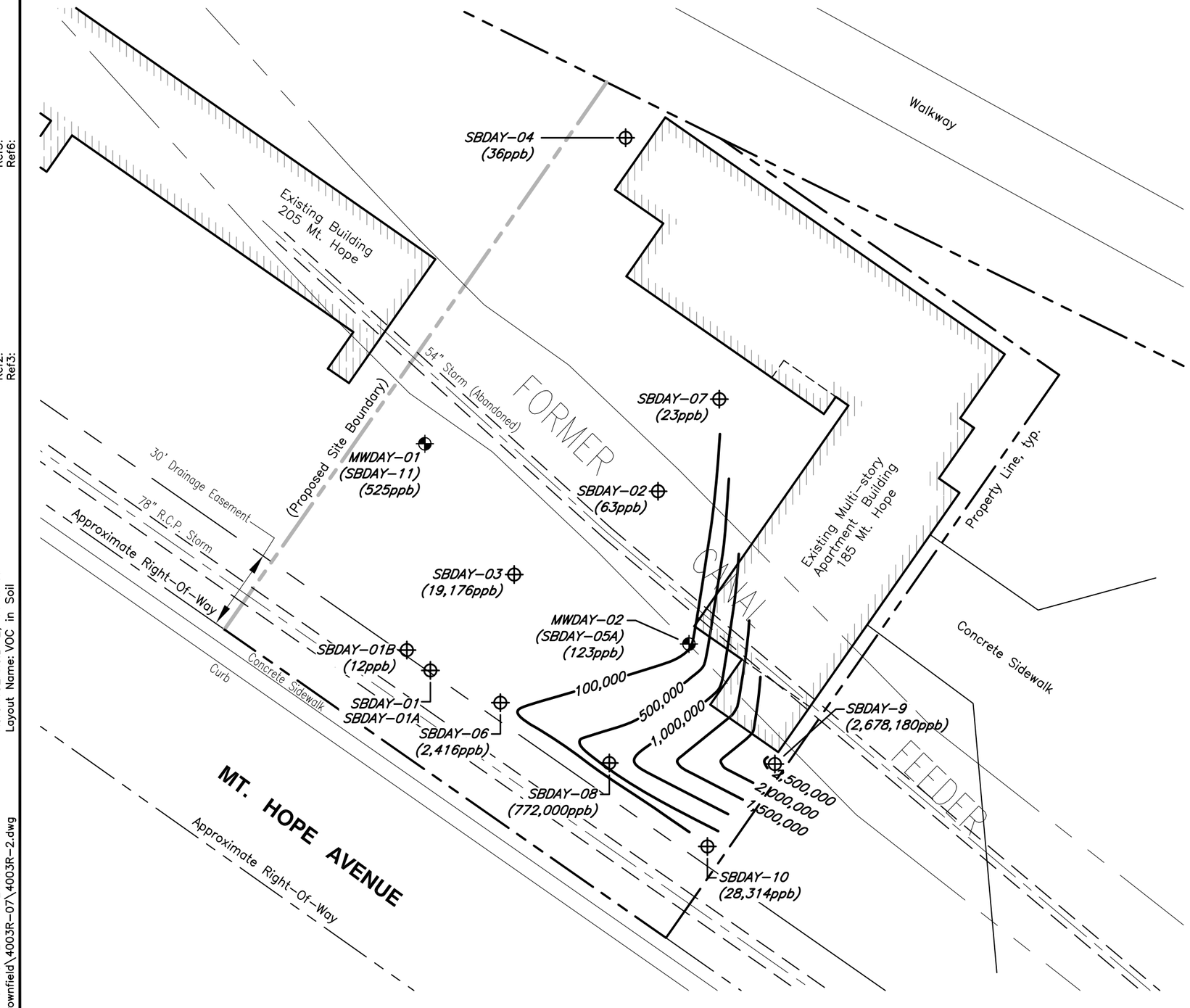
Layout Name: Layout 1



Site Plan
1"= 40'

LEGEND:

MWDAY–01 (525ppb)	Monitoring Well Location Installed February 2005 With Total VOCs Detected In Soil Samples In Parentheses
SBDAY–08 (772,000ppb)	Test Boring Location Installed February 2005 With Total VOCs Detected In Soil Sample In Parentheses
100,000	Total VOCs Contour Line (ppb), Created by Golden Software, Inc. Surfer8 Program

NOTES:

1. This drawing was adapted from a drawing by the City of Rochester, DCD–Housing & Project Development, titled "River Park Commons" dated August 28, 2000, untitled partial utitility plan from Conifer Reality and from an instrument survey performed by James M. Parker, Land Surveyor, on September 13, 2000. No boundary survey was performed.
2. Former Canal Feeder located using Sanborn Maps provided by Environmental Risk Information & Imagaing Services. Location should be considered approximate.
3. Location of 54" abandoned storm sewer from an as–built drawing by Teetor–Dobbins P.C., tiltled "Relocation Of Storm Drain Plan & Profile Sheet 2 of 3", drawing No. 2, dated June 1973. Location should be considered accurate to the degree implied by the method used.

FIELD VERIFIED BY	JAD
DATE	11-2007
DRAWN BY	RJM
DATE DRAWN	11-6-2007
SCALE	1" = 40'
DATE ISSUED	11-6-2007

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
185 MT. HOPE AVENUE
ROCHESTER, NEW YORK

BROWNFIELD CLEANUP PROGRAM

DRAWING TITLE
Total VOCs In Remedial Investigation Subsurface Soil Samples

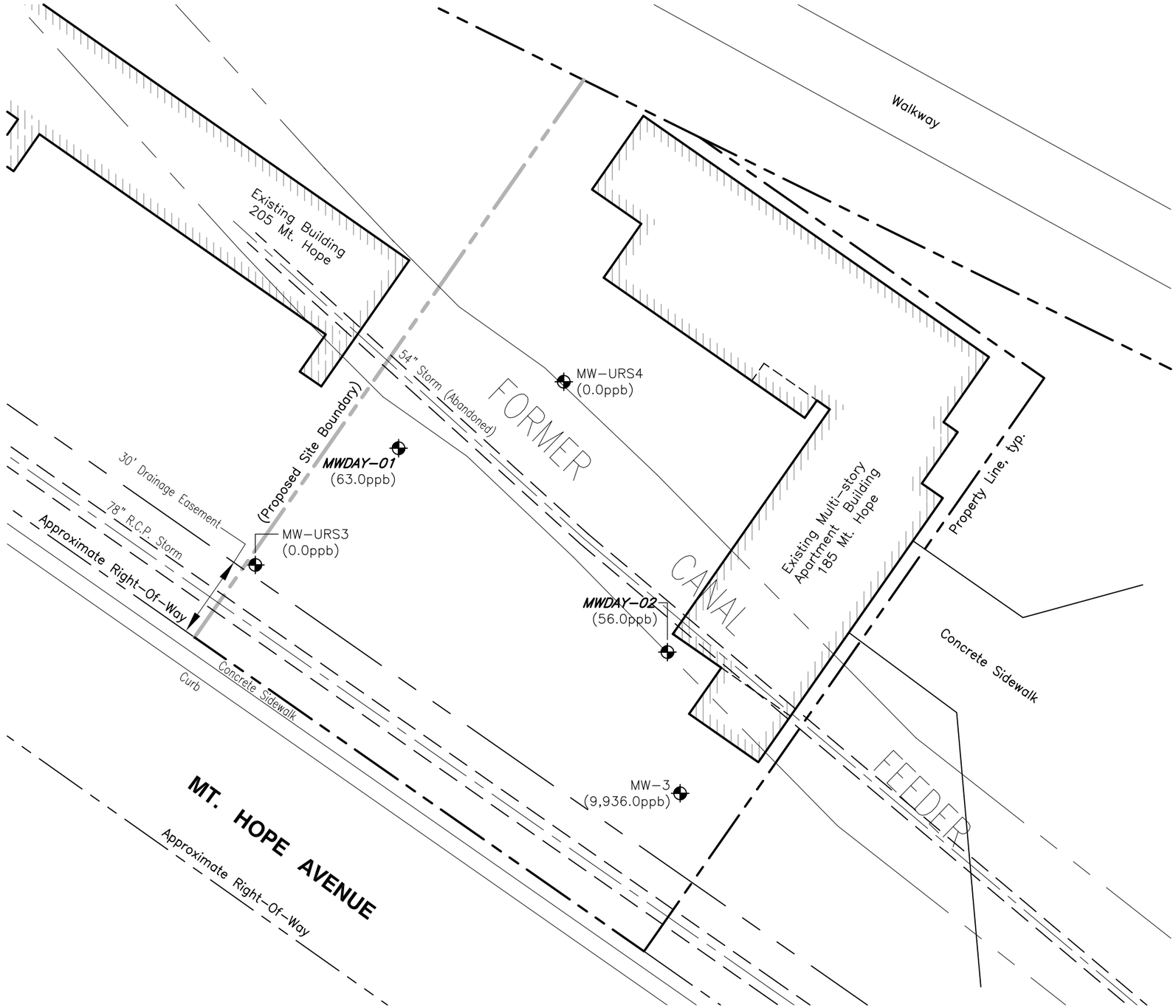
PROJECT NO.
4003R-07

FIGURE 3

Ref1: PEAK VOC IN SOIL Contours.dwg
Ref2:
Ref3:
Ref4:
Ref5:
Ref6:

Xerox432AnsiB–2; 11 x 17
Layout Name: VOC in Soil

Time Plotted: Mon Jun 2 09:10 2008
File Name: Brownfield\4003R–07\4003R–2.dwg



Site Plan
1"= 40'

LEGEND:

MWDAY-01 (63.0ppb)	Monitoring Well Location Installed February 2005 With Total VOCs Detected In 09/08/05 Groundwater Sample In Parentheses
MW-URS3 (0.0ppb)	Monitoring Well Location Installed Prior To February 2005 With Total VOCs Detected In 09/08/08 Groundwater Sample In Parentheses

NOTES:

1. This drawing was adapted from a drawing by the City of Rochester, DCD-Housing & Project Development, titled "River Park Commons" dated August 28, 2000, untitled partial utitility plan from Conifer Reality and from an instrument survey performed by James M. Parker, Land Surveyor, on September 13, 2000. No boundary survey was performed.
2. Former Canal Feeder located using Sanborn Maps provided by Environmental Risk Information & Imagaing Services. Location should be considered approximate.
3. Location of 54" abandoned storm sewer from an as-built drawing by Teetor-Dobbins P.C., tiltled "Relocation Of Storm Drain Plan & Profile Sheet 2 of 3", drawing No. 2, dated June 1973. Location should be considered accurate to the degree implied by the method used.

