Alternatives Analysis Report/ Remedial Action Work Plan

295 Maryland Street Site
BCP Site No. C915242
Buffalo, New York

December 2014

0222-001-100

Prepared For:

295 Maryland, LLC

Prepared By:

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BROWNFIELD CLEANUP PROGRAM

ALTERNATIVES ANALYSIS REPORT/ REMEDIAL ACTION WORK PLAN

295 MARYLAND STREET SITE, BCP SITE NO. C915242
BUFFALO, NEW YORK

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Prepared for:

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AAR/RAWP

295 Maryland Street Site

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295 Maryland Street Site

Certification

I, Thomas H. Forbes, certify that I am currently a NYS registered Professional Engineer as defined in 6 NYCRR Part 375 and that this Alternatives Analysis Report/Remedial Action Work Plan for the 295 Maryland Street Site (BCP Site No. C915242) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

070950-1	
NYS Professional Engineer #	Date

1.0 INTRODUCTION

This document presents an Alternatives Analysis Report (AAR) and Remedial Action Work Plan (RAWP) prepared under the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) for the 295 Maryland Street Site in Buffalo, New York (see Figures 1 and 2). The BCP Site consists of 1.557 acres of contiguous property at 295 and 305 Maryland, and 129 West Avenue. The AAR/RAWP and the BCP are being performed on behalf of 295 Maryland, LLC for the purpose of redeveloping former manufacturing property into residential apartments for approximately 54 living units in a three-story building (see Figure 3).

In August 2010, Benchmark Environmental Engineering & Science, PLLC (Benchmark) met with the NYSDEC to discuss the potential eligibility of the Site for inclusion in the BCP. Based on extensive prior investigation work completed on the property by Benchmark and others (discussed below), it was determined that the Site would be a candidate for entry into the BCP at the remedial implementation stage, predicated on completion of a groundwater quality assessment. Accordingly, 295 Maryland, LLC completed preliminary groundwater characterization in September 2010 and subsequently submitted a BCP application to the NYSDEC in March 2011. The BCP application was deemed complete by the NYSDEC, and the public notice was published in the Buffalo News on April 13, 2011. The review and comment period concluded on May 13, 2011 and the Site, designated as BCP Site No. C915242, was accepted into the BCP effective July 14, 2011.

1.1 Background

The Site was historically used in a residential and commercial capacity, with the property at 295 Maryland Street most recently occupied by Lamar Advertising, Inc. (Lamar), a firm specializing in the sale of billboard advertising space and erection of billboard signs. Lamar relocated to another location within the City in December 2000; the associated commercial buildings and facilities on 295 Maryland Street as well as the residences at 121-129 West Avenue have been demolished. Currently, the Site is vacant and undeveloped.

A Phase I Environmental Site Assessment (ESA) was performed for the former Lamar Advertising property in January 2000, prior to facility demolition (Ref. 1). A separate Phase I ESA was prepared in 2001 for 121-129 West Avenue on behalf of the Buffalo

Niagara Renaissance Corporation (BNRC) (Ref. 2). The ESA reports indicate that 121-129 West Avenue was historically used for residential purposes, with 295 Maryland Street historically improved with an office, commercial building, and two multiple bay garages. Potential recognized environmental conditions (RECs) at 295 Maryland Street included:

- Vehicle maintenance
- Use and storage of paints, adhesives, and other flammables
- Underground storage tanks (USTs): 550-gallon and 4,000-gallon gasoline USTs were reportedly removed from the Site in 1974 and 1997, respectively. In addition, a small UST containing benzene was reportedly discovered and removed during facility decommissioning.

A Phase II Environmental Site Investigation was completed at 295 Maryland Street by Benchmark on behalf of the BNRC in November 2001 (Ref. 3) based on Phase I ESA findings. The Phase II identified surface and subsurface soil/fill materials exceeding NY State soil cleanup guidance values (i.e., as compared to TAGM 4046, the applicable NYSDEC guidance in place at that time) for certain parameters, including arsenic, lead, mercury, and several polyaromatic hydrocarbons (PAHs). These same parameters are elevated with respect to more recent Soil Cleanup Objectives (SCOs) for restricted-residential use as published in 6NYCRR Part 375. Section 3.0 discusses the findings of the historic investigations in more detail, as well as supplemental investigations completed under the BCP to assess groundwater quality and refine areas of soil/fill requiring remediation.

1.2 Purpose and Scope

This AAR and RAWP has been prepared in general accordance with Section 5.3.b of NYSDEC's May 2010 DER-10 Technical Guidance for Site Investigation and Remediation. Accordingly, it addresses the following items:

- A Site characterization, including a description of the data from prior reports and the results of supplemental groundwater and soil/fill assessments in 2010, 2011, and 2013 (Section 2.0).
- Alternatives analysis relative to the NYSDEC Site Screening Criteria (Section 3.0).
- Remedial Action Work Plan for the implementation of the selected remedy (Section 4.0) along with schedule for implementation.
- References cited in the report (Section 5.0).

1.3 Project Organization and Responsibilities

Benchmark, a NY State professional engineering firm, will serve as BCP consultant to 295 Maryland, LLC. An experienced and qualified contractor will be retained by 295 Maryland, LLC to implement the remediation, with Benchmark providing confirmatory sampling as well as Qualified Environmental Professional (QEP) observation and documentation of the remedial activities. The NYSDEC Division of Environmental Remediation (DER) will monitor the remedial actions to verify that the work is performed in accordance with the approved RAWP.

2.0 SITE CHARACTERIZATION

2.1 2001 Investigation Approach

Investigation activities undertaken on 295 Maryland Street on behalf of the BNRC in 2001 included an electromagnetic (EM) survey to check for the presence of buried metallic objects across the property, and a test pit investigation to further investigate the source of EM anomalies and allow for surface and subsurface soil/fill characterization. A summary of the 2001 investigation activities is presented below.

2.1.1 EM-61 Survey

On September 13-14, 2001, Benchmark's designated subcontractor, Geomatrix Consultants, Inc., performed an electromagnetic geophysical (EM-61) survey across 295 Maryland Street. The purpose of the EM-61 survey was to identify and define areas within the Site boundary that may be indicative of buried metal or other highly conductive material. A Geonics EM-61 high-resolution time domain electromagnetic (TDEM) metal detector capable of detecting both ferrous and nonferrous metallic objects was used to collect the subsurface data. The EM-61 has an approximate effective depth of up to 10 feet below ground surface (fbgs).

Results of the geophysical survey indicated a number of suspect buried metallic anomalies across the property (see Appendix A). Based on discussions with the former owner (Lamar), several of the anomalies were suspected to be structural (reinforced) concrete. In addition, Lamar provided documentation substantiating removal of two USTs historically used for gasoline storage and a small UST historically containing benzene; these three USTs were identified in the January 2000 Phase I ESA Report. Nevertheless, Benchmark and the BNRC agreed that additional intrusive investigation would be required to positively identify the source of the anomalies.

2.1.2 EM Anomaly Test Pits

On October 22, 2001, a total of 10 test pits (EM-1 through EM-10) were excavated at suspect anomaly locations identified during the EM survey (see Figure 4). The test pits were excavated with a track-mounted excavator until the geophysical anomaly was positively identified, which occurred at depths ranging from 6 inches to 4 fbgs. During test pit

excavation, a Benchmark engineer logged the test pit lithology and anomaly findings, and characterized excavated soil/fill for visual and/or olfactory evidence of contamination. Soil/fill materials were also screened for volatile organic vapors with a photoionization detector (PID) as a further indicator of potential contamination.

Fill was generally present at each location to a depth of 3-4 fbgs. A thin layer of native topsoil overlying native clayey soils with silt was typically encountered below the fill materials. Groundwater was not encountered, excluding some instances of perched water over clayey soils. The fill material consisted of generally fine grained and very loose soil with mixtures of brick, concrete, ash, slag, and various metallic debris. All EM test pits positively identified each geophysical anomaly as metallic debris (e.g., steel channeling, plates, angles, etc.) and/or reinforced concrete; no vessels or containers were discovered. None of the test pits exhibited field evidence of impact with the exception of test pit EM-6, where a slight petroleum odor and staining were noted in the excavated fill soils. Based on these observations, test pit EM-6 was extended approximately 6 feet in the northern direction to provide an indication of the extent of impact. As the test pit was continued to the north, visual and olfactory evidence of petroleum became less evident to the point where no impacts were observed. In addition, perched water was encountered at the apparent native soil interface (approximately 3 fbgs), with a slight sheen observed on the perched water surface at this location.

In order to characterize the impacted soil/fill, a composite sample was collected from the side wall of test pit EM-6 for laboratory analysis of: "full list" volatile organic compounds (i.e., NYSDEC STARS List and Target Compound List volatiles); Target Compound List (TCL) semi-volatile organic compounds (SVOCs); Target Analyte List (TAL) inorganic compounds; and polychlorinated biphenyls (PCBs).

2.1.3 Soil Characterization Test Pits

On October 23, 2001, Benchmark completed 10 soil characterization test pits (TP-1 through TP-10) across the 295 Maryland Street parcel (see Figure 4). Each test pit was completed to a depth of 8 fbgs or refusal, whichever occurred first.

At each location, Benchmark recorded pertinent field observations including fill types; depth to native soil (if encountered); visual or olfactory evidence of contamination; and photoionization detector (PID) readings. The investigation test pit lithology was similar

to the EM test pits, with the upper 6 inches to 1 foot of soil at each test pit location generally comprised of topsoil and clayey soils mixed with fragments of brick and stone. Approximately 2-3 feet of reworked clay fill generally underlies this upper fill layer followed by a thin (2 to 4-inch) historic topsoil layer. Deeper native soils are characterized by brown clayey soils containing some silt. Appendix B includes the test pit logs summarizing these field observations.

Benchmark collected separate composite samples of the surficial (0-6" below grade) and subsurface (1' below grade to completion) soils from each test pit. Samples were either retrieved using a stainless steel trowel or the backhoe bucket, depending on sample depth. All shallow (0-6") samples were collected for analysis of TCL SVOCs, PCBs, and TAL inorganic compounds. Deeper samples (6" to completion) were collected for these same parameters as well as TCL VOCs. All environmental samples were cooled to 4°C and transferred under chain-of-custody to Friend Laboratory for analysis in accordance with USEPA Method SW-846 protocols.

2.2 2010-2011 Supplemental Investigation Approach

In September 2010, Benchmark performed a preliminary groundwater investigation in support of the BCP application. Four groundwater monitoring wells (MW-1 to MW-4) were installed to allow for collection of representative groundwater samples across the Site and determine groundwater elevation and flow direction. The wells were initially sampled in September 2010 and resampled for select parameters in March 2011. In addition, the drill rig advanced one soil boring (deemed SB-5) on the 129 West Avenue parcel to establish soil lithology and allow for sample collection on that property, which was not assessed during the 2001 Phase II investigation.

2.2.1 Soil Borings

On September 13-14, 2010, Earth Dimensions, Inc. (retained by Benchmark) drilled four well borings and soil boring SB-5 using 4¼-inch hollow stem augers. As shown on the field borehole logs in Appendix C, 2-inch diameter split-spoon samples were collected at 2-foot intervals continuously through the fill and into the native soil. Stratigraphic field borehole logs were prepared by a qualified geologist from ground surface to the bottom of the borehole. Borings MW-1 through MW-4 were drilled to a nominal depth of 22 fbgs, and

SB-5 to 6 fbgs. Each 2-foot split-spoon soil sample was scanned for total organic vapors with a MiniRae 2000 Photoionization Detector (PID) equipped with a 10.6 eV lamp. Soil descriptions, PID scan results, and visual/olfactory observations during boring advancement are recorded on the Field Borehole Logs in Appendix C. As indicated, there were no organic vapors detected above background levels or any visual observations of impact identified in any of the overburden soil samples with the exception of a trace PID reading (1.6 ppm) from 20 to 22 fbgs at MW-2.

Two soil samples were collected during soil boring advancement. Sample MW-3 (4-6') was collected to discretely characterize the native soil layer, as the 2001 program involved collection of a composite of subsurface soil/fill sample that straddled both the fill and native soil intervals. Sample SB-5 (0-2') was collected to characterize fill materials on the 129 West Avenue Parcel. Soil samples were collected using dedicated stainless steel sampling tools. Representative soil samples were placed in pre-cleaned sample bottles and submitted under chain-of-custody to TestAmerica Laboratories Inc., for analysis of TCL VOCs, TCL SVOCs, PCBs, pesticides, and TAL inorganic compounds.

2.2.2 Monitoring Well Construction and Sampling

Following borehole advancement, monitoring wells were installed within soil borings MW-1 to MW-4 at the locations shown on Figure 4. Appendix C includes the monitoring well installation logs. The well screens were installed between approximately 12 and 22 fbgs and extended into the sandy silt layer underlying the native clay soils. The wells were constructed with 2-inch diameter, flush-joint Schedule 40 PVC, and completed in flush mount protective locking curb boxes. Benchmark developed the newly installed monitoring wells on September 18, 2010.

Benchmark surveyed the wells on October 12, 2010; elevations were made relative to an arbitrary vertical datum designated at 500.00 feet. Groundwater was sampled on September 23, 2010 and March 1, 2011. Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, turbidity, dissolved oxygen, water level, and visual and olfactory field observations were recorded on the forms provided in Appendix D.

Groundwater grab samples were collected from each monitoring well using dedicated disposable polyethylene bailers. The September 2010 samples were transferred into

laboratory provided pre-preserved sample vials for analysis of TCL VOCs, TCL SVOCs, Pesticides/PCBs, and TAL inorganic compounds as well as total cyanide. Samples collected on March 1, 2011 were analyzed for a subset of parameters based on detections during the first event. The samples were cooled to 4°C in the field, and transported under chain-of-custody to TestAmerica Laboratories, Inc. The soil and groundwater samples were analyzed using United States Environmental Protection Agency (USEPA) SW-846 methods, and a Category B deliverable package was prepared (see Appendix E). Appendix D contains the groundwater sampling summary logs.

2.3 2013 Pre-Remedial Investigation

A pre-remedial investigation was performed on September 18-20, 2013 to better assist in defining the volume of soil/fill materials potentially requiring remediation under a restricted-residential use scenario. The work included the completion of 25 test pits designated as TP-1-13 through TP-25-13 (see Figure 4). Several of the test pits were directed toward areas of former dwellings on the property to characterize backfill of the basement areas. The test pits were advanced by Benchmark with a Komatsu PC150LC excavator to a maximum depth of approximately 14 fbgs. Soil/fill samples were generally characterized within each test pit in 2-foot intervals continuously from the ground surface through the test pit terminus. Table 1 summarizes the soil descriptions, PID scan results, and visual/olfactory observations for the pre-remedial test pit investigation. No evidence of gross impact was observed with the exception of elevated PID readings in two areas. As indicated on Figure 4 and Table 1, soil/fill PID screening during the test pit activities indicated field evidence of impact in two areas of concern (AOCs): AOC 1 as represented by test pit TP-6-13 (5.5 to 11 fbgs); and AOC 2 as represented by test pits TP-9-13 (4 to 14 fbgs) and TP-13-13 (0 to 7 fbgs). At these locations, PID readings greater than 100 ppm were reported along with moderate odor.

To further assess potential impacts across the Site and determine potential alternatives for beneficial reuse of excavated soil/fill, 10 composite soil/fill samples were selected for laboratory analysis from 10 test pits at varying depths. Composite subsurface soil/fill samples were transferred to laboratory supplied, pre-cleaned sample containers, stored on ice in a cooler, and transported to Alpha Analytical following chain of custody procedures. Alpha Analytical is an independent, New York State Department of Health

(NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory. Table 2 summarizes the analytical program that was implemented. Appendix E contains the laboratory analytical data report.

2.4 Investigation Findings

2.4.1 Physical Soil Description

As represented by 45 test pits and 5 borings, the soil at the 295 Maryland Street Site consists of fill generally present at each location to a nominal depth between 3 and 4 fbgs, with deeper areas of fill identified in certain areas where former dwellings with basements were located. Reworked and native clay soils underlying a thin layer of native topsoil were typically encountered below the fill materials. No fill materials were encountered during advancement of well boring MW-1, suggesting that fill thickness thins toward West Avenue consistent with Site topography (see Figure 4). Groundwater was not encountered within the fill, excluding some instances of perched water over clayey soils. The fill material generally consists of fine-grained soil (silt and clay) with mixtures of brick, concrete, ash, slag, and varying types of metallic debris. Underlying the fill material was a layer of brown clayey soils containing some silt typically extending to approximately 15 fbgs (20 fbgs in MW-4). A sandy silt layer beneath the clay layer was saturated and represents the uppermost water bearing unit at the Site.

2.4.2 Groundwater Contours

Table 3 summarizes the groundwater elevations measured on September 23, 2010. As shown on Figure 5, overburden groundwater flows toward the southwest. MW-2 is a downgradient well and MW-4 is an upgradient well for the Site.

2.4.3 Soil Sample Results

Table 4 summarizes the analytical results of soil samples collected during the 2001 Phase II investigation, 2010 soil boring program, and 2013 pre-remedial investigation. Figure 4 shows the soil sample locations.

As indicated on Table 4, surficial (0-0.5') and subsurface (>0.5') soil testing identified several PAHs and five inorganic compounds at levels in excess of the NYSDEC SCOs for restricted-residential use (see Figure 7). The compounds detected above restricted-residential SCOs in at least one samples include: benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3)pyrene, dibenz(a,h)anthracene, arsenic, barium, cadmium, lead, and mercury.

Samples from AOC 1 (TP-6-13; 7-9') and AOC 2 (TP-9-13; 9-12') were tested using the toxic characteristic leaching procedure (TCLP) with the extract analyzed for VOCs via USEPA Method 1311. As indicated on Table 4, no VOCs were detected in the extract from either sample. The negligible total VOCs and absence of leachable VOCs in these AOCs suggest that the elevated PID readings and moderate odors are indicative of weathered petroleum from a historic release.

2.4.4 Groundwater Sample Analytical Results

Table 5 summarizes the analytical results of the groundwater sampling. As indicated, select VOCs and SVOCs were detected in the sample from well MW-2 at concentrations above NYSDEC groundwater quality standards and guidance values (GWQS/GVs). The VOCs and SVOCs detected above these standards include: benzene, ethylbenzene, toluene, and xylenes (BTEX); 1,2,4-trimethylbenzene; isopropylbenzene; benzo(a)anthracene; and naphthalene, all of which are constituents of petroleum products (e.g., gasoline or diesel). No other VOCs or SVOCs exceeded GWQS/GVs. Individual VOC and SVOC concentrations at well MW-2 were less than 100 micrograms per liter (ug/L). The total VOC concentrations from each of the two sampling rounds were 196 and 263 ug/L, well below the 1,000 ug/L threshold typically employed for inactivation of petroleum spill sites. Benzo(a)anthracene and naphthalene are relatively immobile in groundwater (i.e., high octanol-water partition coefficient and low water solubility).

Pesticides were also detected in the groundwater from all four wells. Pesticide exceedances of the GWQS/GVs were reported in wells MW-2, MW-3, and MW-4 for one or more of the following: alpha-BHC, beta-BHC, dieldrin, gamma-chlordane, and heptachlor. Concentrations were all less than 1 ug/L. Higher levels of pesticides were identified in wells MW-4 (upgradient) and MW-3, suggesting groundwater transport onto the Site from an upgradient source. Downgradient well MW-2 had one exceedance (beta-BHC)

of the GWQS/GVs at a concentration of 0.06 ug/L during the September 23, 2010 sampling event. Well MW-1 did not contain any pesticide concentration above the GWQS/GVs.

Groundwater from all four wells contained levels of sodium greater than the GWQS. Groundwater from well MW-4 contained a slight exceedance of manganese (0.315 mg/L) as compared to the GWQS (0.3 mg/L). Sodium and manganese are naturally-occurring minerals. Their presence in the upgradient wells indicates ambient conditions.

2.4.5 Chemicals of Potential Concern

Based on the foregoing, chemicals of potential concern (COPCs) in soil as defined by exceedances of restricted-residential SCOs include the following PAHs: benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3)pyrene, and dibenz(a,h)anthracene. In addition, the following inorganic compounds were detected in at least one sample in excess of the restricted-residential SCOs and are considered COPCs: arsenic, barium, cadmium, lead, and mercury.

Groundwater constituents that were identified above GWQS/GVs but were not otherwise identified in upgradient wells include VOC and SVOC compounds commonly associated with petroleum products (e.g., gasoline or diesel). While groundwater samples from well MW-2 exceeded GWQS/GVs for certain petroleum VOCs and SVOCs, the concentrations present are not indicative of a large release; rather, these results are indicative of residual contamination in *de minimis* quantities. Further, the contaminants are subject to natural degradation due to sorption and biodegradation, and the likely source of VOCs has been removed (i.e., historic USTs). Consequently, the levels of VOCs will continue to naturally degrade over time. In addition, residents in Buffalo are serviced by municipal-supplied public water obtained from Lake Erie; therefore, exposure to contaminants is unlikely as there are no drinking water receptors.

2.5 Conceptual Model

Historical usage of this Site as a manufacturing facility from the 1920s through 2000 included the use of solvents; petroleum products including gasoline (USTs) and hydraulic oil (maintenance lift); paints; and other hazardous materials. Import of non-virgin fill material as well as apparent releases from these manufacturing products/processes resulted in surface

and subsurface soil impacts for SVOCs and inorganic compounds to a depth of approximately 1 to 4 fbgs across the Site, with deeper impacts identified in areas where basements were historically present. The SVOCs and inorganic compounds detected in the soil/fill are isolated to that medium as they are not mobile in groundwater nor are they subject to significant volatilization.

2.6 Fate and Transport of COPCs

The soil and groundwater sample analytical results were incorporated with the physical characterization of the Site to evaluate the fate and transport of COPCs in Site media. The mechanisms by which the COPCs can migrate to other areas or media are outlined below.

2.6.1 Airborne Pathways

Potential migration pathways involving airborne transport of non-volatile COPCs include erosion and transport of soil particles and sorbed chemical constituents in fugitive dust emissions. The VOC compounds in groundwater (primarily BTEX) are not considered a threat to soil vapor migration due to the presence of a clay soils over the uppermost water bearing unit and the low levels of the detections.

2.6.2 Fugitive Dust

The chemicals present in soil/fill at elevated concentrations are considered non-volatile substances that can be released to ambient air as a result of fugitive dust generation caused by wind erosion or physical disturbance of surface soil particles.

2.6.3 Waterborne Pathways

Chemicals in surface soils could be potentially transported via storm water runoff. Due to the relatively insoluble nature of the soil COPCs and presence of clayey soils above the water table, chemical migration via leaching to groundwater from surface soil/fill is not considered a relevant migration pathway.

2.6.4 Groundwater Pathway

Concentrations of VOCs (primarily BTEX) and two SVOC compounds in groundwater do not represent a significant threat to on-site or off-site receptors. The concentrations of the compounds detected are relatively low. The chemical properties (low water solubility and high octanol-water partition coefficient) coupled with the attenuation processes such as sorption and biodegradation makes the groundwater pathway insignificant. Other compounds detected in groundwater (low level pesticides and inorganic compounds) appear to be a result of upgradient off-site conditions or are otherwise ubiquitous.

2.6.5 Surface Water Runoff

Erosion and transport of surface soils and associated sorbed chemicals in surface water runoff is a potential migration pathway as the Site is sloped with sparse vegetation. The Site is surrounded by a combined sanitary/storm water sewer collection system (i.e., Buffalo Sewer Authority [BSA] collection and conveyance system), which provides a mechanism for controlled surface water transport, but will ultimately result in sediment capture in the BSA's grit chambers followed by disposal at a permitted sanitary landfill.

2.6.6 Exposure Pathways

Based on the conceptual model described in the previous section, the potentially complete exposure pathways through which Site contaminants could reach receptors at significant point concentrations include:

- On-site contact with surface and subsurface soil/fill
- Off-site contact from fugitive dust emissions via wind erosion and physical disturbance of surface soil particles and, to a lesser extent, via surface water runoff.

3.0 REMEDY SELECTION

3.1 Remedial Action Objectives

The remedial actions for the 295 Maryland Street Site must satisfy Remedial Action Objectives (RAOs). RAOs are site-specific statements that convey the goals for minimizing substantial risks to public health and the environment and/or addressing specific environmental regulatory requirements. For the Site, appropriate RAOs have been defined as follows:

Soil RAOs

- Prevent inhalation, ingestion, and direct contact with contaminated soil/fill.
- Prevent migration of contaminants that would result in impacted sediment transport or surface water contamination.
- Remove, to the extent feasible, any soils characterized as grossly impacted as defined in 6NYCRR Part 375-1.2(u).