FIELD VERIFIED BY: JAD	DATE: 11-2007		
DRAWN BY: RJM	DATE DRAWN: 11-6-2007	SCALE: 1" = 40'	DATE ISSUED: 11-6-2007

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008
NEW YORK, NEW YORK 10165-1617

PROJECT TITLE
185 MT. HOPE AVENUE
ROCHESTER, NEW YORK

BROWNFIELD CLEANUP PROGRAM

DRAWING TITLE
Total VOCs In Remedial Investigation
Groundwater Samples Collected 09-08-2005

PROJECT NO.
4003R-07

FIGURE 4

Ref1: VOC GW-Contours.dwg
Ref2:
Ref3:
Ref4:
Ref5:
Ref6:

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Layout Name: VOC in Groundwater

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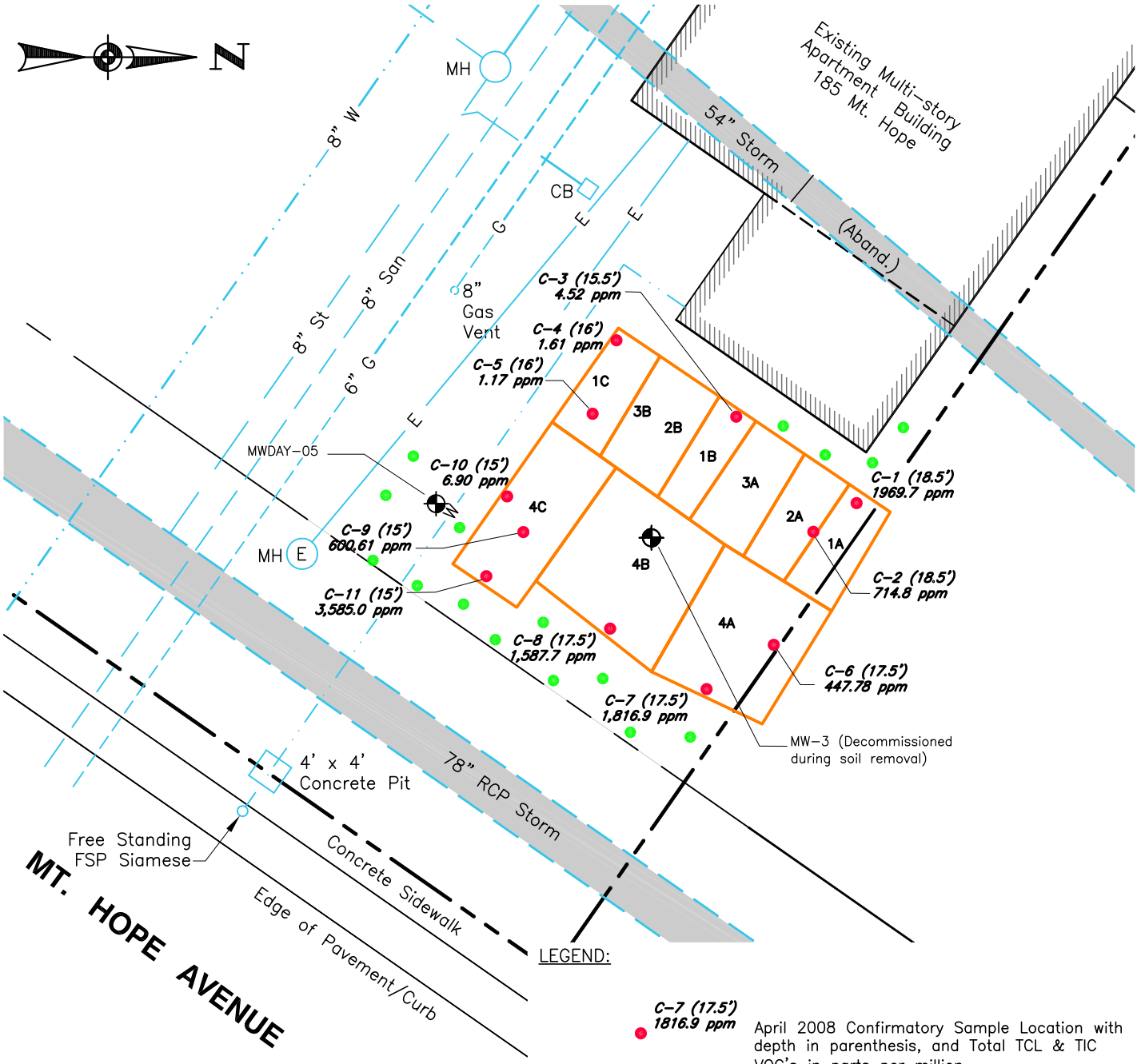

NOTES:

1. This drawing was adapted from a drawing by the City of Rochester, DCD-Housing & Project Development, titled "River Park Commons" dated August 28, 2000, untitled partial utitility plan from Conifer Reality and from an instrument survey performed by James M. Parker, Land Surveyor, on September 13, 2000. No boundary survey was performed.

2. Location of 54" abandoned storm sewer from an as-built drawing by Teetor-Dobbins P.C., tiltled "Relocation Of Storm Drain Plan & Profile Sheet 2 of 3", drawing No. 2, dated June 1973. Location should be considered accurate to the degree implied by the method used.

DATE 06-13-2008	DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008 NEW YORK, NEW YORK 10165-1617	PROJECT TITLE 185 MT. HOPE AVENUE ROCHESTER, NEW YORK BROWNFIELD CLEANUP PROGRAM	PROJECT NO. 4003R-07
DRAWN BY RJM/CPS		DRAWING TITLE In-Situ Treatment Injection Point Locations	FIGURE 5
SCALE 1" = 20'			

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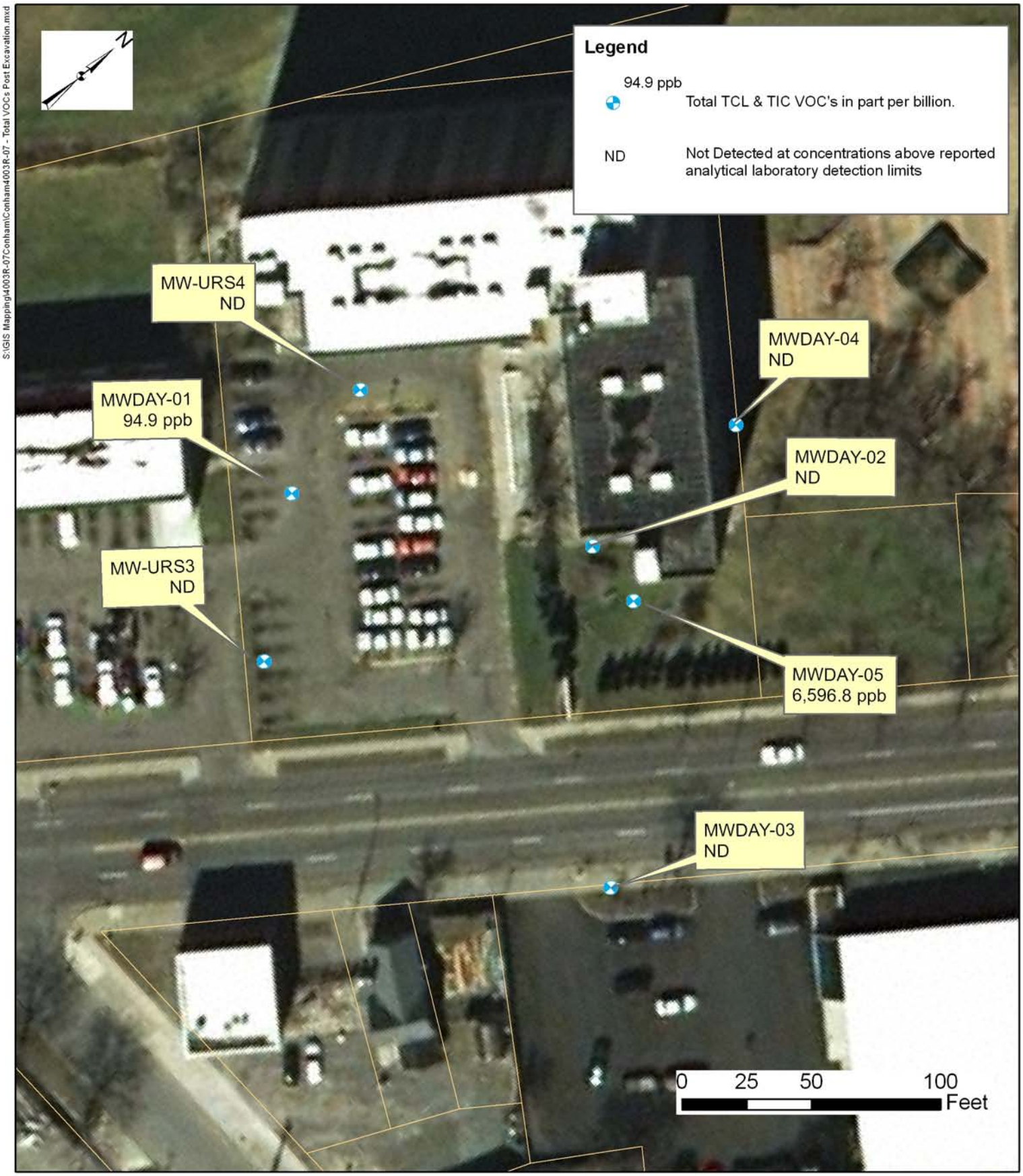
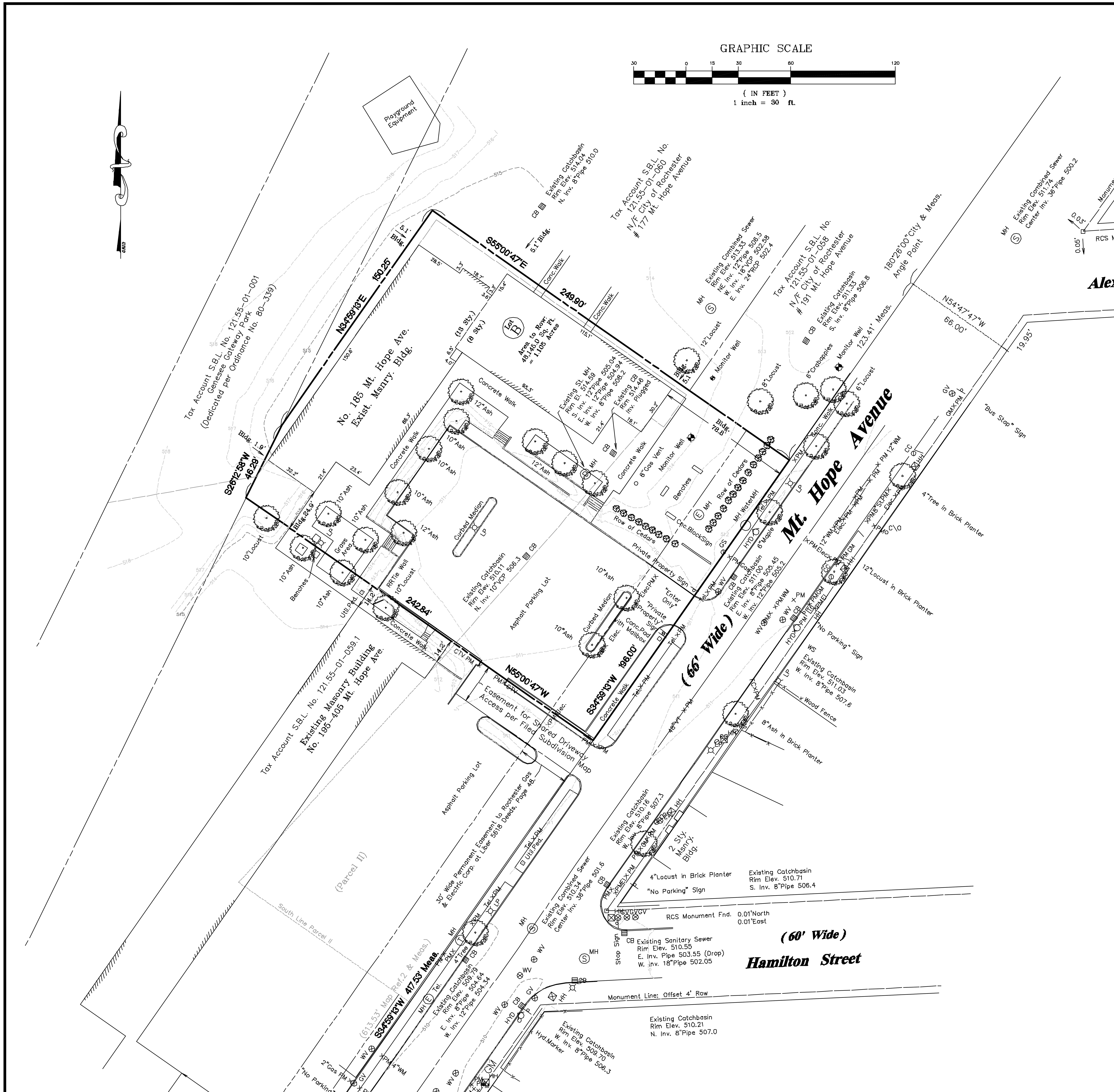


DATE: 06-05-2008	**DAY ENVIRONMENTAL, INC.** Environmental Consultants Rochester, New York 14614-1008 New York, New York 10165-1617	PROJECT TITLE: 185 MT. HOPE AVENUE ROCHESTER, NEW YORK BROWNFIELD CLEANUP PROGRAM	PROJECT NO.: 4003R-07
DRAWN BY: CPS		DRAWING TITLE: TOTAL VOC'S IN POST- EXCAVATION GROUNDWATER SAMPLES COLLECTED MAY 5 & 6, 2008	FIGURE 6
SCALE: AS NOTED			



LEGEND	
CB	Catchbasin
c/o	Cleanout
GV	Gas Valve
HYD	Hydrant
LP	Lightpole
MH	Manhole (Unkown Type)
MH	Manhole Electric
MH	Manhole Inlet Storm Drainage
MH	Manhole Storm Drainage
MH	Manhole Sanitary Sewer
	Sign Post (Single)
PP	Utility Pole
	Utility Pole Anchor Wire
	Utility Pole with Light
CC	Water Service
WV	Water Valve

REFERENCE:

1.) TITLE REPORT PREPARED BY MONROE TITLE INSURANCE CORPORATION, TITLE NO. 201-032250, DATED 03/23/04.

2.) MAP PREPARED BY PASSERO SCARDETTA ASSOCIATES, ENTITLED "INSTRUMENT LOCATION MAP, FINAL AS-BUILT SURVEY", PROJECT NO. 7639H-1, DRAWINGS NO. 1 & 2, LAST DATED APRIL 27, 1977.

3.) CITY OF ROCHESTER DEPT. ENVIRONMENTAL SERVICES, MAPS & SURVEYS RECORD INFORMATION FOR THE RIGHT OF WAY OF MT. HOPE AVENUE, DISTRICT 22, MAP 9; DISTRICT 22 MAP 12; DISTRICT 22 MAP 14.

4.) CITY OF ROCHESTER DEPT. ENVIRONMENTAL SERVICES, MAPS & SURVEY DEPT. RECORD INFORMATION AND SURVEY DATA FOR EAST GENESEE RIVER WALL.

5.) LIBER 4769 DEEDS, PAGE 227.

6.) LIBER 4424 DEEDS, PAGE 79.

7.) MAP PREPARED BY SEAR BROWN ASSOCIATES, P.C. ENTITLED "PLAN OF PARCELS 1 THRU 11, GENESEE GATEWAY HOUSING", DRAWING NO. 1463.03-03, DATED DECEMBER 11, 1973.

8.) MAP PREPARED BY PASSERO ASSOCIATES ENTITLED "SUBDIVISION PLAT, GENESEE GATEWAY, NO. 185-405 MT. HOPE AVE.", FILED IN THE MONROE COUNTY CLERKS OFFICE IN LIBER 325 OF MAPS, PAGE 37.

9.) NO UPDATED ABSTRACT OF TITLE HAS BEEN PROVIDED FOR THE COMPLETION OF THIS INSTRUMENT SURVEY.

CERTIFICATION:

WE, PASSERO ASSOCIATES, CERTIFY THAT THIS MAP WAS PREPARED ON SEPTEMBER 24, 2007 USING PORTIONS OF THE REFERENCE MATERIAL LISTED HEREON AND FROM NOTES OF AN INSTRUMENT SURVEY COMPLETED ON JULY 16, 2004. THIS PARCEL IS SUBJECT TO ANY EASEMENTS OR ENCUMBRANCES OF RECORD. NO CERTIFICATION IS EXTENDED TO RECORD INFORMATION NOT REFERENCED. PARCEL WAS REINSPECTED ON SEPTEMBER 21, 2007, WITH CHANGES AND/OR ADDITIONS SHOWN HEREON. THIS CERTIFICATION IS MADE TO:

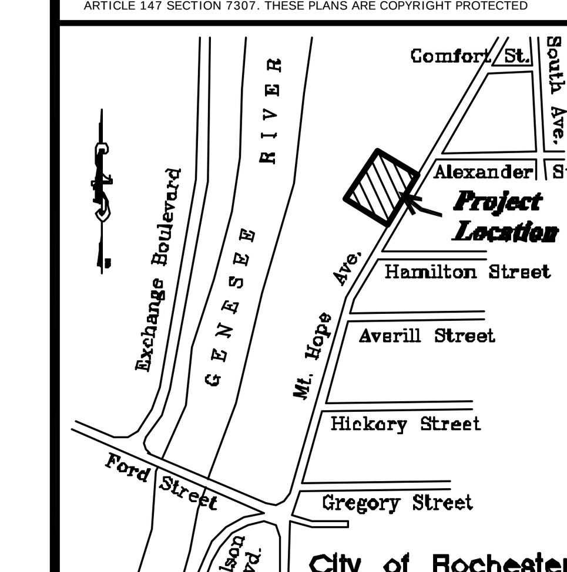
1. CONIFER REALTY, LLC

EDWARD J. FREEMAN N.Y.S.P.L.S. NO. 049771

Passero Associates
Rochester, NY → Fernandina Beach, FL
www.passero.com

Revisions

No.	Date	By	Description



Passero Associates
100 Liberty Pole Way, Rochester, NY 14604
(585) 325-1000
Fax (585) 325-1691

Principal-in-Charge: John F. Caruso, P.E.
Project Manager: Ed Freeman, P.L.S.
Designed by: D. Sauve

Conifer Realty LLC
183 East Main Street
Rochester, N.Y. 14604
(585) 324-0500

Instrument Survey

Tax Account S.B.L. No. 121.55-01-059.2

185 Mt. Hope Avenue
River Park Tower
Lot B of The Genesee Gateway Subd.

Portion of The Former Lehigh Valley Railroad and Part of The J.F. Barnard Subdivision
City of Rochester, Monroe County, New York

Project No.	24103.02A
Drawing No.	IS-1
Sheet No.	1 of 1
Scale:	1" = 30'
Date	9.24.07

TABLE 1

Required Analytical Laboratory Testing Program and Comparison to Standards, Criteria, and Guidance (SCG) Values

Table 1

Required Analytical Laboratory Testing Program and Comparison to Standards, Criteria, and Guidance (SCG) Values

185 Mt. Hope Avenue
Rochester, New York

Section of Site Management Plan	Task	Matrix	Analyses	SCGs
2.2	In-Situ Remediation Performance Monitoring	Soil/Fill	TCL VOCs, TCL SVOCs	Part 375 SCOs for Restricted Residential Use
3.4.4	Characterization of Site Soil and Fill Material	Soil/Fill Grab	TCL VOCs	Part 375 SCOs for Restricted Residential Use
		Soil/Fill Composite	TCL SVOCs, TAL Metals	Part 375 SCOs for Restricted Residential Use
3.4.6	Off-Site Soils to be Used On-Site as Sub-Grade	Soil	TCL VOCs, TCL SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Part 375 SCOs for Restricted Residential Use
3.4.7	Off-Site Soils to be Used On-Site as Cover	Soil	TCL VOCs, TCL SVOCs, PCBs, Pesticides, TAL Metals, Cyanide	Part 375 SCOs for Restricted Residential Use
5.0	Groundwater Monitoring Program	Groundwater	TCL VOCs, TCL SVOCs	TOGS 1.1.1 Groundwater Standards and Guidance Values

Notes:

TCL VOCs	Target Compound List Volatile Organic Compounds via ASP Method OLM04.3, or other NYSDEC-Approved Method
TCL SVOCs	Target Compound List Semi-Volatile Organic Compounds via ASP Method OLM04.3, or other NYSDEC-Approved Method
PCBs	Polychlorinated Biphenyls via ASP Method OLM04.3, or other NYSDEC-Approved Method
Pesticides	Pesticides via ASP Method OLM04.3, or other NYSDEC-Approved Method
TAL Metals	Target Analyte List Metals via ASP Method OLM04.1, or other NYSDEC-Approved Method
Cyanide	Cyanide via ASP Method OLM04.1, or other NYSDEC-Approved Method
SCGs	Standards, Criteria, and Guidance

APPENDIX A

Health and Safety Plan

HEALTH AND SAFETY PLAN

BROWNFIELD CLEANUP PROGRAM
185 MOUNT HOPE AVENUE
ROCHESTER, NEW YORK
NYSDEC SITE ID C828124

Prepared for:	Conifer Hamilton, LLC. and Genesee Hamilton, L.P. 183 East Main Street, 6th Floor Rochester, New York 14604
Prepared by:	Day Environmental, Inc. 40 Commercial Street Rochester, New York 14614
Project No.:	4003R-07
Date:	June 2008

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

This Health and Safety Plan (HASP) outlines the policies and procedures necessary to protect workers and the public from potential environmental hazards posed during activities performed under a Site Management Plan (SMP) that was developed under the New York State Department of Environmental Protection (NYSDEC) Brownfield Cleanup Program (BCP). The subject property is approximately 1.12 acres addressed as 185 Mount Hope Avenue, City of Rochester, County of Monroe, New York (Site). Figure 1 included in Attachment 2 depicts the general location of the Site. As outlined in this HASP, the activities shall be conducted in a manner to minimize the probability of injury, accident, or incident occurrence.

The HASP must remain flexible due to the unknown nature of future work at the Site that may have the potential to disturb impacted soil, fill, or groundwater. Conditions may change and unforeseen situations can arise that require deviations from the original HASP.

1.1 Site History/Overview

The Site is improved with an apartment building with an associated paved parking lot. The apartment building totals approximately 143,000 square feet and consists of a multi-level eight to twelve-story brick and concrete-block, slab-on-grade building constructed in 1975. The apartment building houses 202 residential units. The units primarily are one bedroom and studio apartments. Prior to the residential development in 1975, past uses of the Site included commercial and warehouse uses. Also, portions of a feeder canal and rail yards, and possibly a portion of a gasoline/service station, were located on the Site. Historical use of adjoining/nearby properties to the north included gasoline/service station use.

The Site is located in a mixed-use urban area. The Site is bounded to the north by open parkland, to the east by Mt. Hope Avenue with commercial and residential properties beyond, to the south by residential properties, and to the west by the Genesee Gateway Park with the Genesee River beyond.

The Site is located in an urban area that is serviced by a public water system. The Monroe County Department of Public Health (MCDPH) has no records of public or private drinking water wells or process water wells within a 0.25-mile radius of the Site. A review of a document titled “Ground Water Resources of Monroe County” (1935) revealed no groundwater supply wells on, or in the immediate area of, the Site.

The Site and surrounding area are generally level. The Genesee River is located approximately 130 feet west of the site. Surface water appears to flow off the Site toward Mount Hope Avenue to the east, and into the City of Rochester sewer system. Groundwater flows toward the south/southeast away from the Genesee River. This flow direction may be modified locally due to buried utilities, seasonal conditions, or other factors.

An October 24, 2000 Phase I Environmental Site Assessment report prepared by Day Environmental, Inc. (DAY) identified the following recognized environmental conditions (RECs) at the Site:

- **Historic Use of the Site:** Former uses at the Site include: rail yards, former Erie Canal feeder, and possibly a portion of a gasoline station.

- **Historic Use of Adjoining Properties:** Historic uses of adjoining properties include: gasoline stations to the north and possibly east of the Site (i.e., east of Mt. Hope Avenue); former railroad infrastructure to the west of the Site; and a former Erie Canal feeder, a rail yard, a tannery, iron cutting, and auto repair to the south of the Site.

Subsequent intrusive environmental studies conducted between 2000 and 2003 identified petroleum contamination in soil and groundwater on the northeastern portion of the Site. In August 2004, the NYSDEC assigned Spill File #0470234 due to the petroleum contamination that is present on the Site (i.e., 185 Mt. Hope Avenue). [Note: This spill file was closed by the NYSDEC on May 18, 2008].

A Remedial Investigation/Remedial Alternatives Analysis (RI/RAA) Report dated May 2007 was prepared by DAY. Tasks performed as part of the remedial investigation to evaluate or address the RECs identified above included:

- Conducting an EM-61 geophysical survey and subsequent test pit study to assist in evaluating the locations of suspect underground storage tanks (USTs);
- Evaluating surface soil conditions;
- Evaluating subsurface soil conditions;
- Evaluating groundwater quality conditions and groundwater movement characteristics;
- Conducting a vapor intrusion study to evaluate whether volatile organic compounds (VOCs) in soil or groundwater were volatilizing and impacting indoor air inside the apartment building on the Site; and
- Conducting a soil vapor study to evaluate whether VOCs were preferentially migrating along select buried utilities.

The findings of the remedial investigation are summarized below:

- Constituents were not detected in surface soil samples at concentrations above Track 2 soil cleanup objectives (SCOs) for Restricted Residential Use as set forth in Table 375-6.8(b) of the NYSDEC document titled "6 NYCRR Part 375 Environmental Remediation Program" dated December 14, 2006.
- Concentrations of petroleum-related VOCs and semi-volatile organic compounds (SVOCs) in subsurface soil and groundwater were generally highest on the northeastern portion of the Site in proximity to the portion of the adjoining property to the north that was formerly improved with gasoline/service stations. A plume associated with this area of petroleum contamination appears to extend southward across the Site. The soil contamination starts between 3.0 feet and 10 feet below the ground surface and generally extends to depths between 14 feet and 18 feet below the ground surface. The groundwater on this portion of the Site has been measured at depths ranging between approximately 14 and 17 feet below the ground surface. As such, soil contamination is located above and below the groundwater table.
- Track 2 SCOs for Restricted Residential Use for the area of petroleum contamination on the northeast portion of the Site were only exceeded at one test location (i.e., test boring SBDAY-09). In addition, test boring SBDAY-08 located within this area of petroleum

contamination contained a concentration of manganese [i.e., 4,060 parts per million (ppm)] that exceeded its Track 2 SCO of 2,000 ppm for Restricted Residential Use.