3.2 Alternative Evaluation Criteria

NYSDEC's Environmental Remediation Program calls for remedy evaluation in accordance with DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 4) and set forth in 6NYCRR 375-1.8(f). The guidance provides for remedy evaluation for the nine criteria described below:

1. **Overall protectiveness of public health and the environment.** This criterion is an evaluation of the remedy's ability to protect public health and the environment, assessing how risks posed through each existing or potential pathway of exposure are eliminated, reduced, or controlled through removal, treatment, engineering controls, or institutional controls.
2. **Standards, criteria, and guidance.** Compliance with SCGs addresses whether a remedy will meet applicable environmental laws, regulations, standards, and guidance. Table 6 summarizes the SCGs for the Site.
3. **Long-term effectiveness and permanence**. A program or project that achieves a complete and permanent cleanup of the site is preferred over a program or project that does not do so. This criterion evaluates the long-term effectiveness of the remedy after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: (i) the magnitude of the remaining risks (i.e., will there be any significant threats, exposure

pathways, or risks to the community and environment from the remaining wastes or treated residuals), (ii) the adequacy of the engineering and institutional controls intended to limit the risk, (iii) the reliability of these controls, and (iv) the ability of the remedy to continue to meet RAOs in the future.

4. **Reduction in toxicity, mobility, or volume of contamination through treatment**. A program or project that permanently and significantly reduces the toxicity, mobility, or volume of contamination is to be preferred over a program or project that does not do so. This criterion evaluates the remedy's ability to reduce the toxicity, mobility, or volume of site contamination. Preference is given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the site.
5. **Short-term impacts and effectiveness.** Short-term effectiveness is an evaluation of the potential short-term adverse impacts and risks of the remedy upon the community, the workers, and the environment during construction and/or implementation. This includes a discussion of how the identified adverse impacts and health risks to the community or workers at the site will be controlled, and the effectiveness of the controls. This criterion also includes a discussion of engineering controls that will be used to mitigate short term impacts (i.e., dust control measures), and an estimate of the length of time needed to achieve the remedial objectives.
6. **Implementability.** The implementability criterion evaluates the technical and administrative feasibility of implementing the remedy. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.
7. **Cost-effectiveness, including capital costs and annual site maintenance plan costs**. Capital, operation, maintenance, and monitoring costs are estimated for the remedy and presented on a present worth basis.
8. **Land Use**. This is an evaluation of the current, intended, and reasonably intended future use of the site. In developing and screening remedial alternatives, NYSDEC's Part 375 regulations require that the reasonableness of the anticipated future land be factored into the evaluation. The regulations identify 15 criteria that must be considered. Appendix F presents these criteria and the resultant outcome for the 295 Maryland Site. As indicated, this evaluation supports residential use as the reasonably anticipated future use of the Site, which is consistent with historic use of the neighborhood. Accordingly, remedial alternatives to clean up the Site to restricted-residential end use are identified and evaluated herein.

9. **Community acceptance**. This criterion evaluates the public's comments, concerns, and overall perception of the remedy, and is generally gauged through public comment of the NYSDEC's Decision Document.

3.3 Technology Evaluation

The types of technologies that could be implemented at the Site are limited based on the exposure scenarios and the recalcitrant nature of the inorganic compounds and PAHs to treatment technologies such as soil washing and chemical oxidation. Accordingly, technologies that can be used under these conditions and to address the COCs identified herein are generally limited to excavation and off-site disposal or capping.

3.4 Alternative Evaluation

The Site is intended to be used for residential (apartment) purposes. As such, the alternatives include options to achieve a restricted-residential end use. In addition, the least restricted-use (i.e., unrestricted) scenario is evaluated consistent with the requirements of NYSDEC DER-10. The following alternatives are evaluated relative to the criteria outlined in Section 3.2:

- Unrestricted use SCOs (Track 1)
- Restricted-residential use SCOs (Track 2) with institutional controls (ICs)
- Restricted-residential use using site-specific action levels (Track 4) with IC/ECs

3.4.1 Alternative 1: Remediate to Unrestricted-Use Conditions (Track 1)

Alternative 1 consists of excavation and off-site disposal of all soil/fill that contains chemical constituents at concentrations greater than the 6NYCRR Part 375 unrestricted-use SCOs and/or is considered grossly contaminated media. Achieving Track 1 remediation goals generally obviates the need for IC/ECs; however, under this scenario a groundwater restriction may be required to preclude groundwater use without treatment unless data can be generated to show that groundwater meets Class GA GWQS/GVs following completion of the removal work.

Exceedances of the Part 375 unrestricted-use SCOs were noted in the majority of soil/fill samples collected at the Site, primarily for PAHs and select metals. Due to the highly ubiquitous nature of the constituents observed in Site soil/fill and the extent to which they

exceeded the unrestricted-use SCO values, it is likely that this alternative would require removal of soil/fill materials across the entire Site footprint as well as deeper areas in the AOCs (i.e., in the vicinity of test pits TP-6-13 and TP-9-/TP-13-13) where PID impacts extend into the underlying native soils. Based on these assumptions, Figure 6 illustrates the areas and approximate depths of soil/fill removal that would be expected under this alternative. The volume of impacted soils/fill across the Site that would be excavated, loaded, transported and landfilled is estimated at 10,900 cubic yards (i.e., approximately 17,500 tons).

The excavated soil/fill is assumed be non-hazardous and would therefore be transported to a commercial solid waste disposal facility. Excavated materials would require handling and preparation prior to off-site transportation and disposal. Excavated areas would be backfilled with material meeting the BCP criteria presented in DER-10 and 6NYCRR Part 375 to the design (i.e., redevelopment) subgrade elevations and grades, and all disturbed areas would be restored with topsoil and grass seeding or hardscape.

Overall Protectiveness of Public Health and the Environment – Excavation and off-site disposal to unrestricted-use SCOs would be protective of public health under the intended reuse scenario (i.e., apartments with municipal water service). However, this alternative would permanently use and displace approximately 11,000 cubic yards (CY) of valuable landfill airspace, and would require excavating, transporting, and placing a similar number of CY of clean soil from an off-site borrow source to backfill the excavation, also contributing to significant detrimental off-site environmental issues.

Compliance with SCGs – Excavation and off-site disposal work under this alternative would need to be performed in accordance with applicable, relevant, and appropriate SCGs. Soil excavation activities would necessitate preparation of and adherence to a community air monitoring plan (CAMP) in accordance with Appendices 1A and 1B of DER-10.

Long-Term Effectiveness and Permanence – This alternative would remove all impacted soil/fill and therefore provides long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment – Through removal of all impacted soil/fill, this alternative would permanently

and significantly reduce the toxicity, mobility, and volume of contamination on the Site. However, since this alternative transfers Site soil/fill from one environment to another, an overall reduction of toxicity and volume would not occur, although mobility of soluble constituents would be reduced in the commercial landfill with a liner, leachate collection, and cover system.

Short-Term Impacts and Effectiveness – The principal advantage of a large-scale excavation to achieve unrestricted-use SCOs is reliability of the remedy in the long-term. However, the short-term adverse impacts and risks to the community, workers, and environment during implementation of this alternative are significant. Potential accidents from heavy truck traffic would be expected as the excavation work would require removal of approximately 800 truckloads of soil/fill through narrow residential streets servicing the property and import of a similar number of clean loads from the borrow source. Dust control methods would be required to limit the release of particulates during placement of the backfill soils; however, substantial disruption of the neighboring community would occur due to material transport and deliveries and noise from heavy equipment used to construct the remedy. This action would result in storm water impacts at the borrow source(s) and on-site, and diesel fuel consumption on the order of 6,500 gallons (assuming 65 miles round trip to a local landfill; 8 miles per gallon), with an equal number of gallons likely consumed by excavation and grading equipment and backfill delivery trucks. The USEPA's estimated CO_2 generation rate for diesel engines is approximately 22.2 pounds per gallon of diesel consumed. Accordingly, this alternative would produce over 288,000 pounds of greenhouse gas. The RAOs would be achieved once the soil/fill is removed from the Site (est. 3 months).

Implementability – Certain technical implementability issues would be encountered in construction of this unrestricted-use alternative. These issues may include, but are not limited to: shoring/stabilizing excavation sidewalls to prevent sloughing during excavation; groundwater and/or storm water handling; and traffic coordination for trucks entering and exiting the Site.

Cost-Effectiveness – The remedial costs for implementation of Alternative 1 are estimated at $1.37 million and detailed on Table 7.

Land Use – This alternative is consistent with the reasonably anticipated future use of the Site.

Community Acceptance – Community acceptance will be evaluated based on comments received from the public on the draft Decision Document. However, significant short-term disruption may result in complaints by neighbors during construction.

3.4.2 Alternative 2: Remediate Site to Restricted-Residential SCOs with ICs (Track 2)

This remedial scenario is aimed at removal of soil/fill across the Site such that no materials remain within the upper 15 feet in excess of the restricted-residential use SCOs. Exceedances of the restricted-residential SCOs were commonly found in the surface and near surface (0-4 fbgs) soil/fill materials across much of the Site, excluding the northeastern area of the property (fill materials were encountered in this area of the Site but not sampled and, as such, this area may also contain fill in excess of restricted-residential SCOs). Similar to Alternative 1 deeper soil contamination (grossly contaminated soils from apparent weathered petroleum products) exists to a limited extent in the natural soils proximate to test pits TP-6-13 and TP-9-13/TP-13-13.

Based on the assumption that this alternative would address only the known areas of restricted-residential SCO exceedances and/or grossly impacted soil/fill, Figure 7 illustrates the areas and approximate depths of soil/fill removal that would be expected. The estimated volume of impacted soil/fill across the Site that would be excavated, loaded, transported and landfilled under this alternative is estimated at 7,400 CY (i.e., approximately 11,800 tons). Post-excavation confirmatory sampling would be performed to verify achievement of the restricted-residential SCOs, the absence of nuisance conditions, and low PID readings.

The excavated soil/fill is assumed to be non-hazardous and would therefore be transported to a commercial solid waste disposal facility. Excavated materials would require handling and preparation prior to off-site transportation and disposal. Excavated areas would be backfilled with material meeting the BCP criteria presented in DER-10 and 6NYCRR Part 375 to the design (i.e., redevelopment) subgrade elevations and grades, and all disturbed areas would be restored with topsoil and grass seeding or hardscape.

Because the alternative would not achieve unrestricted use conditions, ICs would be required. Specifically, an Environmental Easement would be prepared and filed limiting Site

use to restricted-residential or a more restrictive end use and precluding the use of on-site groundwater without treatment. A Site Management Plan (SMP) would also be prepared to ensure that the ICs are followed, with annual certifications provided via a Periodic Review Report (PRR). An SMP describes the ICs/ECs, if any, and includes the following components: an IC/EC Plan; Operations and Maintenance (O&M) Plan; and Excavation Work Plan; a Site Monitoring Plan; and a copy of the Environmental Easement.

Overall Protection of Public Health and the Environment – Alternative 2 will achieve removal of soil/fill within the areas exhibiting soil contaminant concentrations in excess of restricted-residential SCOs to a nominal depth of 15 feet. As such Alternative 2 is protective of public health and the environment under the intended reuse scenario, and will successfully achieve the RAOs for the Site.

Compliance with SCGs – Excavation and off-site disposal under this alternative would need to be performed in accordance with applicable, relevant, and appropriate SCGs. Soil excavation activities would necessitate preparation of and adherence to a CAMP in accordance with Appendices 1A and 1B of DER-10.

Long-Term Effectiveness and Permanence – Excavation of the impacted soil/fill will achieve removal of effectively all soil/fill with exceedances of restricted-residential SCOs within the work limits. As such, this alternative provides long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment – Through removal of all soil/fill exceeding the restricted-residential SCOs, this alternative would permanently and significantly reduce the toxicity, mobility, and volume of contamination on the Site. However, since this alternative transfers Site soil/fill from one environment to another, an overall reduction of toxicity and volume would not occur, although mobility of soluble constituents would be reduced in the commercial landfill with a liner, leachate collection, and cover system.

Short-Term Effectiveness – The short-term adverse impacts and risks to the community, workers, and environment during implementation of this alternative are similar

to those discussed for Alternative 1. Alternative 2 is expected to achieve the RAOs for the Site within approximately 2-3 months after initiation of the work.

Implementability – Technical implementability issues expected with this alternative are similar to those under Alternative 1.