- A sample of fill material at test location SBDAY-02 contained some polyaromatic hydrocarbon (PAH) SVOCs and the metal mercury at concentrations that exceeded Track 2 SCOs for Restricted Residential Use. This test boring was advanced within the footprint of the former feeder canal.
- Groundwater samples from wells MWDAY-01 and MW-3 contained concentrations of VOCs and/or SVOCs that exceeded groundwater standards or guidance values as referenced in the Division of Water Technical and Operational Guidance Series 1.1.1 document titled "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" (TOGS 1.1.1), June 1998 (as amended by an April 2000 addendum). Concentrations of VOCs in groundwater tend to decrease as the distance away from the northeast portion of the Site is increased. Based on field findings and analytical laboratory testing of soil and groundwater samples, the length of the petroleum plume located south of the northeastern portion of the Site is estimated to be at least 140 feet long. Petroleum constituents were not detected in groundwater located in the right-of-way of Mt. Hope Avenue approximately 70 feet southeast of the northeast portion of the Site.
- The results of a vapor intrusion evaluation indicate indoor air quality inside the on-site high-rise apartment building has not been impacted as a result of VOC vapors present in subsurface soil and groundwater beneath and in proximity to this building.
- Evidence of light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) was not detected at test boring, test pit or monitoring well locations.
- Evidence of underground storage tanks was not encountered on the Site.
- Apparent sources of petroleum identified during the remedial investigation include former gasoline/service station use on the northeast portion of the Site (i.e., gasoline tanks associated with a former gasoline station that may have been present at the site) and at locations on adjoining/nearby property(s) north of the Site.
- Apparent sources of other types of constituents (e.g., some PAH SVOCs, metals, cyanide, etc.) may be attributable to surficial fill materials that were documented at the Site.

Figure 2 of the June 2008 Site Management Plan (SMP) shows the locations of test borings and monitoring wells mentioned above.

In accordance with a Remedial Work Plan (RWP) dated December 2007, the following remedial activities have been completed at the Site and are documented in a separate Final Engineering Report (FER):

- In April 2008, a source area removal of petroleum-contaminated soil was completed in the northeastern portion of the Site, which included the decommissioning (i.e., removal) of monitoring well MW-3. NYSDEC Part 364 permitted waste haulers transported the contaminated soil off-site. A total of 833.47 tons of non-hazardous petroleum contaminated soil was disposed at a regulated landfill.

- In April 2008, post-excavation soil sampling and analysis included the collection and testing of three soil samples from the bottom of the excavation at locations C-2, C-5, and C-9, and eight soil samples from near the base of sidewalls around the perimeter of the excavation at locations C-1, C-3, C-4, C-6, C-7, C-8, C-10 and C-11 (refer to Figure 5 of the June 2008 SMP). The soil samples were analyzed for Target Compound List (TCL) VOCs and TCL SVOCs, including tentatively identified compounds (TICs), and the test results indicate the following:

  - Ten of eleven samples contain one or more VOC (i.e., acetone, benzene, ethylbenzene, xylene, and/or isopropyl benzene) at a concentration exceeding the Part 375 SCOs for Protection of Groundwater, and one sample contained the VOC xylene at a concentration exceeding its Part 375 SCO for Restricted Residential Use.
  - Three samples contained one or more SVOCs at concentrations exceeding Part 375 SCOs for Restricted Residential Use and/or for the Protection of Groundwater.

- A total of 300 pounds of Regenesis' Oxygen Release Compound-Advanced (ORC-Advanced®) was placed in the bottom of the source area soil removal excavation.

- The source area excavation was backfilled with select clean geotechnical fill consisting of #2 crusher, bank run, and topsoil.

- New groundwater monitoring well MWDAY-05 was installed south of the source-area excavation.

- In May 2008, a first round sampling and analysis of groundwater samples was completed at the seven monitoring wells associated with this Site. The groundwater samples were analyzed for TCL VOCs and TCL SVOCs, including TICs. Total TCL and TIC VOCs are shown on Figure 6 of the June 2008 SMP, and the test results indicate the following:

  - Sample 012 from MWDAY-05 contained the five VOCs at concentrations exceeding groundwater standards or guidance values referenced in the NYSDEC Division of Water Technical and Operational Guidance Series 1.1.1 document titled "*Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*" (TOGS 1.1.1), June 1998 (as amended by an April 2000 addendum). Sample 013 from MWDAY-01 contained one VOC at a concentration that exceeded its NYSDEC TOGS 1.1.1 groundwater standard.
  - VOCs were not detected at concentrations above laboratory detection limits in the groundwater samples collected from the other five project monitoring wells.
  - Sample 012 from MWDAY-05 contained one SVOC at a concentration that exceeded its NYSDEC TOGS 1.1.1 groundwater standard. Only the detected concentration of bis(2-ethylhexyl)phthalate detected in Sample 017 from MWDAY-04 exceeded its NYSDEC TOGS 1.1.1 groundwater standard. [Note: bis(2-ethylhexyl)phthalate is a common artifact attributable to disposable gloves used during sampling or analysis].
  - For the groundwater samples collected from the other five project monitoring wells, SVOCs were either not detected at concentrations above reported analytical laboratory

detection limits, or were detected at concentrations below NYSDEC TOGS 1.1.1 groundwater standards or guidance values.

In summary, the source-area soil removal was successful in removing accessible grossly contaminated petroleum-impacted soil from the Site. Analytical laboratory test results for post-excavation soil samples from the bottom and sidewalls of the excavation, and also for groundwater samples collected from Site monitoring wells, show petroleum contamination remains in soil and groundwater on the northeast portion of the Site at concentrations exceeding regulatory criteria. Fill material at the Site also contains some SVOCs and metals at concentrations exceeding regulatory criteria. Remaining impacted soil, fill and groundwater are being addressed by the protocols identified in the June 2008 SMP dated June 2008, of which this HASP is included as an appendix.

1.2 Planned Activities Covered by HASP

This HASP is intended to be used during implementation of activities under the SMP. Currently, identified activities include:

- During any activity that has the potential to disturb contaminated soil, fill, or groundwater that could result in possible exposure to construction workers, on-site personnel, the nearby community, etc.;
- During any activity that breaches of the Site's cover system (clean soil, asphalt or concrete surfaces);
- During implementation of a limited in-situ remediation beyond the footprint of the source area soil removal excavation using Regenesis' RegenOx^{TM} and ORC-Advanced®;
- During performance monitoring to be performed to evaluate the effectiveness of the limited in-situ remediation; and
- During groundwater monitoring.

ORC-Advanced® is a proprietary formulation of calcium oxy-hydroxide that produces a controlled release of oxygen for a period of up to 12 months. ORC-Advanced® is used to accelerate the rate of naturally occurring aerobic contaminant biodegradation in groundwater and saturated soils. RegenOx^{TM} is a solid alkaline oxidant that uses a sodium percarbonate complex with a multi-part catalytic formula. The product consists of an oxidizer complex ("Part A") and an activator complex ("Part B") that are mixed with water, combined aboveground, and then injected into the subsurface using common drilling or direct-push equipment or mixed with impacted media that are then placed back in the excavation. Once in the subsurface, the product produces an effective surface-mediated oxidation reaction comparable to that of Fenton's Reagent, without a violent exothermic reaction. RegenOx^{TM} destroys a wide range of contaminants (including petroleum constituents) in both soil and groundwater. A copy of the material safety data sheets (MSDS) for ORC-Advanced® and RegenOx^{TM} are included in Attachment 1.

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

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP. A PM and SSO with proper training shall be assigned to each project that requires implementation in accordance with the June 2008 SMP and this HASP.

2.1 Project Manager

The PM has the overall responsibility for the project and shall coordinate with the SSO to ensure that the goals of the remedial program are attained in a manner consistent with the HASP requirements.

2.2 Site Safety Officer

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

2.3 Employee Safety Responsibility

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

3.0 SAFETY RESPONSIBILITY

Contractors, consultants, state or local agencies, or other parties, and their employees, involved with this project shall be responsible for their own safety while on-site. Their employees shall be required to understand the information contained in this HASP, and will abide by the protocols in this document, including wearing the appropriate personal protection equipment for specific areas being entered. As an alternative, contractors, consultants, state or local agencies, or other parties, and their employees, involved with this project can utilize their own health and safety plan for this project as long as it is found acceptable to the New York State Department of Health (NYSDOH) and/or the MCDPH.

Contractors engaged in subsurface construction or maintenance activities (e.g., foundation and utility workers) shall be required to implement appropriate health and safety procedures. These procedures will involve, at a minimum, donning adequate personal protective equipment, performing appropriate air monitoring, and implementing other engineering controls as necessary to mitigate potential exposure (e.g., ingestion, inhalation, and contact) with residual constituents in the soils. Recommended health and safety procedures include, but may not be limited to, the following:

- While conducting invasive work at the Site, the Contractor shall provide safe and healthful working conditions. The Contractor shall comply with New York State Department of Labor regulations and published recommendations and regulations promulgated under the Federal Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, as amended, and with laws, rules, and regulations of other authorities having jurisdiction. Compliance with governmental requirements is mandated by law and considered only a minimum level of safety performance. The Contractor shall insure that work is performed in accordance with recognized safe work practices.
- The Contractor shall be responsible for the safety of the Contractor's employees and the public. The Contractor shall be solely responsible for the adequacy and safety of construction methods, materials, equipment and the safe implementation of the work.
- The Contractor is responsible to ensure that project personnel have been trained based on the job they are performing.

4.0 JOB HAZARD ANALYSIS

There are many hazards associated with work on a site, and this HASP discusses some of the anticipated hazards for this Site. The hazards listed below deal specifically with those hazards associated with the management of potentially contaminated media (soil, groundwater, fill, etc.).

4.1 Chemical Hazards

Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or injection (i.e., a puncture would, etc.). A contaminant can cause damage to the point of contact or can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact. Health and safety provisions for chemical hazards associated with the Regenesis remediation products RegenOx™ and Regenesis' ORC-Advanced® products, that will be used for the limited in-situ remediation identified in Section 2.0 of the SMP, are provided on MSDS' in Attachment 1 of this HASP.

A list of selected VOCs, SVOCs, and metals that have been detected at the Site and exceed soil or groundwater standards, criteria and guidance (SCG) values are presented below. This list also presents the Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs), National Institute for Occupational Safety and Health (NIOSH) recommended exposure limits (RELs), and NIOSH immediately dangerous to life or health (IDLH) levels.

CONSTITUENT	OSHA PEL	NIOSH REL	IDLH
Benzene	1 ppm	0.1 ppm	500 ppm
Toluene	200 ppm	100 ppm	500 ppm
Ethylbenzene	100 ppm	100 ppm	800 ppm
Xylenes	100 ppm	100 ppm	900 ppm
Isopropylbenzene	50 ppm	50 ppm	900 ppm
1,2-Dichloroethane	1 ppm	50 ppm	50 ppm
Naphthalene	10 ppm	10 ppm	250 ppm
Phenol	5 ppm	5 ppm	250 ppm
Benzo(a)anthracene	NA	NA	NA
Benzo(b)fluoranthene	0.2 mg/m^3	0.1 mg/m^3	80 mg/m^3
Benzo(a)pyrene	0.2 mg/m^3	0.1 mg/m^3	80 mg/m^3
Mercury	0.1 mg/m^3	0.05 mg/m^3	10 mg/m^3
Manganese	5 mg/m^3	1 mg/m^3	500 mg/m^3

NA = Not Available

The potential routes of exposure for these analytes and chemicals include inhalation, ingestion, skin absorption and/or skin/eye contact. The potential for exposure through any one of these routes will depend on the activity conducted. The most likely routes of exposure for the activities that are performed during future activities at the Site that disturb contaminated soil, fill or groundwater include inhalation and skin/eye contact.

4.2 Physical Hazards

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

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

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

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

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

  - Workers being startled, annoyed, or distracted.
  - Physical damage to the ear resulting in pain, or temporary and/or permanent hearing loss.
  - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.