Cost – The capital cost of Alternative 2 is estimated at $1.0 million. Annual OM&M costs for annual certifications are estimated to be $2,500. Therefore, the 30-year present worth of the remedial cost to implement Alternative 2 is estimated at $1.05 million. Table 8 provides a breakdown of these remedial costs.

Land Use – This alternative is consistent with the reasonably anticipated future use of the Site.

Community Acceptance – Community acceptance will be evaluated based on comments received from the public on the draft Decision Document. However, significant short-term disruption may result in complaints by neighbors during construction.

3.4.3 Alternative 3: Remediate Site to SSALs and Place Cover (Track 4)

Per 6NYCRR Part 375-3.8(e)(4), Track 4 soil cleanups use site-specific information to identify site-specific SCOs (or site-specific action levels; SSALs) that are protective of public health and the environment under a restricted-use scenario. For Track 4 remedies, restrictions can be placed on the use of the property in the form of IC/ECs if they can be realistically implemented and maintained in a reliable and enforceable manner. For restricted-residential use, the top two feet of all exposed soils that are not otherwise covered by the components of the development of the site (e.g. buildings, pavement) cannot exceed the restricted-residential SCOs. Areas that exceed the restricted-residential SCOs must be covered by material meeting the requirements of the generic soil cleanup table contained in 6NYCRR Part 375-6.7(d) for restricted-residential future Site use.

In determining the SSALs that will be employed under the Track 4 cleanup approach, it is necessary to consider: 1) the need to remediate grossly impacted soil/fill (such as those in the AOCs exhibiting weathered petroleum impact) where feasible per NYSDEC cleanup policy; and 2) the exposure scenario of the construction or maintenance worker who may

need to perform periodic grounds keeping or other subsurface work (e.g., utility repairs) involving work beneath the cover system. Toward that end, Alternative 3 would include:

- Removal and off-site disposal of soil/fill that is characterized by weathered petroleum products (i.e., the AOCs associated with TP-6-13 and TP-9-/TP-13-13 and any other areas of grossly impacted soil/fill that might be encountered during construction).
- Removal and off-site disposal of soil/fill where total PAHs exceed 500 mg/kg (i.e., NYSDEC CP-51 total PAH guidance for non-residential sites; Ref. 5), and removal and off-site disposal of soil/fill where other parameter concentrations exceed Industrial SCOs[1] (see Figure 8).
- Placement of a site-wide soil cover system, including a demarcation layer (e.g., orange plastic netting) and at least two feet of approved cover material in areas not covered by impervious/hardscape materials such as asphalt driveways and parking lots, and concrete slabs or walkways. Hardscape cover outside the building footprint would be a minimum of 6 inches thick.
- Filing of an Environmental Easement limiting site use to restricted residential or more restrictive end uses, precluding the use of on-site groundwater without treatment, and requiring adherence to a Site Management Plan (SMP). The SMP would be prepared to ensure that the ICs are followed and that the ECs (cover system) are maintained, with annual certifications provided via a Periodic Review Report (PRR).

The volume of soil/fill to be excavated, loaded, transported, and landfilled under Alternative 3 is estimated at 2,065 CY (i.e., approximately 3,300 tons).

Overall Protectiveness of Public Health and the Environment – This alternative meets NYSDEC requirements for a Track 4 cleanup under the BCP regulations and is protective of public health and the environment. The RAOs for the Site would be satisfied through the completed and planned remedial activities, including: removal and off-site disposal of soil/fill AOCs; removal and off-site disposal of soil/fill exceeding SSALs; installation of cover systems (soil and imperious) across the Site; and the enforced use of

[1] The Industrial SCOs are deemed protective of human health for outdoor workers who contact soils on a routine basis (twice per week), and are therefore conservative when considered as an initial screening criterion for establishing SSALs under a Track 4 scenario. For PAHs, the alternative Soil Cleanup Level of 500 mg/kg total PAHs for non-residential sites was employed in lieu of individual Industrial SCOs per NYSDEC CP-51 Soil Cleanup Guidance on the premise that the Track 4 cleanup will include institutional controls (Environmental Easement and Site Management Plan).

IC/ECs to prevent potential future exposure and limit the future Site use to restricted-residential applications.

Compliance with SCGs – The remedial activities will need to be performed in accordance with applicable, relevant, and appropriate SCGs. Imported cover material would need to meet backfill quality criteria per DER-10 and 6NYCRR Part 375. Subgrade preparation activities will need to adhere to a CAMP in accordance with Appendices 1A and 1B of DER-10. The remedial actions are expected to be fully protective of public health and the environment once the cover is placed and the easement is filed.

Long-Term Effectiveness and Permanence – Removal of soil/fill AOCs and impacted soil/fill exceeding the SSALs as well as construction of a cover system will mitigate direct contact with soil/fill exceeding applicable SCOs. Periodic inspection and maintenance of the soil cover as well as the hardscape cover (e.g., asphalt roads, concrete walkways, and parking areas, etc.) will be required to assure long-term cover integrity. The SMP will include: an O&M Plan to confirm that ECs, including the cover systems, are operating and being maintained in accordance with the SMP; an Excavation Work Plan to address any impacted soil/fill encountered during post-development maintenance activities; and a Site-wide inspection program to assure that the IC/ECs placed on the Site have not been altered and remain effective. Furthermore, an Environmental Easement for the Site will be filed with Erie County, which will limit the future use of the Site to restricted-residential use, restrict groundwater use, and reference the NYSDEC-approved SMP. As such, this alternative will provide long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment – Removal of soil/fill AOCs and soil/fill exceeding SSALs followed by placement of cover systems will permanently and significantly reduce the toxicity, mobility, and volume of the soil/fill that could potentially be contacted or produce localized areas of environmental impact at the Site. Accordingly, this alternative satisfies this criterion.

Short-Term Effectiveness and Impacts – During intrusive remedial activities, air monitoring will be performed to assure conformance with the CAMP action levels. The potential for chemical exposures and physical injuries will be addressed through safe work practices; proper personal protection equipment (PPE); environmental monitoring;

establishment of work zones and Site control; and appropriate decontamination procedures. Excavation of the soil/fill AOCs is expected to be completed within a 2-week period, thereby limiting short-term adverse effects. This alternative will achieve the RAOs for the Site once the cover system is in place and the Environmental Easement is filed.

Implementability – No significant technical or administrative implementability issues are associated with this alternative.

Cost-Effectiveness – The estimated capital cost for Alternative 3 is $370,000 including: soil/fill removal; construction of a 2-foot soil cover system in landscaped areas; development and filing of an Environmental Easement; and preparation of an FER and SMP. Annual OM&M costs for cover maintenance and annual certifications are estimated to be $3,000. Therefore, the 30-year present worth of the remedial cost to implement Alternative 3 is estimated at $432,000. Table 9 provides a breakdown of these remedial costs.

Land Use – Based on the land use evaluation presented in Appendix F, reuse of the Site in a restricted-residential capacity is consistent with past and current development and zoning on-site and within the vicinity of the Site, and does not pose additional environmental or public health risks.

Community Acceptance – Community acceptance will be evaluated based on comments received from the public on the draft Decision Document.

3.4.4 Alternative 3A: Remediate Site to SSALs (Additional Soil/Fill Removal) and Place Cover (Track 4)

Alternative 3A is similar to Alternative 3; however, under this alternative the volume of soil/fill to be excavated prior to cover placement would be expanded to improve the quality of the remaining soil/fill and further reduce the risk from exposure to residual concentrations in the event of cover system failure or breach. Specifically this alternative would involve:

- Removal and off-site disposal of an estimated 2,065 CY (same area and criteria as Alternative 3) with the addition of the following areas (see Figure 9):
  - Soil/fill surrounding TP-25-13, where elevated mercury concentrations were identified in the composite sample from 0.5-4 fbgs. It is suspected that the

elevated concentration is associated with shallow fill materials. Excavation in this area will proceed with a goal of achieving commercial SCOs[2] or better for mercury.

- Soil/fill surrounding TP-7, where elevated lead and barium levels were identified in the composite sample from 0.5-4 fbgs. It is suspected that the elevated concentrations are associated with shallow fill materials. Excavation in this area will proceed with a goal of achieving commercial SCOs or better for lead and barium.
- Soil/fill surrounding TP-10, where elevated PAH levels were identified primarily in the composite sample from 0-0.5 fbgs. Although total PAHs were reported below the CP-51 level of 500 mg/kg, this area represents an outlier with respect to other soil/fill that will remain under the Track 4 approach. Accordingly, excavation in this area will proceed with a goal of achieving total PAHs less than 100 mg/kg consistent with other ubiquitous soil/fill on-site.

- Placement of a site-wide soil cover system, including a demarcation layer (e.g., orange plastic netting) and at least two feet of approved cover material in areas not covered by impervious/hardscape materials such as asphalt driveways and parking lots, and concrete slabs or walkways. Hardscape cover outside the building footprint will be a minimum of 6 inches thick.

- Filing of an Environmental Easement: limiting Site use to restricted-residential or a more restrictive end use; precluding the use of on-site groundwater without treatment; and requiring adherence to an SMP. The SMP would be prepared to ensure that the ICs are followed and that the ECs (cover system) are maintained, with annual certifications provided via a PRR.

The volume of soil/fill to be excavated, loaded, transported, and landfilled under this Alternative is estimated at 2,200 CY (3,520 tons).

Overall Protectiveness of Public Health and the Environment – This alternative meets NYSDEC requirements for a Track 4 cleanup under the BCP regulations and is protective of public health and the environment. The RAOs for the Site would be satisfied through the completed and planned remedial activities, including: removal and off-site disposal of soil/fill AOCs; removal and off-site disposal of soil/fill exceeding the SSALs; installation of cover systems (soil and imperious) across the Site; and the enforced use of

[2] Per the September 2006 NYSDEC/NYSDOH Technical Support Document, Commercial SCOs are protective of dermal, inhalation and ingestion exposures, including those by child receptors, on a routine basis but at a reduced frequency and duration than those under a restricted residential scenario.

IC/ECs to prevent potential future exposure and limit the future Site use to restricted-residential applications.

Compliance with SCGs – The remedial activities will need to be performed in accordance with applicable, relevant, and appropriate SCGs. Imported cover material would need to meet backfill quality criteria per DER-10 and 6NYCRR Part 375. Subgrade preparation activities will need to adhere to a CAMP in accordance with Appendices 1A and 1B of DER-10. The remedial actions are expected to be fully protective of public health and the environment once the cover is placed and the easement is filed.

Long-Term Effectiveness and Permanence – Removal of soil/fill AOCs and impacted soils exceeding the SSALs as well as construction of a cover system will mitigate direct contact with soil/fill exceeding applicable SCOs. Periodic inspection and maintenance of the soil cover as well as the hardscape cover (e.g., asphalt roads, concrete walkways, and parking areas, etc.) will be required to assure long-term cover integrity. The SMP will include: an O&M Plan to confirm that ECs, including the cover systems, are operated and maintained in accordance with the SMP; an Excavation Work Plan to address any impacted soil/fill encountered during post-development maintenance activities; and a Site-wide inspection program to assure that the IC/ECs placed on the Site have not been altered and remain effective. Furthermore, an Environmental Easement for the Site will be filed with Erie County, which will limit the future use of the Site to restricted-residential use, restrict groundwater use, and reference the NYSDEC-approved SMP. As such, this alternative will provide long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment – Removal of soil/fill AOCs and soil/fill exceeding SSALs followed by placement of cover systems will permanently and significantly reduce the toxicity, mobility, and volume of the soil/fill that could potentially be contacted or produce localized areas of environmental impact at the Site. Accordingly, this alternative satisfies this criterion.

Short-Term Effectiveness and Impacts – During intrusive remedial activities air monitoring will be performed to assure conformance with CAMP action levels. The potential for chemical exposures and physical injuries will be addressed through safe work practices; proper PPE; environmental monitoring; establishment of work zones and Site

control; and appropriate decontamination procedures. Excavation of the soil/fill AOCs and other areas is expected to be completed within a 2-week period, thereby limiting short-term adverse effects. This alternative will achieve the RAOs for the Site once the cover system is in place and the Environmental Easement is filed.

Implementability – No significant technical or administrative implementability issues are associated with this alternative.

Cost-Effectiveness – The estimated capital cost for Alternative 3A is $393,000 including: soil/fill removal; construction of a 2-foot soil cover system in landscaped areas; development and filing of an Environmental Easement; and preparation of an FER and SMP. Annual OM&M costs for cover maintenance and annual certifications are estimated to be $3,000. Therefore, the 30-year present worth of the remedial cost to implement Alternative 3A is estimated at $455,000. Table 10 provides a breakdown of these remedial costs.

Land Use – Based on the land use evaluation presented in Appendix F, reuse of the Site in a restricted-residential capacity is consistent with past and current development and zoning on-site and within the vicinity of the Site, and does not pose additional environmental or public health risks.

Community Acceptance – Community acceptance will be evaluated based on comments received from the public on the draft Decision Document.

3.4.5 Comparison of Remedial Alternatives

The remedial alternatives evaluated above are compared below using the same screening criteria.

Overall Protectiveness of Public Health and the Environment – Each of the alternatives is protective of public health and the environment. Alternatives 2, 3, and 3A require ICs (environmental easements) to assure protection of site users; Alternatives 3 and 3A also require ECs (cover systems) to prevent exposures to soil/fill above the restricted-residential SSALs. Alternative 3A would yield lower residual concentrations beneath the cover than Alternative 3, which would reduce short-term risks due to cover system failure.

Compliance with SCGs – Each of the alternatives will need to be performed in accordance with applicable, relevant, and appropriate SCGs. Imported subgrade backfill under each alternative as well as imported cover material under Alternatives 3 and 3A would need to meet import quality criteria per DER-10 and 6NYCRR Part 375. Subgrade preparation activities under all of the alternatives will need to adhere to a CAMP in accordance with Appendices 1A and 1B of DER-10.

Long-Term Effectiveness and Permanence – Each of the alternatives provides long-term remedy effectiveness and permanence. Alternatives 2, 3, and 3A require development and continued enforcement of ICs (environmental easements) to assure continuing effectiveness and permanence, and Alternatives 3 and 3A also require continued maintenance of the cover systems.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment – Removal of soil/fill exceeding SCOs and/or SSALs will permanently and significantly reduce the toxicity, mobility, and volume of the soil/fill that could potentially be contacted or produce localized areas of environmental impact at the Site; however, each of the alternatives relies on off-site disposal resulting in no overall reduction of toxicity or volume.

Short-Term Effectiveness and Impacts – Short-term impacts attributable to dust and organic vapor migration will need to be addressed under each of the alternatives via air monitoring and mitigation in conformance with the CAMP. The potential for chemical exposures and physical injuries under each alternative will be addressed through safe work practices; proper PPE; environmental monitoring; establishment of work zones and Site control; and appropriate decontamination procedures. Potential significant short-term disruption of the neighborhood due to noise and traffic issues is associated with Alternatives 1 and 2. Alternatives 3 and 3A would be less disruptive as they will be completed over a shorter time period.

Implementability – No significant technical or administrative implementability issues are associated with Alternatives 3 or 3A. Technical implementability issues associated with Alternatives 1 and 2 may include, but are not limited to: additional work to shore/stabilize excavation sidewalls to prevent sloughing during excavation; groundwater

and/or storm water handling; and traffic coordination for trucks entering and exiting the Site.

Cost-Effectiveness – The estimated 30-year present worth cost for Alternatives 1, 2, 3, and 3A are $1.37 million; $1.05 million; $432,000, and $455,000.

Land Use – Each of the alternatives proposes Site use in a restricted-residential capacity consistent with past and current development and zoning on-site and within the vicinity of the Site.

Community Acceptance – Community acceptance of the selected alternative will be evaluated based on comments received from the public on the draft Decision Document.

3.4.6 Recommended Remedial Alternative

The recommended remedial approach for the Site is *Alternative 3A: Restricted-Use (Track 4) Cleanup* because it is: fully protective of public health and the environment; significantly less disruptive to the community than Alternatives 1 and 2; consistent with current and future land use; and a more cost-effective approach than Alternatives 1 or 2 while fully satisfying the RAOs for the Site. Although Alternative 3A requires a higher capital investment than Alternative 3, it provides greater protection of public health because residual concentrations would be lower, resulting in reduced short-term risk if the cover system fails or is breached. In summary, Alternative 3A involves:

- Excavation and off-site disposal of soil/fill in the areas identified on Figure 9. Post-excavation confirmatory samples would be collected to assure absence of gross impact (elevated PID, visual and/or olfactory evidence of impact), and that residual concentrations of metal COCs fall below commercial SCOs with total PAHs falling below 100 mg/kg consistent with ubiquitous conditions across the site. Excavation would continue as reasonable and warranted to achieve these goals.
- Placement of a vapor barrier (greater than 10-mil) beneath the reinforced concrete floor slab of the apartment building and future buildings to prevent against potential vapor intrusion. Although not required based on current vapor intrusion guidance, this is considered a preventative measure based on elevated PID readings measured in soil/fill and low petroleum VOC levels in one of the monitoring wells. Alternatively, the building may be constructed with a vented

crawl space to allow for utility access only (i.e., not for storage or occupancy), in which case vapor barrier would not be necessary.

- Placement of a cover system across the entire BCP Site. This will be comprised of a demarcation layer and at least two feet of approved soil cover material in landscaped areas, or impervious materials such as asphalt driveways and parking lots, and concrete building foundations, slabs, or walkways in non-vegetated areas. Approved soil cover material will meet NYSDEC DER-10 standards for restricted-residential sites (i.e., lower of Part 375 public health or groundwater protection values for restricted-residential use sites). Hardscape material outside of the building footprint will be at least 6 inches thick.
- Implementation of an SMP that will include:
    - IC/EC Plan describing ECs that: include any physical barrier or method employed to actively or passively contain, stabilize, or monitor contaminants; restrict the movement of contaminants; or eliminate potential exposure pathways to contaminants; and ICs that include restrictions on groundwater use and Site use for restricted-residential purposes.
    - Excavation Work Plan to assure that future intrusive activities and soil/fill handling at the Site are completed in a safe and environmentally responsible manner.
    - Site Monitoring Plan that includes provisions for a Site-wide inspection program to assure that the IC/ECs have not been altered and remain effective.
    - Environmental Easement filed with Erie County.

Section 4.0 is the Remedial Action Work Plan (RAWP) that summarizes the components and details of the proposed remedial action.

4.0 REMEDIAL ACTION WORK PLAN

4.1 Purpose and Scope

This section of the Remedial Action Work Plan (RAWP) describes the excavation and off-site disposal of impacted soil/fill and cover system placement. The primary tasks of the planned remedial work are:

- Testing of the soil/fill to develop a waste profile.
- Excavation of impacted soil/fill across the Site to achieve SSALs.
- Verification sampling on a grid basis to determine residual concentrations and assess the need for additional excavation.
- Off-site transportation and disposal of impacted soil/fill at a permitted solid waste disposal facility. Any additional soil/fill requiring removal to enable a minimum two feet of cover in the "green" areas and allow for hardscape, utilities, or building areas will be subject to off-site transportation and disposal as well.

The RAWP also addresses the following tasks:

- Pre-mobilization
- Health, safety, and community air monitoring procedures
- Dust, storm water, and erosion control measures required for minimizing potential release of soils outside the work zone during construction
- Equipment decontamination requirements
- Remedial action documentation
- Implementation scheduling
- Post-remedial Site Management Plan

4.2 Pre-Mobilization Tasks

4.2.1 Public Information and Outreach

It is expected that the NYSDEC will issue a draft Decision Document for NYSDOH review and public comment. A fact sheet announcing the draft Decision Document will be transmitted to those individuals on the Brownfield Site Contact List, including property owners and residents adjacent to the Site; environmental groups; local

political representatives; and interested regulatory agencies. Furthermore, a copy of the RAWP will be made available for public review at the NYSDEC Region 9 office and the Niagara Branch of the Buffalo and Erie County Public Library, the designated document repository.

4.2.2 Underground Utilities Location

The remediation contractor will contact underground facilities protection organization (Dig Safely New York, UFPO) to locate utility lines within the work area.

4.2.3 Health and Safety Plan Development

A Health and Safety Plan (HASP) will be prepared and enforced by the remediation contractor in accordance with the requirements of 29 CFR 1910.120. The HASP will cover all on-site remedial activities. Benchmark will be responsible for Site control and for the health and safety of its authorized Site workers. For informational purposes, Benchmark's HASP is provided in Appendix G. The remediation contractor will be required to develop a HASP as or more stringent than Benchmark's HASP.

4.2.4 Waste Disposal Characterization

Benchmark and the remediation contractor will coordinate with the Solid Waste Disposal Facility (SWDF) for disposition of the soil/fill to be removed from the Site. Although 295 Maryland, LLC has no knowledge of any hazardous waste disposal on the Site, the soil/fill must be tested to verify that it does not exceed characteristic hazardous waste thresholds. A composite sample(s) will be prepared from representative areas of soil/fill planned for removal by compositing discrete samples of soil/fill at a frequency agreeable to the SWDF. The composite sample(s) will be tested by the Toxic Characteristic Leaching Procedure (TCLP) for the full list of regulated toxicity indicator parameters, as well as ignitability, corrosivity, and total PCBs. For the purposes of the discussion below, the assumption has been made that the impacted soil/fill is non-hazardous. If the soil/fill is determined to be characteristically hazardous, the RAWP will be modified.

4.3 Remedial Activities

4.3.1 Mobilization and Site Preparation

The remediation contractor's field operations at the Site will commence with mobilizing equipment and materials to the Site, and erecting safety fencing and other temporary controls as described below.

4.3.2 Temporary Facilities and Controls

Temporary facilities for use during the remedial work may include a construction field trailer and portable toilets. Temporary controls will be employed for protection against off-site migration of soil and safety hazards during construction, including safety fencing, dust suppression, and erosion control as further described below.

4.3.2.1 Access Controls

Temporary safety construction fencing (i.e., 3-foot high orange plastic or 6-foot chain link) will be placed around the perimeter of the work area(s) to distinguish the work zone and discourage trespassing. The fencing will not be removed until the excavation/ backfilling work is complete.

As a requirement of the BCP, a sign will be placed along Maryland Street to identify the property as a BCP Site.

4.3.2.2 Dust Monitoring and Controls

A CAMP will be implemented during Site excavation work. If community air monitoring indicates the need for dust suppression or if dust is visually observed leaving the Site, the remediation contractor will apply a water spray across the excavation and surrounding areas, and on haul roads as necessary to mitigate airborne dust formation and migration. Potable water will be obtained from either a public hydrant or the on-site water service, if available. Other dust suppression techniques that may be used to supplement the water spray include:

- Hauling materials in properly tarped containers or vehicles
- Restricting vehicle speeds on-site

4.3.2.3 Erosion and Sedimentation Control

Provisions will be made for erosion and sedimentation control at the work perimeter during remediation activities. Erosion and sedimentation controls to be followed during remedial activities include silt fencing, hay baling, mulching, and other measures, as warranted and deemed necessary to mitigate erosion and sedimentation.

4.3.3 Soil/Fill Excavation

Excavation of impacted subsurface soil/fill will proceed methodically across the Site digging progressively from one side of the Site to the other. A track-mounted crawler excavator with a mechanically operated bucket will be used to unearth the soil/fill. Verification samples will be collected to confirm that SSALs have been attained. If active utilities (e.g., electric service) are encountered or anticipated, hand digging will be performed to expose the utility line within the planned excavation horizon (2 feet or deeper if needed) and limit the potential for damage to the utility(s).

Excavated materials will be direct-loaded into dump trucks for off-site disposal at a SWDF. All excavation work will be observed by an experienced Benchmark environmental scientist. If disposal truck scheduling necessitates stockpiling of excavated soil/fill, the stockpiles will be placed on and covered with plastic sheeting during non-working hours.

4.3.4 Post-Excavation Verification Sampling

Post-excavation verification composite samples will be collected from the side walls and bottom of the excavations. Consistent with the requirements of DER-10 (Ref. 4), the following discrete samples are proposed:

- One sample from the sidewall of each excavation at a frequency of one per every 30 feet along the perimeter.
- One sample for each 900 square feet of excavation bottom.

All samples will be analyzed by a NYSDOH ELAP certified analytical laboratory for TCL SVOCs (i.e., to quantify PAHs) by USEPA Method 8270 and inorganic compounds by Method 6010/7471 for arsenic, barium, cadmium, copper, lead, mercury, silver, and zinc.

Samples will be reported with an equivalent Category B deliverables package to facilitate data evaluation by a third-party validation expert.

Quality assurance (QA) samples will be collected to support the verification sample data evaluation. The QA samples will include a minimum of one matrix spike (MS), one matrix spike duplicate (MSD), and one blind duplicate per 20 verification samples. Dedicated equipment will be used to avoid the need for equipment blanks.