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

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

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

4.3 Environmental Hazards

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

4.3.1 Heat Stress

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

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

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

4.3.2 Exposure to Cold

With outdoor work in the winter months, the potential exists for hypothermia and frostbite. Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

5.0 SITE CONTROLS

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

5.1 Site Zones

In the area where contaminated materials present the potential for worker exposure (work zone), personnel entering the area shall wear the mandated level of protection for the area. A "transition zone" shall be established where personnel can begin and complete personal and equipment decontamination procedures. This can reduce potential off-site migration of contaminated media. Contaminated equipment or clothing will not be allowed outside the transition zone (e.g., on clean portions of the Site) unless properly containerized for disposal. Operational support facilities will be located outside the transition zone (i.e., in a "support zone"), and normal work clothing and support equipment are appropriate in this area. If possible, the support zone should be located upwind of the work zone and transition zone.

5.2 General

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

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination shall not occur in the work zone and/or transition zone during disturbance of contaminated material.

- Personnel admitted in the work zone shall be properly trained in health and safety techniques and equipment usage.

- No personnel shall be admitted in the work zone without the proper safety equipment.

- Proper decontamination procedures shall be followed before leaving the Site.

6.0 PROTECTIVE EQUIPMENT

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

6.1 Anticipated Protection Levels

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site mobilization	D	
Site preparation	D	
Extrusive work (e.g., surveying, etc.)	D	
Intrusive work (e.g., advancement of borings, excavation of soils, collecting samples, etc.)	C/Modified D/D	Based on air monitoring, and SSO discretion
Support zone	D	
Site breakdown and demobilization	D	

It is anticipated that work involving the disturbance of contaminated soil, fill, or groundwater will be performed in Level D or modified Level D PPE. If conditions are encountered that require Level A or Level B PPE, the work shall immediately be stopped. The appropriate government agencies (e.g., NYSDEC, NYSDOH, MCDPH, etc.) will be notified and the proper health and safety measures will be implemented (e.g., develop and implement engineering controls, upgrade in PPE, etc.).

6.2 Protection Level Descriptions

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

6.2.1 Level D

Level D consists of the following:

- Safety glasses
- Hard hat when working with heavy equipment
- Steel-toed or composite-toed work boots
- Protective gloves during sampling or handling of potentially contaminated media
- Work clothing as prescribed by weather

6.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat when working with heavy equipment
- Steel-toed or composite-toed work boots
- Work gloves
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and polyvinyl chloride (PVC) acid gear will be required when workers have a potential to be exposed to impacted liquids or impacted particulates].

6.2.3 Level C

Level C consists of the following:

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

6.2.4 Level B

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

6.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-encapsulating, vapor-proof suit capable of maintaining positive pressure. Level A PPE is not anticipated to be required during this project. If the need for level A PPE becomes evident, the specific project activities shall be stopped until site conditions are further evaluated, and any necessary modifications to the HASP have been approved by the PM and SSO. Subsequently, the appropriate safety measures (including Level A PPE) shall be implemented prior to commencing site activities.

6.3 Respiratory Protection

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

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

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

7.0 DECONTAMINATION PROCEDURES

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

7.1 Personnel Decontamination

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

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

7.2 Equipment Decontamination

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

7.3 Disposal

Disposable clothing shall be disposed in accordance with applicable regulations. Liquids (e.g., decontamination water, etc.) or solids (e.g., soil) generated by specific project activities shall be disposed in accordance with applicable regulations.

8.0 AIR MONITORING

Air monitoring shall be conducted in order to determine airborne particulate and contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that are encountered and that chemical contaminants are not migrating off-site. Additional air monitoring may be conducted at the discretion of the SSO. Readings will be recorded and be available for review.

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

Monitoring Device	Action level	Response/Level of PPE
PID Volatile Organic Compound Meter	< 1 ppm in breathing zone, sustained 5 minutes	Level D
	1-25 ppm in breathing zone, sustained 5 minutes	Level C
	26-250 ppm in breathing zone, sustained 5 minutes	Level B, Stop work, evaluate the use of engineering controls
	>250 ppm in breathing zone	Level A, Stop work, evaluate the use of engineering controls
RTAM Particulate Meter	< 150 $\mu g/m^3$ over an integrated period not to exceed 15 minutes.	Continue working
	> 150 $\mu g/m^3$	Cease work, implement dust suppression, change in way work performed, etc. If levels can not be brought below 150 $\mu g/m^3$, then upgrade PPE to Level C.

8.1 Particulate Monitoring

During activities where contaminated materials (e.g., fill) may be disturbed, air monitoring shall include real-time monitoring for particulates using a real-time aerosol monitor (RTAM) particulate meter at the perimeter of the work zone in accordance with the 1989 NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031 entitled, "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites." The TAGM uses an action level of 150 $\mu g/m^3$ (0.15 mg/m^3) over an integrated period not to exceed 15 minutes. If the action level is exceeded, or if visible dust is encountered, then work shall be discontinued until corrective actions are implemented. Corrective actions may include dust suppression, change in the way work is performed, and/or upgrade of personal protective equipment.

8.2 Volatile Organic Compound Monitoring

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

8.3 Community Air Monitoring Plan

This Community Air Monitoring Plan (CAMP) includes real-time monitoring for VOCs and particulates (i.e., dust) at the downwind perimeter of each designated work area when activities with the potential to release VOCs or dust are in progress at the Site. This CAMP is based on the NYSDOH Generic CAMP included as Appendix 1A of the NYSDEC document titled *"Draft DER-10, Technical Guidance for Site Investigation and Remediation"* dated December 2002. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of project activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. Reliance on the CAMP should not preclude simple, common sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Continuous monitoring shall be conducted during ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, grading, etc.

Periodic monitoring for VOCs shall be conducted during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Periodic monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

8.3.1 VOC Monitoring, Response Levels, and Actions

VOCs shall be monitored at the downwind perimeter of the immediate work area (i.e., the work zone) on a continuous basis or as otherwise specified. Upwind concentrations shall be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment shall be calibrated at least daily

for the contaminant(s) of concern or for an appropriate surrogate. The equipment shall be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

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

The 15-minute readings shall be recorded and made available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

8.3.2 Particulate Monitoring, Response Levels, and Actions

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques shall be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu g/m^3$ above the upwind level, work shall be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu g/m^3$ of the upwind level and in preventing visible dust migration.

Readings shall be recorded and made available for NYSDEC and NYSDOH personnel to review.

9.0 EMERGENCY RESPONSE

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

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

9.1 Emergency Telephone Numbers

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

Fire/Police Department:	911
Poison Control Center:	(800) 222-1222
NYSDEC	
Kelly Cloyd	(585) 226-5351
Spills	(585) 226-2466
NYSDOH	
Debra McNaughton	(585) 423-8069
MCDPH	
Jeffrey M. Kosmala, P.E.	(585) 753-5470
CONIFER HAMILTON LLC and GENESEE HAMILTON, L.P.	
Allen Handelman	(585) 324-0512
DAY ENVIRONMENTAL, INC.	
Jeff Danzinger	(585) 454-0210 x114
Ray Kampff	(585) 454-0210 x108
Nearest Hospital	Highland Hospital 1000 South Avenue Rochester, NY 14620 (585) 473-2200 (Main) (585) 341-6880 (Emergency Department)
Directions to the Hospital:	Turn right (southwest) onto NY-15/Mount Hope Avenue travel approximately <0.1 miles. Turn left (east) onto Hamilton Street and travel approximately 0.3 miles. Turn right (south) onto South Avenue and travel approximately 0.7 miles. Turn left (east) into Highland Hospital and follow signs to the Emergency Department (refer to Figure 1 in Attachment 2).

9.2 Evacuation

A log of each individual entering and leaving the Site shall be kept by the SSO for emergency accounting practices. Although unlikely, it is possible that a site emergency could require evacuating personnel from the site. If required, the SSO will give the appropriate signal for site evacuation (i.e., hand signals, alarms, etc.).

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

9.3 Medical Emergency

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

9.4 Contamination Emergency

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

9.5 Fire Emergency

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

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

Class A: Wood, cloth, paper, rubber, many plastics, and ordinary combustible materials.

Class B: Flammable liquids, gases and greases.

Class C: Energized electrical equipment.

Class D: Combustible metals such as magnesium, titanium, sodium, potassium.

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

Examples of proper extinguishing agent as follows:

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

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

Class C: ABC Dry Chemical
Carbon Dioxide

Class D: Metal-X Dry Powder

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

9.6 Spill or Air Release

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

9.7 Buried Containerized Waste and/or Underground Storage Tanks

In the event that unanticipated containerized waste (e.g., drums) and/or USTs are located during soil/fill excavation activities, the excavation work shall cease, the area shall be secured, and the NYSDEC shall be immediately notified. The SSO shall monitor the area as outlined in Section 8.0

of this HASP. After visual assessment and air monitoring, if the material remains unknown, Level B protection is mandatory. Drums and/or underground storage tanks that are encountered shall be evaluated, and the owner of the Site shall submit a removal plan for NYSDEC approval. Appropriately trained personnel shall excavate the drums and/or underground storage tanks while following applicable federal, state, and local regulations. Removed drums and underground storage tanks shall be properly characterized and disposed off-site. The soil/fill surrounding the buried drums or underground storage tanks shall be characterized in accordance with the protocols outlined in Section 3.4.4 of the SMP. Visibly impacted soil/fill containing one or more constituents in excess of the SCG values shown in Table 1 of the SMP shall be transported off-site to a permitted waste management facility.

10.0 ABBREVIATIONS

BCP	Brownfield Cleanup Program
CAMP	Community Air Monitoring Program
CPR	Cardio-Pulmonary Resuscitation
DAY	Day Environmental, Inc.
dBA	Decibels on the A-Weighted Scale
DNAPL	Dense Non-Aqueous Phase Liquid
EMS	Emergency Medical Service
HASP	Health and Safety Plan
IDLH	Immediately Dangerous to Life or Heath
LNAPL	Light Non Aqueous Phase Liquid
MCDPH	Monroe County Department of Public Health
mg/m^3	Milligram Per Meter Cubed
NIOSH	National Institute for Occupational Safety and Health
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PAH	Polyaromatic Hydrocarbon
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PM	Project Manager
PM-10	Particulate Matter Less Than 10 Micrometers In Diameter
PPE	Personal Protection Equipment
ppm	Parts Per Million
PVC	Polyvinyl Chloride
REC	Recognized Environmental Condition
REL	Recommended Exposure Limit
RI/RAA	Remedial Investigation/Remedial Alternatives Analysis
RTAM	Real-Time Aerosol Monitor
SCG	Standards, Criteria and Guidance
SCO	Soil Cleanup Objective
SSO	Site Safety Officer
SVOC	Semi-Volatile Organic Compound
TAGM	Technical and Administrative Guidance Memorandum
TOGS	Technical and Operational Guidance Series
TWA	Time-Weighted Average
$\mu g/m^3$	Micrograms Per Meter Cubed
UST	Underground Storage Tank
VOC	Volatile Organic Compound

ATTACHMENT 1

Material Safety Data Sheets for Regenesis' ORC-Advanced® and RegenOx™

Oxygen Release Compound – Advanced (ORC *Advanced*™)
MATERIAL SAFETY DATA SHEET (MSDS)

Last Revised: March 13, 2007

Section 1 - Material Identification

Supplier:

REGENESIS

1011 Calle Sombra
San Clemente, CA 92673

Phone: **949.366.8000**

Fax: **949.366.8090**

E-mail: **info@regenesis.com**

Chemical Description:	A mixture of Calcium OxyHydroxide [$CaO(OH)_2$] and Calcium Hydroxide [$Ca(OH)_2$].
Chemical Family:	Inorganic Chemical
Trade Name:	Advanced Formula Oxygen Release Compound (ORC *Advanced*™)
Chemical Synonyms	Calcium Hydroxide Oxide; Calcium Oxide Peroxide
Product Use:	Used to remediate contaminated soil and groundwater (environmental applications)

Section 2 – Composition

CAS No.	Chemical
682334-66-3	**Calcium Hydroxide Oxide [$CaO(OH)_2$]**
1305-62-0	**Calcium Hydroxide [$Ca(OH)_2$]**
7758-11-4	**Dipotassium Phosphate (HK_2O_4P)**
7778-77-0	**Monopotassium Phosphate (H_2KO_4P)**

Section 3 – Physical Data

Form:	Powder
Color:	White to Pale Yellow
Odor:	Odorless
Melting Point:	527 °F (275 °C) – Decomposes
Boiling Point:	Not Applicable (NA)
Flammability/Flash Point:	NA
Auto- Flammability:	NA
Vapor Pressure:	NA
Self-Ignition Temperature:	NA
Thermal Decomposition:	527 °F (275 °C) – Decomposes
Bulk Density:	0.5 – 0.65 g/ml (Loose Method)
Solubility:	1.65 g/L @ 68° F (20° C) for calcium hydroxide.
Viscosity:	NA
pH:	11-13 (saturated solution)
Explosion Limits % by Volume:	Non-explosive
Hazardous Decomposition Products:	Oxygen, Hydrogen Peroxide, Steam, and Heat
Hazardous Reactions:	None

Section 4 – Reactivity Data

Stability:	Stable under certain conditions (see below).
Conditions to Avoid:	Heat and moisture.
Incompatibility:	Acids, bases, salts of heavy metals, reducing agents, and flammable substances.
Hazardous Polymerization:	Does not occur.