4.3.5 Off-Site Disposal

All sample shipments will be accompanied by a solid waste disposal manifest. Scale receipts will be required to confirm offload at the SWDF and quantify the amount of material removed from the Site.

4.4 Construction of Cover System

4.4.1 Subgrade Preparation

Site grading to design subgrade elevations, and as necessary for underground utility construction, will occur after confirmatory soil samples are received and SSALs are verified. Any excess materials will be disposed off-site at a permitted SWDF. Following sub-grade preparation work, all equipment will be cleaned free of any soil clods, mud, or clinging debris prior to removal from the Site or use in cover placement activities.

4.4.2 Demarcation Layer

A demarcation layer will be placed in designated green space areas following grading of the Site and prior to import of the soil cover system material. Demarcation will be constructed and placed so as to easily identify the existing Site sub-grade from the cover system material, and prevent the potential for inadvertent removal of sub-grade material during potential future Site work. The demarcation material will be comprised of an orange ¾-inch plastic industrial netting material that will be rolled across the sub-grade and overlapped by approximately one foot at the seams.

4.4.3 Cover System Placement

Construction of the cover system will follow re-grading activities and placement of the demarcation layer. The apartment building and other hardscape construction (parking, sidewalk, driveway, etc., minimum 6" thickness) in addition to the 2-foot soil layer across the remainder of the Site will encompass the Track 4 cover system. As indicated in Section 3.0, the apartment building will be furnished with passive vapor intrusion controls in the form of either a poly vapor barrier or a vented crawl space.

In areas that will not be covered with buildings or hardscape, the cover system will consist of a minimum 2-foot layer of imported clean cover soil followed by seeding or mulching around plantings. Cover material shall be compacted to mitigate potential for settlement. Cover material depth will be verified by Benchmark through survey or grade stake level measurements. Depth verification measurements will be included in the Final Engineering Report.

4.5 Import Criteria

4.5.1 General

All materials proposed for import onto the Site must be approved by the NYSDEC. The criteria under which off-site material may be used as cover or backfill are presented below.

- **Off-Site Soil:** Off-Site soil may be used as backfill provided that it originates from: 1) an NYSDEC-approved borrow site; or 2) a known source having no evidence of disposal or releases of hazardous substances, hazardous, toxic, radioactive wastes, or petroleum. In both instances the imported soil must be tested and demonstrated to meet the criteria identified in Section 3.4.2 in accordance with Appendix 5 of DER-10. In addition, no off-site materials meeting the definition of a solid waste as defined in 6NYCRR, Part 360-1.2 (a) shall be used as backfill.
- **Other Off-Site Material:** Certain material may be imported as backfill or cover, without chemical testing, provided it contains less than 10% (by weight) material that would pass through a size 80 sieve: 1) Rock or stone, consisting of virgin material from a permitted mine or quarry; 2) steel slag under BUD#555-9-152; 3) Recycled concrete, brick, or asphalt from a NYSDEC-registered or permitted construction and demolition (C&D) debris processing facility (as specified in Section 360-16.1 of 6NYCRR Part 360) that conforms to Section 304 of the New York State Department of Transportation Standard

Specifications Construction and Materials Volume 1 (2002). As stated in Section 360-16.4(b)(2), the facility may only accept recognizable, uncontaminated, non-pulverized C&D debris or C&D debris from other authorized C&D processing facilities. According to Section 360-16.2(c), "uncontaminated" means C&D debris that is not mixed or commingled with other solid waste at the point of generation, processing, or disposal, and that is not contaminated with spills of a petroleum product, hazardous waste, or industrial waste.

4.5.2 Quality Assurance Requirements

All imported soil sources, including general backfill soil and topsoil, will be subject to third-party testing to verify that they meet the QA requirements specified below. The contractor will be required to collect the specified number of samples and submit the samples to an independent, NYSDOH ELAP-certified laboratory for analysis. The NYSDEC will be notified of the sampling and provided an opportunity to observe the sample collection work.

All analyses will be in accordance with USEPA SW-846 methodology. The laboratory data package will be a Category A deliverable; however, the NYSDEC may request, at any time, to upgrade the deliverable to Category B. Each import soil source shall be analyzed for the following parameters as more specifically listed in 6NYCRR Part 375-6:

- VOCs – Method 8260
- SVOCs – Method 8270
- Organochlorine Pesticides and PCBs – Method 8081/8082
- Metals, excluding mercury – Method 6010
- Mercury – Method 7471
- Cyanide – Method 9013

Each import soil source shall be subject to testing in accordance with the following schedule per NYSDEC DER-10 Table 5.4(e)10:

Contaminant:	VOCs	SVOCs, Inorganics & PCBs/Pesticides	
Soil Quantity (cubic yards)	**Discrete Samples**	**Composite**	**Discrete Samples/Composite**
0-50	1	1	3-5 discrete samples from different locations in the fill being provided will comprise a composite sample for analysis
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1,000	7	2	
1,000	Add an additional 2 VOC and 1 composite for each additional 1,000 cubic yards or consult with DER		

Grab samples collected via En-Core® sampling technique will be required for VOC analysis. For all other required analyses, a minimum of four grab samples will be collected to form a single composite sample. Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (e.g., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations).

Import criteria are restricted-residential SCOs and protection of groundwater quality SCOs or lesser as published in 6NYCRR Part 375-6.8(b).

4.6 Remedial Activities Support Documents

4.6.1 Community Air Monitoring

Real-time community air monitoring will be performed during remedial activities at the Site in accordance with the CAMP (see Appendix G). Particulate monitoring will be performed along the downwind perimeter of the work area during subgrade excavation, backfilling, grading, and soil/fill handling activities in accordance with the CAMP. The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDOH's Generic CAMP (Appendix 1A of DER-10) and Fugitive Dust and Particulate Monitoring (Appendix 1B of DER-10).

4.7 Health and Safety Protocols

Benchmark has prepared a HASP for use by its employees in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120. The HASP, provided as Appendix G, includes the following site-specific information:

- Hazard assessment
- Training requirements
- Definition of exclusion, contaminant reduction, and other work zones
- Monitoring procedures for Site operations
- Safety procedures
- Personal protective clothing and equipment requirements for various field operations
- Disposal and decontamination procedures

The HASP also includes a contingency plan that addresses potential site-specific emergencies and a CAMP that describes required particulate monitoring to protect the neighboring community during intrusive site remediation activities.

Health and safety activities will be monitored throughout the remedial field activities. A member of the field team will be designated to serve as the Site Safety and Health Officer (SSHO) throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the remedial activities.

4.8 Citizen Participation Activities

NYSDEC will coordinate and lead community relations throughout the course of the project with support from Benchmark as requested. A Citizen Participation (CP) Plan will be prepared by Benchmark and approved by NYSDEC. A copy of the CP Plan will be placed in the Niagara Branch of the Buffalo and Erie County Public Library, the designated project document repository. The NYSDEC, with input from Benchmark, will issue project fact sheets to keep the public informed of remedial activities.

4.9 Reporting

4.9.1 Remedial Activities Reporting

Benchmark will provide full-time on-site inspection to document all remedial action activities. Monitoring and documentation of the remedial action activities will include: daily reports of activities; community air monitoring results; pre- and post-excavation sampling and analysis; and progress photographs and sketches.

4.9.2 Construction Monitoring

Standard daily reporting procedures will include preparation of an Inspector's Daily Report and, when appropriate, problem identification and corrective measures reports. Appendix H contains sample project documentation forms. Information that may be included on the daily report form includes:

- Processes and locations of construction under way
- Equipment and personnel working in the area, including subcontractors
- Number and type of truckloads of soil/fill removed from the Site
- Approximate sampling locations (sketches) or GPS (Trimble) coordinates and sample designations for pre-excavation characterization and post-excavation verification
- Grid locations and depths being excavated

The completed reports will be available on-site and submitted to the NYSDEC as part of the Final Engineering Report. The NYSDEC will be promptly notified of problems requiring modifications to this RAWP prior to proceeding or completion of the construction item.

Photo documentation of the remedial activities will be prepared by a field representative throughout the duration of the project as necessary to convey typical work activities, changed conditions, and/or special circumstances.

4.10 Final Engineering Report

A Final Engineering Report (FER) will be prepared at the conclusion of remedial activities. The FER will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Remediation (Ref. 4):

- Introduction and background
- A Site or area planimetric map showing the parcel(s) remediated, including significant site features
- A Site map showing the lateral limits of any excavations
- Tabular summaries of unit quantities including: volume of soil excavated and disposition of excavated soil
- Planimetric map showing location of all verification and other sampling locations with sample identification labels/codes
- Tabular comparison of verification and other sample analytical results to SCOs. An explanation shall be provided for any results exceeding acceptance criteria
- Documentation on the disposition of impacted soil removed from the Site
- Copies of daily inspection reports and, if applicable, problem identification and corrective measure reports
- Photo documentation of remedial activities
- Text describing the remedial activities performed; a description of any deviations from the RAWP and associated corrective measures taken; and other pertinent information necessary to document that the Site activities were carried out in accordance with this RAWP

In addition, Benchmark will subcontract for third-party data review of post-excavation verification data by a qualified, independent data validation expert. Specifically, a DUSR will be prepared, with appropriate data qualifiers added to the results. The DUSR format will follow the NYSDEC's September 1997 DUSR guidelines and DER-10 guidance (Ref. 4). The DUSR and any necessary qualifications to the data will be appended to the FER.

4.11 Site Management Plan

For any BCP site not cleaned up to NYSDEC Part 375 unrestricted SCOs, preparation of a Site Management Plan (SMP) that describes site-specific IC/ECs is a required component of the final remedy. Therefore, an SMP will be prepared as part of the final remedy for the Site. Consistent with NYSDEC BCP requirements, components of the SMP will include:

- ***Engineering and Institutional Controls Plan.*** Engineering controls include any physical barrier or method employed to actively or passively contain, stabilize, or monitor contaminants; restrict the movement of contaminants; or

eliminate potential exposure pathways to contaminants. Institutional controls at the Site will include groundwater use restrictions and restrictions for use of the Site (i.e., residential or commercial purposes).

- ***Operation and Maintenance Plan*** will not be a requirement of the SMP as there are no systems containing mechanical components that will be operated, monitored, and maintained.
- ***Excavation Work Plan*** to assure that future intrusive activities and soil/fill handling at the Site are completed in a safe and environmentally responsible manner unless the Site has been remediated to unrestricted SCOs.
- ***Site Monitoring Plan*** that includes: provisions for a groundwater monitoring plan and a Site-wide inspection program to assure that the IC/ECs have not been altered and remain effective.
- ***Environmental Easement*** filed with Erie County.

4.12 Project Schedule

The anticipated project schedule for the major tasks to be performed during implementation of the RAWP is as follows:

- *December 2014* – Conduct pre-excavation waste profile sampling
- *Late January 2015* – Initiate remedial excavation fieldwork
- *March-August* 2015 – Construct building and place cover systems
- *August 2015* – Submit SMP
- *September 15, 2015* – Submit FER

5.0 REFERENCES

1. Clayton Group Services, Inc. Excerpts of the January 2000 *Phase I Environmental Site Assessment and Trench Sampling Report of the Lamar Outdoor Advertising Facility, 295 Maryland Street, Buffalo, New York*.
2. Benchmark Environmental Engineering & Science, PLLC. *Phase I Environmental Site Assessment at 295 Maryland Street & 121-129 West Avenue*. 2001.
3. Benchmark Environmental Engineering & Science, PLLC. *Phase II Environmental Site Investigation Report, 295 Maryland Street, Buffalo, NY*. November 2001.
4. New York State Department of Environmental Conservation. *DER-10/Technical Guidance for Site Investigation and Remediation*. May 3, 2010.
5. New York State Department of Environmental Conservation. *CP-51/Soil Cleanup Guidance*. October 21, 2010.