Section 5 – Regulations

TSCA Inventory List:	Listed

CERCLA Hazardous Substance (40 CFR Part 302)

Listed Substance:	No
Unlisted Substance:	Yes
Reportable Quantity (RQ):	100 pounds
Characteristic(s):	Ignitibility
RCRA Waste Number:	D001

SARA, Title III, Sections 302/303 (40 CFR Part 355 – Emergency Planning and Notification)

Extremely Hazardous Substance:	No

SARA, Title III, Sections 311/312 (40 CFR Part 370 – Hazardous Chemical Reporting: Community Right-To-Know

Hazard Category:	Immediate Health Hazard Fire Hazard
Threshold Planning Quantity:	10,000 pounds

Section 5 – Regulations (cont)

SARA, Title III, Section 313 (40 CFR Part 372 – Toxic Chemical Release Reporting: Community Right-To-Know

Extremely Hazardous Substance:	No	
WHMIS Classification:	C	Oxidizing Material Poisonous and Infectious Material
	D	Material Causing Other Toxic Effects – Eye and Skin Irritant
Canadian Domestic Substance List:	Not Listed	

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:	Keep in tightly closed container. Store in dry area, protected from heat sources and direct sunlight.
Handling:	Clean and dry processing pipes and equipment before operation. Never return unused product to the storage container. Keep away from incompatible products. Containers and equipment used to handle this product should be used exclusively for this material. Avoid contact with water or humidity.

Section 6 – Protective Measures, Storage and Handling (cont)

Personal Protective Equipment (PPE)

Engineering Controls:	Calcium Hydroxide ACGIH® TLV® (2000) 5 mg/m^3 TWA OSHA PEL Total dust–15 mg/m^3 TWA Respirable fraction– 5 mg/m^3 TWA NIOSH REL (1994) 5 mg/m^3
Respiratory Protection:	For many conditions, no respiratory protection may be needed; however, in dusty or unknown atmospheres use a NIOSH approved dust respirator.
Hand Protection:	Impervious protective gloves made of nitrile, natural rubbber or neoprene.
Eye Protection:	Use chemical safety goggles (dust proof).
Skin Protection:	For brief contact, few precautions other than clean clothing are needed. Full body clothing impervious to this material should be used during prolonged exposure.
Other:	Safety shower and eyewash stations should be present. Consultation with an industrial hygienist or safety manager for the selection of PPE suitable for working conditions is suggested.
Industrial Hygiene:	Avoid contact with skin and eyes.
Protection Against Fire & Explosion:	NA

Section 7 – Hazards Identification

Emergency Overview:	Oxidizer – Contact with combustibles may cause a fire. This material decomposes and releases oxygen in a fire. The additional oxygen may intensify the fire.
Potential Health Effects:	Irritating to the mucous membrane and eyes. If the product splashes in ones face and eyes, treat the eyes first. Do not dry soiled clothing close to an open flame or heat source. Any

	clothing that has been contaminated with this product should be submerged in water prior to drying.
Inhalation:	High concentrations may cause slight nose and throat irritation with a cough. There is risk of sore throat and nose bleeds if one is exposed to this material for an extended period of time.
Eye Contact:	Severe eye irritation with watering and redness. There is also the risk of serious and/or permanent eye lesions.
Skin Contact:	Irritation may occur if one is exposed to this material for extended periods.
Ingestion:	Irritation of the mouth and throat with nausea and vomiting.

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage/Gas Leakage:	Collect in suitable containers. Wash remainder with copious quantities of water.
Extinguishing Media:	See next.
Suitable:	Large quantities of water or water spray. In case of fire in close proximity, all means of extinguishing are acceptable.
Further Information:	Self contained breathing apparatus or approved gas mask should be worn due to small particle size. Use extinguishing media appropriate for surrounding fire. Apply cooling water to sides of transport or storage vessels that are exposed to flames until the fire is extinguished. Do not approach hot vessels that contain this product.
First Aid:	After contact with skin, wash immediately with plenty of water and soap. In case of contact with eyes, rinse immediately with plenty of water and seek medical attention. Consult an opthalmologist in all cases.

Section 8 – Measures in Case of Accidents and Fire

Eye Contact:	Flush eyes with running water for 15 minutes, while keeping the eyelids wide open. Consult with an ophthalmologist in all cases.
Inhalation:	Remove subject from dusty environment. Consult with a physician in case of respiratory symptoms.

Ingestion:	If the victim is conscious, rinse mouth and admnister fresh water. DO NOT induce vomiting. Consult a physician in all cases.
Skin Contact:	Wash affected skin with running water. Remove and clean clothing. Consult with a physician in case of persistent pain or redness.
Special Precautions:	Evacuate all non-essential personnel. Intervention should only be done by capable personnel that are trained and aware of the hazards associated with this product. When it is safe, unaffected product should be moved to safe area.
Specific Hazards:	Oxidizing substance. Oxygen released on exothermic decomposition may support combustion. Confined spaces and/or containers may be subject to increased pressure. If product comes into contact with flammables, fire or explosion may occur.

Section 9 – Accidental Release Measures

Precautions:	Observe the protection methods cited in Section 3. Avoid materials and products that are incompatible with product. Immediately notify the appropriate authorities in case of reportable discharge (> 100 lbs).
Cleanup Methods:	Collect the product with a suitable means of avoiding dust formation. All receiving equipment should be clean, vented, dry, labeled and made of material that this product is compatible with. Because of the contamination risk, the collected material should be kept in a safe isolated place. Use large quantities of water to clean the impacted area. See Section 12 for disposal methods.

Section 10 – Information on Toxicology

Toxicity Data

Acute Toxicity:	Oral Route, LD_{50}, rat, > 2,000 mg/kg (powder 50%) Dermal Route, LD_{50}, rat, > 2,000 mg/kg (powder 50%) Inhalation, LD_{50}, rat, > 5,000 mg/m^3 (powder 35%)
Irritation:	Rabbit (eyes), severe irritant

Sensitization:	No data
Chronic Toxicity:	In vitro, no mutagenic effect (Powder 50%)
Target Organ Effects:	Eyes and respiratory passages.

Section 11 – Information on Ecology

Ecology Data	
	10 mg $Ca(OH)_2$/L: pH = 9.0 100 mg $Ca(OH)_2$/L: pH = 10.6
Acute Exotoxicity:	Fishes, Cyprinus carpio, LC_{50}, 48 hrs, 160 mg/L Crustaceans, Daphnia sp., EC_{50}, 24 hours, 25.6 mg/L (Powder 16%)
Mobility:	Low Solubility and Mobility
Abiotic Degradation:	Water – Slow Hydrolysis. Degradation Products: Calcium Hydroxide Water/soil – complexation/precipitation. Carbonates/sulfates present at environmental concentrations. Degradation products: carbonates/sulfates sparingly soluble
Biotic Degradation:	NA (inorganic compound)
Potential for Bioaccumulation:	NA (ionizable inorganic compound)

Section 11 – Information on Ecology (cont)

Comments:	Observed effects are related to alkaline properties of the product. Hazard for the environment is limited due to the product properties of: • No bioaccumulation • Weak solubility and precipatation as carbonate or sulfate in an aquatic environment. Diluted product is rapidly neutralized at environmental pH.
Further Information:	NA

Section 12 – Disposal Considerations

Waste Disposal Method:	Consult current federal, state and local regulations regarding the proper disposal of this material and its emptied containers.

Section 13 – Shipping/Transport Information

D.O.T Shipping Name:	Oxidizing Solid, N.O.S [A mixture of Calcium OxyHydroxide [$CaO(OH)_2$] and Calcium Hydroxide [$Ca(OH)_2$].
UN Number:	1479
Hazard Class:	5.1
Label(s):	5.1 (Oxidizer)
Packaging Group:	II
STCC Number:	4918717

Section 14 – Other Information

HMIS® Rating	Health – 2 Flammability – 0	Reactivity – 1 PPE - Required

HMIS® is a registered trademark of the National Painting and Coating Association.

NFPA® Rating	Health – 2 Flammability – 0	Reactivity – 1 OX

NFPA® is a registered trademark of the National Fire Protection Association.

Reason for Issue: Update toxicological and ecological data

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available.

Regen OX – Part A (Oxidizer Complex)

Material Safety Data Sheet (MSDS)

Last Revised: October 1, 2007

Section 1 – Supplier Information and Material Identification

Supplier:

1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description:	A mixture of sodium percarbonate [$2Na_2CO_3 \cdot 3H_2O_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.
Chemical Family:	Inorganic Chemicals
Trade Name:	Regen Ox – Part A (Oxidizer Complex)
Product Use:	Used to remediate contaminated soil and groundwater (environmental applications)

Section 2 – Chemical Information/Other Designations

CAS No.	Chemical	Percentage
15630-89-4	Sodium Percarbonate	60 -100 %
5968-11-6	Sodium Carbonate Monohydrate	10 – 30 %
7699-11-6	Silicic Acid	< 1 %
63231-67-4	Silica Gel	< 1 %

Section 3 – Physical Data

Form:	Powder
Color:	White
Odor:	Odorless
Melting Point:	NA
Boiling Point:	NA

Section 3 – Physical Data (cont)	
Flammability/Flash Point:	NA
Vapor Pressure:	NA
Bulk Density:	0.9 – 1.2 g/cm^3
Solubility:	Min 14.5g/100g water @ 20 ºC
Viscosity:	NA
pH (3% solution):	≈ 10.5
Decomposition Temperature:	Self-accelerating decomposition with oxygen release starts at 50 ºC.

Section 4 – Reactivity Data	
Stability:	Stable under normal conditions
Conditions to Avoid/Incompatibility:	Acids, bases, salts of heavy metals, reducing agents, and flammable substances
Hazardous Decomposition Products:	Oxygen. Contamination with many substances will cause decomposition. The rate of decomposition increases with increasing temperature and may be very vigorous with rapid generation of oxygen and steam.

Section 5 – Regulations	
TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	*No*
Unlisted Substance:	*Yes*
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No
WHMIS Classification:	C, D2B
Canadian Domestic Substance List:	Appears

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:

Oxidizer. Store in a cool, well ventilated area away from all sources of ignition and out of the direct sunlight. Store in a dry location away from heat and in temperatures less than 40 °C.

Keep away from incompatible materials and keep lids tightly closed. Do not store in improperly labeled containers.

Protect from moisture. Do not store near combustible materials. Keep containers well sealed.

Store separately from reducing materials. Avoid contamination which may lead to decomposition.

Handling:

Avoid contact with eyes, skin and clothing. Use with adequate ventilation.

Do not swallow. Avoid breathing vapors, mists or dust. Do not eat, drink or smoke in the work area.

Label containers and keep them tightly closed when not in use.

Wash hands thoroughly after handling.

Personal Protective Equipment (PPE)

Engineering Controls:

General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mists. Maintain adequate ventilation at all times. Do not use in confined areas. Keep levels below recommended exposure limits. To determine actual exposure limits, monitoring should be performed on a routine basis.

Respiratory Protection:

For many conditions, no respiratory protection is necessary; however, in dusty or unknown conditions or when exposures exceed limit values a NIOSH approved respirator should be used.

Hand Protection:

Wear chemical resistant gloves (neoprene, rubber, or PVC).