TABLES

TABLE 1
2013 PRE-REMEDIAL INVESTIGATION - TEST PIT FIELD OBSERVATIONS

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Test Pit Number	Basement Present (Y/N)	Basement Depth (ft)	Concrete Slab Present (Y/N)	Fill		Native Soil		Sample Depth	PID Readings
				Depth	Description	Depth	Description		
TP-1-13	Y	4.5'	N	0-4.5'	Brown, moist, lean clay (low plasticity fines) with some cinders and ash, few metal and wood, stiff	4.5-9'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-2-13	Y	5.0'	Y	0-4.0'	Brown and gray, moist, sandy silt (non-plastic fines with some fine to coarse sand) with some fill (brick, concrete, metal pieces, cinders and ash)	4-7.5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-3-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with little fill (cinders, ash, and brick), stiff	4-5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-4-13	N	N	N	0-3.5'	Brown, moist, lean clay (low plasticity fines) with few fill (brick, rocks, and metal pieces)	3.5-6.5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles	0-3'	0
TP-5-13	N	N	N	0-3'	Brown, moist, lean clay (low plasticity fines) with few fill (bricks and ash), stiff	3-4'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles	0-3'	0
TP-6-13	N	N	N	0-5.5'	Brown, moist, lean clay (low plasticity fines) with few fill (brick, concrete and trace ash), stiff	5.5-11'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles, moderate odor	7-9'	0-5.5' = 0 5.5-7' = 400 7-9' = 1000 9-11' = 1300
TP-7-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with few fill (brick and concrete), stiff	3-7'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles	0-3'	0
TP-8-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with some fill (basement rocks, bricks, and ash), stiff	4-5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-9-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with few fill (bricks, concrete and trace metal pieces), stiff	4-14'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles, moderate odor	9-12'	0-4' = 0 4-6' =300 6-11' = 400 11-14' = 500
TP-10-13	N	N	N	0-3.5'	Brown, moist, lean clay (low plasticity fines) with some fill (bricks, concrete, metal pieces, wood pieces, and ash), stiff	3.5-5.5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-11-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with some fill (bricks, concrete, metal pieces, wood pieces, cinders and ash), stiff	4-6'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-12-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with some fill (cinders,ash, bricks, and metal pieces), stiff	4-7'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0

TABLE 1
2013 PRE-REMEDIAL INVESTIGATION - TEST PIT FIELD OBSERVATIONS

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Test Pit Number	Basement Present (Y/N)	Basement Depth (ft)	Concrete Slab Present (Y/N)	Fill		Native Soil		Sample Depth	PID Readings
				Depth	Description	Depth	Description		
TP-13-13	N	N	N	0-3'	Black and gray, moist, sandy gravel with little cinders and ash, moderate odor, loose	3-9'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles, moderate odor from 3 to 7', faint odor from 7 to 9'	8-9'	0-3' = 300 3-7' = 500 7-9' = 25
TP-14-13	N	N	N	0-3'	Brown, moist, lean clay (low plasticity fines) with some fill (bricks, basement rocks, wood pieces, metal pieces), stiff	3-5.5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-15-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with some fill (bricks, wood pieces, metal pieces, trace cinders and ash), stiff	4-5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-16-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with some fill (bricks, wood pieces, metal pieces, trace cinders and ash), stiff	4-5.5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-17-13	Y	6'	Y	0-6'	Bricks and concrete with some lean clay and trace metal, stiff	6-8'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-18-13	Y	6'	Y	0-6'	Brown and black, moist, lean clay (low plasticity fines) with some fill (concrete, bricks, shingles, cinders and ash), stiff	6-8'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-19-13	Y	7'	N	0-7'	Concrete with some cinders, ash, brick and trace metal pieces	7-8.5'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-20-13	N	N	N	0-9+'	Pea stone with little concrete, few lean clay, and trace metal pieces, loose		Not encountered		0
TP-21-13	Y	5.5'	Y	0-5.5'	Brown, moist, lean clay (low plasticity fines) with some fill (concrete, bricks, and trace wood pieces, cinders and ash), stiff	5.5-7'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles		0
TP-22-13	Y	5.5'	Y	0-5.5'	Brown, moist, lean clay (low plasticity fines) with some fill (concrete, bricks, and trace metal pieces), stiff	5.5-8'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles	6-8'	0
TP-23-13	N	N	N	0-1'	Dark brown, moist, lean clay (low plasticity fines) with few fill (bricks and concrete), stiff	1-8'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles	0.5-3'	0-1' = 0 1-5' =1.7 5-8' = 0
TP-24-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with few fill (bricks, concrete and trace ash), stiff	4-8'	Reddish brown, moist, lean clay (medium plasticity fines) with few sub-rounded fine gravel, very stiff, gray mottles	0.5-4'	0
TP-25-13	N	N	N	0-4'	Brown, moist, lean clay (low plasticity fines) with some fill (bricks, concrete, few cinders and ash), stiff			0.5-4'	0

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TABLE 2
2013 PRE-REMEDIAL INVESTIGATION - ANALYTICAL PROGRAM SUMMARY

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Test Pit Number	Depth Sampled/ Screened (fbgs)	Analysis								
		TCL VOCs	TCL BN SVOCs	Select PAHs[1]	PCBs	TAL Metals	Select Metals[2]	Pesticides	Herbicides	TCLP VOCs
TP-4-13	0-3'	X	X		X	X		X	X	
TP-5-13	0-3'	X	X		X	X		X	X	
TP-6-13	7-9'	X	X							X
TP-7-13	0-3'			X	X		X			
TP-9-13	9-12'	X	X							X
TP-13-13	8-9'	X	X							
TP-22-13	6-8'	X	X		X	X		X	X	
TP-23-13	0.5-3'			X	X		X			
TP-24-13	0.5-4'			X	X		X			
TP-25-13	0.5-4'			X	X		X			

Notes:

1. Includes benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3)pyrene.
2. Includes arsenic, barium, cadmium, copper, lead, mercury, silver, and zinc.

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TABLE 3
SUMMARY OF SEPTEMBER 2010 GROUNDWATER ELEVATIONS

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

			18-Sep-10		23-Sep-10	
Monitoring Location	**Grade**	**Top of PVC Riser Elev.**	**Water Level from Top of Riser**	**Groundwater Elevation**	**Water Level from Top of Riser**	**Groundwater Elevation**
MW-1	492.4	491.78	7.94	483.84	8.09	483.69
MW-2	493.4	495.85	14.78	481.07	15.00	480.85
MW-3	497.2	499.49	15.08	484.41	15.25	484.24
MW-4	497.5	499.83	14.07	485.76	14.46	485.37

Notes:

1. All wells were surveyed on 10/12/10 with site specific datum of 500 feet.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 4
SUMMARY OF SOIL/FILL ANALYTICAL RESULTS