Section 6 – Protective Measures, Storage and Handling (cont)

Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Chemical resistant gloves (neoprene, PVC or rubber) and protective clothing should be worn during use.
Other:	Eye wash station.
Protection Against Fire & Explosion:	Product is non-explosive. In case of fire, evacuate all non-essential personnel, wear protective clothing and a self-contained breathing apparatus, stay upwind of fire, and use water to spray cool fire-exposed containers.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes slight irritation.
Ingestion:	May be harmful if swallowed (vomiting and diarrhea).

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage:	Eliminate all ignition sources. Evacuate unprotected personnel and never exceed any occupational exposure limit. Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.
Extinguishing Media:	Water

First Aid

Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. **Do Not** induce vomiting.

Section 8 – Measures in Case of Accidents and Fire (cont)

Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water.

Section 9 – Accidental Release Measures

Precautions:

Cleanup Methods:	Shovel or sweep spilt material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to the inventory.

Section 10 – Information on Toxicology

Toxicity Data

LD50 Oral (rat):	2,400 mg/kg
LD50 Dermal (rabbit):	Min 2,000 mg/kg
LD50 Inhalation (rat):	Min 4,580 mg/kg

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information:	NA

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment:	Dispose of in an approved waste facility operated by an authorized contactor in compliance with local regulations.
Package (Pail) Treatment:	The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T. Shipping Name:	Oxidizing Solid, N.O.S. [A mixture of sodium percarbonate [$2Na_2CO_3 \cdot 3H2O_2$], sodium carbonate [Na_2CO_3], sodium silicate and silica gel.]
UN Number:	1479
Hazard Class:	5.1
Labels:	5.1 (Oxidizer)
Packaging Group:	III

Section 14 – Other Information

HMIS® Rating	Health – 1 (slight)	Reactivity – 1 (slight)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat

HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

Regen OX – Part B (Activator Complex)

Material Safety Data Sheet (MSDS)

Last Revised: November 7, 2005

Section 1 – Supplier Information and Material Identification

Supplier:

REGENESIS
1011 Calle Sombra
San Clemente, CA 92673
Telephone: 949.366.8000
Fax: 949.366.8090
E-mail: info@regenesis.com

Chemical Description:	A mixture of sodium silicate solution, silica gel and ferrous sulfate
Chemical Family:	Inorganic Chemicals
Trade Name:	Regen Ox – Part B (Activator Complex)
Product Use:	Used for environmental remediation of contaminated soils and groundwater

Section 2 – Chemical Information/Other Designations

CAS No.	Chemical
1344-09-8	Silicic Acid, Sodium Salt, Sodium Silicate
63231-67-4	Silica Gel
7720-78-7	Ferrous Sulfate
7732-18-5	Water

Section 3 – Physical Data

Form:	Liquid
Color:	Blue/Green
Odor:	Odorless
Melting Point:	NA
Boiling Point:	NA
Flammability/Flash Point:	NA
Vapor Pressure:	NA

Section 3 – Physical Data (cont)	
Specific Gravity	1.39 g/cm^3
Solubility:	Miscible
Viscosity:	NA
pH (3% solution):	11
Hazardous Decomposition Products:	Oxides of carbon and silicon may be formed when heated to decomposition.

Section 4 – Reactivity Data	
Stability:	Stable under normal conditions.
Conditions to Avoid:	None.
Incompatibility:	Avoid hydrogen fluoride, fluorine, oxygen difluoride, chlorine trifluoride, strong acids, strong bases, oxidizers, aluminum, fiberglass, copper, brass, zinc, and galvanized containers.

Section 5 – Regulations	
TSCA Inventory Listed:	Yes
CERCLA Hazardous Substance (40 CFR Part 302)	
Listed Substance:	*No*
Unlisted Substance:	*Yes*
SARA, Title III, Sections 302/303 (40 CFR Part 355) – Emergency Planning and Notification	
Extremely Hazardous Substance:	No
SARA, Title III, Sections 311/312 (40 CFR Part 370) – Hazardous Chemical Reporting: Community Right-To-Know	
Hazard Category:	Acute
SARA, Title III, Sections 313 (40 CFR Part 372) – Toxic Chemical Release Reporting: Community Right-To-Know	
Extremely Hazardous Substance:	No

Section 6 – Protective Measures, Storage and Handling

Technical Protective Measures

Storage:	Keep in a tightly closed container (steel or plastic) and store in a cool, well ventilated area away from all incompatible materials (acids, reactive metals, and ammonium salts). Store in a dry location away from heat and in temperatures less than 24 ?C. Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers.
Handling:	Avoid contact with eyes, skin and clothing. Avoid breathing spray mist. Use with adequate ventilation. Do not use product if it is brownish-yellow in color.

Personal Protective Equipment (PPE)

Engineering Controls:	General room ventilation is required if used indoors. Local exhaust ventilation, process enclosures or other engineering controls may be needed to maintain airborne levels below recommended exposure limits. Safety shower and eyewash station should be within direct access.
Respiratory Protection:	Use NIOSH-approved dust and mist respirator where spray mist exists. Respirators should be used in accordance with 29 CFR 1910.134.
Hand Protection:	Wear chemical resistant gloves.
Eye Protection:	Wear chemical safety goggles. A full face shield may be worn in lieu of safety goggles.
Skin Protection:	Try to avoid skin contact with this product. Gloves and protective clothing should be worn during use.
Other:	
Protection Against Fire & Explosion:	Product is non-explosive and non-combustible.

Section 7 – Hazards Identification

Potential Health Effects

Inhalation:	Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath, and irritations to mucous membranes, nose and throat.
Eye Contact:	Causes irritation, redness and pain.
Skin Contact:	Causes irritation. Symptoms include redness, itching and pain.
Ingestion:	May cause irritation to mouth, esophagus, and stomach.

Section 8 – Measures in Case of Accidents and Fire

After Spillage/Leakage (small):	Mop up and neutralize liquid, then discharge to sewer in accordance with local, state and federal regulations.
After Spillage/Leakage (large):	Keep unnecessary personnel away; isolate hazard area and do not allow entrance into the affected area. Do not touch or walk through spilled material. Stop leak if possible without risking injury. Prevent runoff from entering into storm sewers and ditches that lead to natural waterways. Isolate the material if at all possible. Sand or earth may be used to contain the spill. If containment is not possible, neutralize the contaminated area and flush with large quantities of water.
Extinguishing Media:	Material is compatible with all extinguishing media.
Further Information:	

First Aid

Eye Contact:	Flush eyes with running water for at least 15 minutes with eyelids held open. Seek a specialist.
Inhalation:	Remove affected person to fresh air. Give artificial respiration if individual is not breathing. If breathing is difficult, give oxygen. Seek medical attention if the effects persist.
Ingestion:	If the individual is conscious and not convulsing, give two-four cups of water to dilute the chemical and seek medical attention immediately. **DO NOT** induce vomiting.
Skin Contact:	Wash affected areas with soap and a mild detergent and large amounts of water. Remove contaminated clothing and shoes.

Section 9 – Accidental Release Measures

Precautions:

PPE:	Wear chemical goggles, body-covering protective clothing, chemical resistant gloves, and rubber boots (see Section 6).
Environmental Hazards:	Sinks and mixes with water. High pH of this material may be harmful to aquatic life. Only water will evaporate from a spill of this material.
Cleanup Methods:	Pick-up and place in an appropriate container for reclamation or disposal. US regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities.

Section 10 – Information on Toxicology

Toxicity Data

Sodium Silicate:	When tested for primary eye irritation potential according to OECD Guidelines, Section 405, a similar sodium silicate solution produced corneal, iridal and conjunctival irritation. Some eye irritation was still present 14 days after treatment, although the average primary irritation score has declined from 29.7 after 1 day to 4.0 after 14 days. When tested for primary skin irritation potential, a similar sodium silicate solution produced irritation with a primary irritation index of 3 to abraded skin and 0 to intact skin. Human experience confirms that irritation occurs when sodium silicates get on clothes at the collar, cuffs, or other areas where abrasion may exist. The acute oral toxicity of this product has not been tested.
Ferrous Sulfate:	LD50 Oral (rat): 319 mg/kg not a suspected carcinogen.

Section 11 – Information on Ecology

Ecology Data

Ecotoxicological Information:	Based on 100% solid sodium silicate, a 96 hour median tolerance for fish of 2,320 mg/l; a 96 hour median tolerance for water fleas of 247 mg/L; a 96 hour median tolerance for snail eggs of 632 mg/L; and a 96 hour median tolerance for Amphipoda of 160 mg/L.

Section 12 – Disposal Considerations

Waste Disposal Method

Waste Treatment:	Neutralize and landfill solids in an approved waste facility operated by an authorized contactor in compliance with local regulations.
Package (Pail) Treatment:	The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

Section 13 – Shipping/Transport Information

D.O.T.	This product is not regulated as a hazardous material so there are no restrictions.

Section 14 – Other Information

HMIS® Rating	Health – 2 (moderate)	Reactivity – 0 (none)
	Flammability – 0 (none)	Lab PPE – goggles, gloves, and lab coat
	Contact – 1 (slight)	

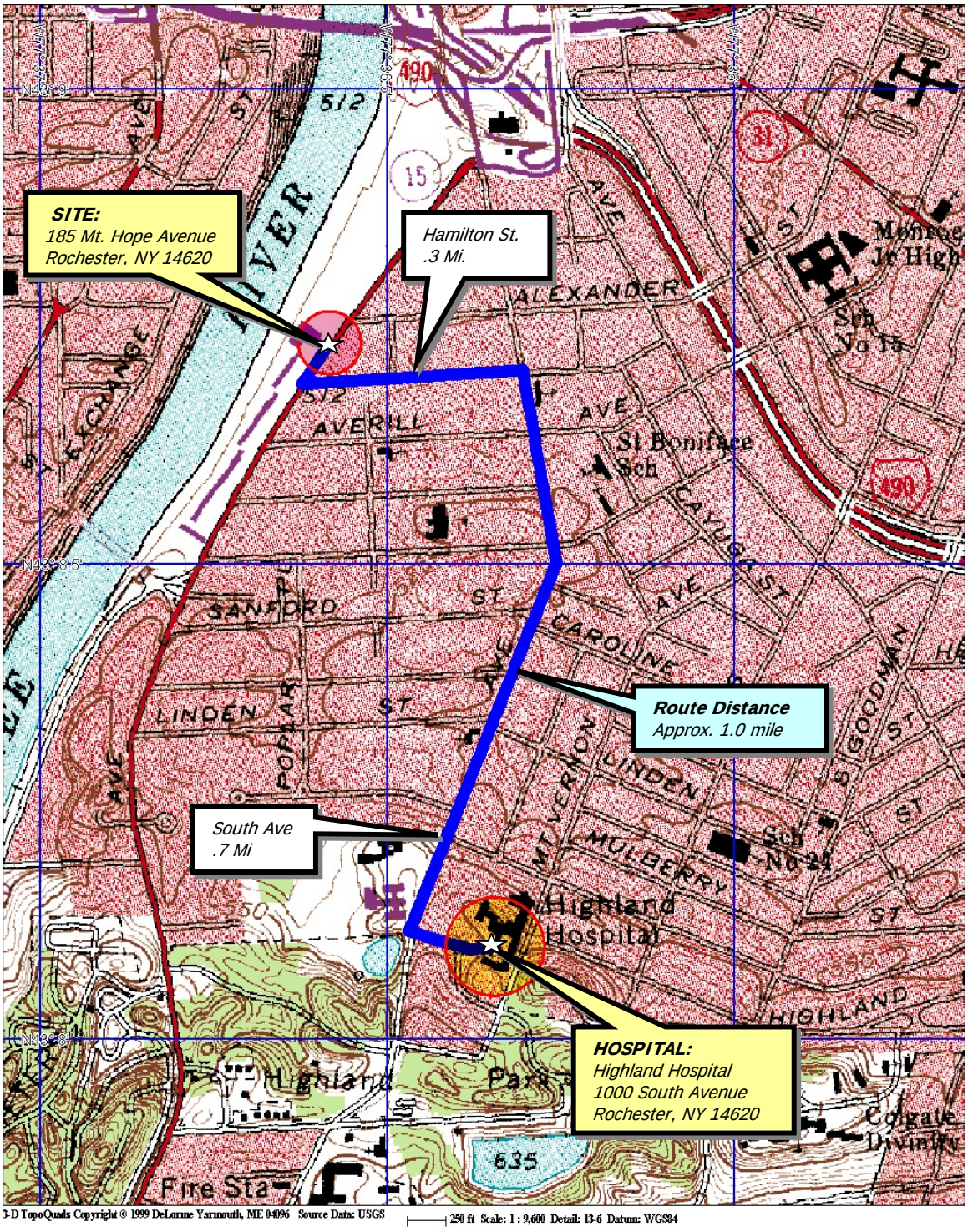
HMIS® is a registered trademark of the National Painting and Coating Association.

Section 15 – Further Information

The information contained in this document is the best available to the supplier at the time of writing, but is provided without warranty of any kind. Some possible hazards have been determined by analogy to similar classes of material. The items in this document are subject to change and clarification as more information become available. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person. Individuals receiving this information must exercise their independent judgment in determining its appropriateness for a particular purpose.

ATTACHMENT 2

Figure 1- Route for Emergency Services



Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad maps Rochester East (NY) 1995.

DATE **11-21-2007** DRAWN BY **TWW** SCALE **As Noted**	day DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	PROJECT TITLE **185 MOUNT HOPE AVENUE** **ROCHESTER, NEW YORK** **HEALTH AND SAFETY PLAN** DRAWING TITLE **ROUTE FOR EMERGENCY SERVICES**	PROJECT NO. **4003R-07** **FIGURE 1**

APPENDIX B

Regenesis' RegenOx™ In-Situ Chemical Oxidation Application Instructions

REGENESIS

RegenOx™

CHEMICAL OXIDATION REDEFINED

RegenOx™ *In Situ* Chemical Oxidation Application Instructions

Using Direct-Push Injection (Step-by-Step Procedures)

RegenOx™ is the new generation of chemical oxidation. RegenOx™ is a proprietary (patent-applied-for) *in situ* chemical oxidation process using a solid oxidant complex (sodium percarbonate/catalytic formulation) and an activator complex (a composition of ferrous salt embedded in a micro-scale catalyst gel). RegenOx™ with its catalytic system has very high activity, capable of treating a very broad range of soil and groundwater contaminants including both petroleum hydrocarbons and chlorinated solvents.

Instructions

1) Prior to the installation of RegenOx™, any surface or overhead impediments should be identified as well as the location of all underground structures. Underground structures include but are not limited to utility lines; tanks; distribution piping; sewers; drains; and landscape irrigation systems. The planned installation locations should be adjusted to account for all impediments and obstacles. These considerations should be part of the SSHP or HASP.

2) Pre-mark the installation locations, noting any points that may have different vertical application requirements or total depth.

3) Set up the direct push unit over each point and follow the manufacturer standard operating procedures (SOP) for the direct push equipment. Care should be taken to assure that probe holes remain in the vertical.

4) For most applications, Regenesis suggests using 1.5-inch O.D./0.625-inch I.D drive rods. However, some applications may require the use of 2.125-inch O.D./1.5-inch I.D. or larger drive rods.

5) Advance drive rods through the surface pavement, as necessary, following SOP.

6) Push the drive rod assembly with an expendable tip to the desired maximum depth. Regenesis suggests pre-counting the number of drive rods needed to reach depth prior to starting injection activities.

7) After the drive rods have been pushed to the desired depth, the rod assembly should be withdrawn three to six inches. Then the expendable tip can be dropped from the drive rods, following SOP. If an injection tool was used instead of an expendable tip, the application of material can take place without any preliminary withdrawal of the rods.

8) In some cases, introduction of a large column of air prior to RegenOx™ application may be problematic because the air can block water flow to the treatment area. This is particularly the case in deep injections (>50 ft) with large diameter rods (>1.5-inch O.D.). To prevent the injection of air into the aquifer during RegenOx™ application, as well as to prevent problems associated with heaving sands, fill the drive rods with water, or the RegenOx™ mixture prior dropping the expendable tip or exposing the injection tool.

9) The RegenOx™ percent of the oxidizer in solution should range between 3% to 5%. Although solutions up to 8% may be used, this will likely increase the difficulty of injection due to reactivity. Solutions with greater than 8% oxidizer in solution will result in excess reaction and flocculation prior to injection and are not typically recommended

   Measure the appropriate quantity of RegenOx™ Oxidizer for one to four vertical foot of injection into a 55 gallon drum or mixing tank. The volume of water per injection location can be calculated from the following formula:

$$\frac{\text{RegenOx Oxidizer lbs/foot}}{(8.34\ \text{lbs/gal water})(\%\ \text{R}egenOx\_Oxidizer\ \text{solids})}\left[1-(\%\ \text{R}egenOx\_Oxidizer\ \text{solids})\right]$$

   Tighter formations (clays and silts), and even some fine sand formations will likely require higher oxidant percentages since less volume can be injected per location. The following are guides to various RegenOx™ mixing ratios based on the above equation.

   - to make a roughly 3% oxidant solution for every 10 lbs of oxidant and 10 lbs of activator (20 lbs total RegenOx™), use 38 gallons of water.
   - to make a roughly 4% oxidant solution for every 10 lbs of oxidant and 10 lbs of activator (20 lbs total RegenOx™), use 28 gallons of water.
   - to make a roughly 5% oxidant solution for every 10 lbs of oxidant and 10 lbs of activator (20 lbs total RegenOx™), use 22 gallons of water.

10) Pour the pre-measured quantity of RegenOx™ Oxidizer into the pre-measured volume of water to make the desired target % oxidant in solution. NOTE: always pour the Oxidizer into water, do not pour water into the Oxidizer. Mix the water and oxidant with a power drill and paint stirrer or other mechanical mixing device to ensure that the Oxidizer has dissolved in the water.

11) Pour the applicable quantity of the pre-mixed RegenOx™ Activator into the oxidant:water solution. Mix the Oxidant and Activator using a power drill paint stirrer or other mechanical mixing device for at least 5 minutes until a homogenous mixture is formed. After mixing the RegenOx™ mixture should be injected into the subsurface as soon as possible.

12) Do not mix more RegenOx™ material than will be used over roughly 1 to 4 feet of injection so as to minimize potential above ground reaction/flocculation prior to injection.

    Transfer the contents of the mixing tank to the pump using gravity feed or appropriate transfer pump. (See Section 9.2: Pump Selection) For some types of pumps, it may be desirable to perform a volume check prior to injecting RegenOx™

13) Connect the delivery hose to the pump outlet and the delivery sub-assembly. Circulate RegenOx™ though the hose and the delivery sub-assembly to displace air in the hose. NOTE: an appropriately sized pressure gauge should be placed between the pump outlet and the delivery sub-assembly in order to monitor application pump pressure and detect changes in aquifer backpressures during application.

14) Connect the sub-assembly to the drive rod. After confirming that all of the connections are secure, pump the RegenOx™ through the delivery system to displace the water/fluid in the rods.

15) Slowly withdraw the drive rods. Commonly RegenOx™ injection progress at 1-foot intervals. However, continuous injection while slowly withdrawing single lengths of drive rod (3 or 4 feet) is an acceptable option. The pre-determined volume of RegenOx™ should be pumped into the aquifer across the desired treatment interval.

16) Remove one section of the drive rod. The drive rod may contain some residual RegenOx™. Place the RegenOx™-filled rod in a clean, empty bucket and allow the RegenOx to drain. Eventually, the RegenOx™ should be returned to the RegenOx™ pump hopper for reuse.

17) Monitor for any indications of aquifer refusal. This is typically indicated by a spike in pressure as indicated or (in the case of shallow applications) RegenOx™ "surfacing" around the injection rods or previously installed injection points. At times backpressure caused by reaction off-gassing will impede the pumps delivery volume. This can be corrected by bleeding the pressure off using a pressure relief/bypass valve (placed inline between the pump discharge and the delivery sub-assembly) and then resume pumping. If aquifer acceptance appears to be low, as indicated by high back pressure, allow sufficient time for the aquifer to equilibrate prior to removing the drive rod.

18) Repeat steps 13 through 23 until treatment of the entire contaminated vertical zone has been achieved. It is recommended that the procedure extend to the top of the capillary fringe/smear zone, or to the top of the targeted treatment interval.

19) Install an appropriate seal, such as bentonite, above the RegenOx™ material through the entire vadose zone. Prior to emplacing the borehole seal, we recommend placing clean sand in the hole to the top of the RegenOx™ treatment zone (especially important in holes that stay open). Bentonite chips or granular bentonite should be placed immediately above the treatment zone, followed by a cement/bentonite grout to roughly 0.5 feet below ground surface. Quick-set concrete should then be used as a surface seal.

20) Remove and clean the drive rods as necessary.

21) Finish the borehole at the surface as appropriate (concrete or asphalt cap, as needed). We recommend a quick set concrete to provide a good surface seal with minimal set up time.

22) A proper borehole and surface seal assures that the RegenOx™ remains properly placed and prevents contaminant migration from the subsurface. Each borehole should be sealed immediately following RegenOx™ application to minimize RegenOx™ surfacing during the injection process. If RegenOx™ continues to "surface" up the direct push borehole, an appropriately sized (oversized) disposable drive tip or wood plug/stake can be used to plug the hole until the aquifer pressures equilibrates and the RegenOx™ stops surfacing. If wells are used for RegenOx™ injection the RegenOx™ injection wells and all nearby groundwater monitoring wells should be tightly capped to reduce potential for surfacing through nearby wells.

23) Periodically compare the pre- and post-injection volumes of RegenOx™ in the holding tank or pump hopper using the pre-marked volume levels. Volume level may not be present on all tanks or pump hoppers. In this case, volume level markings can be temporarily added using known amounts of water and a carpenter's grease pencil (Kiel crayon).

24) Move to the next probe point, repeating steps 8 through 29. We recommend that the next RegenOx™ injection point be as far a distance as possible within the treatment zone from the previous RegenOx™ injection point. This will further minimize RegenOx™ surfacing and short circuiting up an adjacent borehole. When possible, due to the high volumes of liquid being injected, working from the outside of the injection area towards the center will limit expansion of the plume.

REGENESIS

Pump Selection

Regenesis has evaluated a number of pumps and many are capable of delivering RegenOx™ to the subsurface at a sufficient pressure and volumetric rate. However, even though a number of the evaluated pumps may be capable of delivering the RegenOx™ to the subsurface based on adequate pressures and delivery rates, each pump has its own set of practical issues that may make it more or less difficult to manage in a field setting.

In general, Regenesis strongly recommends using a pump with a pressure rating of 200 pounds per square inch (psi) in sandy soil settings, and 800 psi in silt, clay or weathered bedrock settings. Any pump under consideration should have a minimum delivery rate of 5 gallons per minute (gpm). A lower gpm rated pump may be used; however, they are not recommended due to the amount of time required to inject the volume of liquids typically associated with a RegenOx™ injection (i.e. 1,000 lbs of RegenOx™ [500 lbs Oxidant/500 lbs Activator] require roughly 1,100 gallons of water to make a 5% Oxidant solution).

Quite often diaphragm pumps are used for the delivery of chemical oxidants. Generally, these pumps operate pressures from 50-150 psi. Some of these pumps do not have the pressure head necessary to overcome the back pressure encountered in silt and clay lenses. In these cases the chemical oxidant thus ends up being delivered to the surrounding sands (the path of least resistance) and is not delivered to soil with residual adsorbed contamination. The use of a positive displacement pump such as a piston pump or a progressing cavity pump is may be superior because these pumps have the pressure necessary to overcome the resistance of low permeability soils. NOTE: be aware that application at pressures that are too high may over-consolidate the soil and minimize the direct contact of the oxidant. The key is to inject at a rate and pressure that maximizes the radius of influence without causing preferential flow. This can be achieved by injecting at the minimum pressure necessary to overcome the particular pressures associated with your site soil conditions.

Whether direct injection or wells are used, it is best to start by injecting RegenOx™ outside the contaminated area and spiral laterally inwards toward the source. Similarly, RegenOx™ should be applied starting vertically at the bottom elevation of contamination, through the layer of contamination, and a couple of feet above the layer of contamination. The reagents can be pushed out from the well bore with some water.

Pump Cleaning

For best results, flush all moving parts and hoses with clean water at the end of the day; flush the injection system with a mixture of water and biodegradable cleaner such as Simple Green.

For more information or technical assistance please call Regenesis at 949-366-8000

APPENDIX C

Soil and Fill Material Characterization Flow Chart

SOIL AND FILL MATERIAL CHARACTERIZATION FLOW CHART

185 MT. HOPE AVENUE ROCHESTER, NEW YORK