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Parameter	Part 375 SCOs					2001 Test Pit Investigation																					2010 Boring Program		2013 Pre-Remedial Investigation									
	USCO	RSCO	RRSCO	CSCO	ISCO	TP-1 0-0.5'	TP-1 0.5-8'	TP-2 0-0.5'	TP-2 0.5-8'	TP-3 0-0.5'	TP-3 0.5-8'	TP-4 0-0.5'	TP-4 0.5-8'	TP-5 0-0.5'	TP-5 0.5-8'	TP-6 0-0.5'	TP-6 0.5-8'	TP-7 0-0.5'	TP-7 0.5-5.5'	TP-8 0-0.5'	TP-8 0.5-8'	TP-9 0-0.5'	TP-9 0.5-8'	TP-10 0-0.5'	TP-10 0.5-8'	EM-6 Composite	MW-3 4-6'	SB-5 0-2'	TP-4-13 0-3'	TP-5-13 0-3'	TP-6-13 7-9'	TP-7-13 0-3'	TP-9-13 9-12'	TP-13-13 8-9'	TP-22-13 6-8'	TP-23-13 0.5-3'	TP-24-13 0.5-4'	TP-25-13 0.5-4'
Volatile Organic Compounds (µg/kg)																																						
Benzene	60	2900	4800	44,000	89,000	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	0.8	NA	--	NA	--	3	--	--	--	--	--	NA	--	--	--	NA	NA	NA
Acetone	50	100,000	100,000	500,000	1,000,000	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	--	--	--	--	--	--	NA	--	32	--	NA	NA	NA
2-butanone	None	None	None	None	None	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	--	--	--	--	--	--	NA	--	3 J	--	NA	NA	NA
Ethylbenzene	1,000	30,000	41,000	390,000	780,000	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	--	--	--	--	--	--	NA	62	--	--	NA	NA	NA
Bromomethane	None	None	None	None	None	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	--	--	--	--	--	--	NA	97 J	--	--	NA	NA	NA
p/m-xylene	260	100,000	100,000	500,000	1,000,000	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	--	--	--	--	--	--	NA	92 J	--	--	NA	NA	NA
Isopropylbenzene	None	None	None	None	None	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	--	--	--	--	--	--	NA	46 J	1.3	--	NA	NA	NA
Methylene chloride	50	5,100	100,000	500,000	1,000,000	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	NA	--	--	7.9	3.5	--	--	--	NA	--	--	--	NA	NA	NA
TCLP Volatile Organic Compounds (µg/L)																																						
No Compounds Detected	None	None	None	None	None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	NA	--	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds (µg/kg)																																						
2-Methylnaphthalene	None	None	None	None	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	69	--	--	--	--	--	--	--	18,000	--	--	NA	NA	NA
Acenaphthene	20,000	100,000	100,000	500,000	1,000,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	250	--	--	--	--	--	--	--	3,000	240	--	NA	NA	NA
Anthracene	100,000	100,000	100,000	500,000	1,000,000	--	--	--	--	220	--	2,100	--	330	--	280	98	200	--	440	200	2,500	280	4,700	930	--	--	20	80 J	58 J	--	62 J	960	--	--	--	--	4,000
Benzo(a)anthracene	1,000	1,000	1,000	5,600	11,000	150	--	85	--	840	--	4,900	110	1,200	--	1,800	290	1,700	290	2,000	900	8,700	760	17,000	2,000	2,700	--	73	320	240	--	220	100 J	--	64 J	52 J	--	4,800
Benzo(a)pyrene	1,000	1,000	1,000	1,000	1,100	110	--	--	--	750	--	3,600	--	1,200	--	2,100	250	3,000	370	2,000	900	7,100	670	13,000	1,600	--	--	59	300	260	--	200	--	--	53 J	57 J	--	3,400
Benzo(b)fluoranthene	1,000	1,000	1,000	5,600	11,000	--	--	--	--	1,100	--	5,100	--	1,800	--	3,000	360	3,900	350	3,000	1,300	9,900	1,000	19,000	2,600	--	--	84	350	270	--	250	54 J	--	65 J	77 J	--	4,300
Benzo(g,h,i)perylene	100,000	100,000	100,000	500,000	1,000,000	--	--	--	--	330	--	1,400	--	770	--	1,800	99	2,700	720	1,300	470	3,300	260	5,700	680	--	--	47	180	170	--	--	--	--	--	NA	NA	NA
Benzo(k)fluoranthene	800	1,000	3,900	56,000	110,000	--	--	--	--	410	--	1,900	--	540	--	900	140	1,200	--	1,100	540	3,800	330	8,100	980	--	--	31	180	130	--	120	--	--	66 J	40 J	--	2,000
Biphenyl	None	None	None	None	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2,600	--	--	NA	NA	NA
Bis-2-ethylhexyl phthalate	None	None	None	None	None	--	--	--	--	--	--	--	--	--	--	--	--	250	970	--	--	--	--	--	--	--	--	120	--	--	--	--	--	--	--	NA	NA	NA
Butyl benzyl phthalate	None	None	None	None	None	--	--	--	--	--	--	--	--	--	--	--	--	500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA	NA
Carbazole	None	None	None	None	None	--	--	--	--	--	--	--	--	150	--	--	--	--	--	--	--	--	160	--	400	--	--	--	43 J	--	--	--	120 J	--	--	NA	NA	NA
Chrysene	1,000	1,000	3,900	56,000	110,000	120	--	75	--	710	--	4,100	98	1,100	--	1,600	240	1,700	420	1,700	830	7,400	660	14,000	1,700	2,800	--	77	330	210	--	240	110	--	--	60 J	--	4,200
Dibenzo (a,h) anthracene	330	330	330	560	1,100	--	--	--	--	--	--	--	--	--	--	420	--	610	--	--	--	--	--	--	--	--	--	--	50 J	55 J	--	--	--	--	--	--	--	560
Dibenzofuran	7,000	14,000	59,000	None	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	230	--	--	--	--	--	--	--	1,400	--	--	NA	NA	NA
Di-n-octyl phthalate	None	None	None	None	None	--	--	--	73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	130	--	--	--	--	--	--	--	--	--	--	NA	NA	NA
Fluoranthene	100,000	100,000	100,000	500,000	1,000,000	230	--	--	--	1,700	--	13,000	240	2,500	--	2,200	570	1,400	320	3,600	2,400	19,000	1,600	38,000	4,800	--	--	150	640	280	37 J	--	700	--	120	NA	NA	NA
Fluorene	30,000	100,000	100,000	500,000	1,000,000	--	--	--	--	--	--	610	--	72	--	61	--	--	--	--	61	--	86	1,200	250	--	--	--	--	--	--	--	2,400	130 J	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	500	500	500	5,600	11,000	--	--	--	--	390	--	1,700	--	830	--	1,800	--	3,000	410	1,300	550	4,300	290	7,000	740	--	--	43	190	180	--	130 J	--	--	--	42 J	--	1,900
Naphthalene	12,000	100,000	100,000	500,000	1,000,000	--	--	--	--	61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	150	--	--	--	--	--	--	--	17,000	--	--	NA	NA	NA
Phenanthrene	100,000	100,000	100,000	500,000	1,000,000	190	--	79	--	980	63	10,000	160	1,500	--	1,200	510	740	250	2,200	1,300	13,000	1,200	25,000	4,000	--	--	100	310	220	--	--	4,800	--	78 J	NA	NA	NA
Pyrene	100,000	100,000	100,000	500,000	1,000,000	230	--	130	--	1,600	110	10,000	190	3,600	--	6,400	530	5,500	1,900	4,800	2,200	18,000	1,500	35,000	4,100	--	--	120	530	260	--	--	580	--	100 J	NA	NA	NA
					TOTAL PAHs	***800***	--	*369*	*0*	***7,330***	*173*	***45,410***	***558***	***12,942***	--	***21,361***	***2,517***	***24,250***	***4,710***	***19,840***	***9,251***	***78,000***	***7,036***	***149,700***	***19,830***	***5,500***	--	***654***	***2,820***	***2,053***	--	***1,222***	***12,004***	*370*	*426*	*328*	--	***25,160***
PCBs (µg/kg)																																						
Total PCBs	100	1,000	1,000	1,000	25,000	--	--	--	--	--	42	12	--	48	--	61	--	57	--	91	--	211	--	765	--	--	--	--	--	--	NA	--	NA	NA	--	--	--	--
PCB 1254	None	None	None	None	None	--	--	--	--	--	42	12	--	48	--	61	--	57	--	91	--	211	--	765	--	--	--	--	--	--	NA	--	NA	NA	--	--	--	--
Pesticides (ug/kg)																																						
4,4'-DDE	3.3	1800	8900	62,000	120,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	4.1	4.66	--	NA	NA	NA	NA	--	NA	NA	NA
4,4'-DDT	3.3	1700	7900	47,000	94,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	4	--	--	NA	NA	NA	NA	--	NA	NA	NA
Inorganic Compounds (mg/kg)																																						
Aluminum	None	None	None	None	None	6,820	9,980	7,760	8,260	7,980	11,000	8,930	7,710	8,450	8,870	5,690	11,100	4,470	4,410	4,490	5,710	6,720	8,240	10,800	7,270	NA	11,600	13,800	8,700	10,000	NA	NA	NA	NA	8,000	NA	NA	NA
Antimony	None	None	None	None	None	--	--	--	--	--	--	--	8.11	--	--	--	--	7.18	--	7.83	--	--	8.45	--	--	NA	--	--	--	--	NA	NA	NA	NA	--	NA	NA	NA
Arsenic	13	16	16	16	16	2.9	3.5	7.8	2.8	7.2	3.3	16	2.4	23	3.1	4.2	5.2	3.1	4.1	4.7	7.8	4.1	7.5	1.1	3.2	NA	4.5	6.4	7	3.9	5	NA	NA	NA	3.5	2.8	4.4	3.4
Barium	350	350	400	400	10,000	97	82.7	90.2	67.4	218	95.5	327	80	516	78.2	213	106	61.8	552	98.8	192	143	150	140	73.5	NA	136	133	140	100	110	NA	NA	NA	72	78	72	69
Beryllium	7	14	72	590	2,700	0.486	0.539	0.646	0.477	0.536	0.676	0.596	0.46	0.601	0.506	0.603	0.628	0.543	0.244	0.493	0.478	0.778	0.508	2.03	0.467	NA	0.562	0.649	0.44	0.5	NA	NA	NA	NA	0.36 J	NA	NA	NA
Cadmium	2.5	2.5	4	9	60	--	0.608	--	0.885	1.29	--	3.17	0.775	4.2	0.673	1.44	0.599	0.872	1.41	0.651	2.26	2.91	1.81	1.87	0.697	NA	--	0.621	0.96	0.9	0.83	NA	NA	NA	0.72 J	0.63	0.6	1.1
Calcium	None	None	None	None	None	43,100	55,300	35,900	66,900	40,700	70,800	59,900	69,100	45,900	67,100	105,000	45,900	161,000	53,500	179,000	83,000	84,900	48,000	94,200	65,400	NA	55,100	13,200	40,000	9,000	NA	NA	NA	NA	67,000	NA	NA	NA
Chromium	30	36	180	1,500	6,800	8.84	11.5	9.08	10.5	65.4	14.4	37.4	11.3	71.6	11.8	17.2	15.3	11	10.7	13.6	13.8	30	18.9	18	11	NA	14.3	19.2	20	15	NA	NA	NA	NA	13	NA	NA	NA
Cobalt	None	None	None	None	None	5.34	7.83	5.61	7.87	7.42	8.85	6.96	7.15	6.91	9.2	3.74	7.64	1.9	5.38	2.9	5.4	5.15	6.45	3.83	6.09	NA	13	11.8	6	6.7	NA	NA	NA	NA	6.3	NA	NA	NA
Copper	50	270	270	270	1,000	23.8	19.3	25.7	18.5	141	39.5	52.3	17.2	52.3	18	28.8	23.3	19.9	33.4	23.2	49.3	35	28	30.7	22.5	NA	19.4	22.7	32	45	20	NA	NA	NA	19	12	18	37
Iron	None	None	None	None	None	11,100	14,600	8,830	14,600	14,500	19,700	15,200	13,000	15,700	15,200	8,850	17,200	6,390	9,990	7,620	14,500	17,300	19,700	11,700	13,000	NA	18,000	23,600	16,000	17,000	NA	NA	NA	NA	16,000	NA	NA	NA
Lead	63	400	400	1,000	3,900	302	55.2	182	34.3	3,610	126	3,270	167	8,160	36.3	632	150	71.4	1,420	176	503	602	344	328	97.6	NA	14.7	85.3	920	130	270	NA	NA	NA	48	17	110	120
Magnesium	None	None	None	None	None	7,170	16,600	9,630	21,100	12,000	22,900	9,830	20,100	12,000	24,500	15,800	17,900	18,200	9,160	13,600	9,960	23,500	16,000	28,500	21,600	NA	20,600	9,340	13,000	4,800	NA	NA	NA	NA	21,000	NA	NA	NA
Manganese	1,600	2,000	2,000	10,000	10,000	274	510	231	451	540	463	413	388	394	498	655	455	376	291	375	365	533	474	1,120	386	NA	648	904	340	520	NA	NA	NA	NA	390	NA	NA	NA
Mercury	0.18	0.81	0.81	3	6	0.31	--	0.3	--	1	0.3	0.94	0.19	1	--	--	0.062	--	--	0.11	0.92	0.35	0.25	--	--	NA	0.0218	0.167	1.3	1.1	0.7	NA	NA	NA	0.08	--	3.7	4
Nickel	30	140	310	310	10,000	11.1	16.7	11.6	17.6	17.8	20.3	16.2	15.2	15.5	18.3	14.8	19	9.55	10.6	9.59	20	15	17.2	14.9	15.1	NA	22	21.6	12	14	NA	NA	NA	NA	14	NA	NA	NA
Potassium	None	None	None	None	None	1120	1570	1320	1250	1250	1770	1410	1360	1370	1690	881	1620	579	803	726	996	983	1350	1030	1310	NA	1820	1910	950	960	NA	NA	NA	NA	1100	NA	NA	NA
Selenium	3.9	36	180	1,500	6,800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	--	--	--	NA	NA	NA	NA	--	NA	NA	NA
Silver	2	36	180	1,500	6,800	--	--	--	--	--	--	--	--	1.19	--	31.8	1.41	9.39	--	6.91	1.26	1.4	--	3.85	--	NA	--	--	--	--	--	NA	NA	NA	--	--	--	--
Sodium	None	None	None	None	None	149	159	1080	258	299	172	255	155	224	218	379	210	233	339	315	306	208	170	446	228	NA	260	--	88 J	140 J	NA	NA	NA	NA	120 J	NA	NA	NA
Thallium	None	None	None	None	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	--	--	--	--	NA	NA	NA	NA	--	NA	NA	NA
Vanadium	None	None	None	None	None	14.9	19.9	20.7	17.7	19.9	26.2	20.1	17.2	19.1	19.5	12.2	22.6	10.2	12.2	8.37	17.1	11.9	18.8	10.3	15.3	NA	21.6	28.5	19	21	NA	NA	NA	NA	18	NA	NA	NA
Zinc	109	2,200	10,000	10,000	10,000	112	78	60.9	63.9	342	102	683	75.8	784	66.7	141	103	80	546	131	885	850	265	661	170	NA	66.5	135	210	140	99	NA	NA	NA	94	71	84	87

Notes:

= Exceeds the Unrestricted SCO (USCO)
= Exceeds the Residential SCO (RSCO)
= Exceeds the Restricted Residential SCO (RRSCO)
= Exceeds the Commercial SCO (CSCO)
= Exceeds the Industrial SCO (ISCO)

Semi-volatile Organic Compounds highlighted in blue are also categorized as Polyaromatic Hydrocarbons (PAHs). A total PAH concentration of 500 ppm was used to delineate the Track 4 cleanup extents in lieu of individual Industrial Restricted SCOs as specified in the CP-51 policy.

Definitions:

TCLP = Toxic characteristic leaching procedure
NA = not analyzed
-- = Not Detected

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 5
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Parameter[1]	Sample ID and Date									GWQS/GV[2]
	MW-1		MW-2		MW-3		MW-4		Blind Dup[3]	
	(9/23/10)	(3/1/11)	(9/23/10)	(3/1/11)[4]	(9/23/10)	(3/1/11)	(9/23/10)	(3/1/11)[4]	(3/1/11)	
Volatile Organic Compounds (µg/L)										
1,2,4-Trimethylbenzene	ND	ND	ND	**19**	ND	ND	ND	ND	ND	**5**
1,3,5-Trimethylbenzene	--	ND	--	1.2	--	ND	--	ND	ND	**5**
Acetone	5	ND	ND	ND	ND	ND	ND	ND	ND	**50**
Benzene	ND	ND	**38**	**20**	ND	ND	ND	ND	ND	**1**
Chloroform	2	ND	4.2	ND	5.4	ND	2.8	ND	ND	**7**
Ethylbenzene	ND	ND	**39**	**46**	ND	ND	ND	ND	ND	**5**
Isopropylbenzene	ND	ND	ND	4.6	ND	ND	ND	ND	ND	**5**
m/p-Xylenes	--	ND	ND	**43**	ND	ND	ND	ND	ND	**5**
Methyl-t-Butyl Ether (MTBE)	ND	ND	ND	2.3	ND	ND	ND	ND	ND	**10**
o-Xylenes	--	ND	--	**35**	ND	ND	ND	ND	ND	**5**
Toluene	ND	ND	**18**	**14**	ND	ND	ND	ND	ND	**5**
Xylenes(Total)	ND	ND	**97**	**78**	ND	ND	ND	ND	ND	**5**
Semi-Volatile Organic Compounds (ug/L)										
2-Methylphenol	ND	--	1.3	--	ND	--	ND	--	--	**5**
Acetophenone	ND	--	2.8	--	1.1	--	ND	--	--	--
Benzo(a)anthracene	ND	--	**0.35**	ND	ND	--	ND	--	--	**0.002**
Butyl benzyl phthalate	0.51	--	0.71	--	0.58	--	0.72	--	--	**50**
Di-n-butyl phthalate	0.51	--	0.65	--	0.55	--	1.1	--	--	**50**
Fluoranthene	ND	--	0.47	ND	ND	--	ND	--	--	**50**
Naphthalene	ND	--	**21**	**92**	ND	--	ND	--	--	**10**
Phenanthrene	ND	--	0.58	ND	0.46	--	ND	--	--	**50**
Pyrene	ND	--	0.42	ND	ND	--	ND	--	--	**50**
Pesticides (ug/L)										
4,4'-DDD	ND	--	ND	--	0.23	0.04 J	0.25	0.036 J	0.022 J	**0.3**
4,4'-DDT	0.082	--	ND	--	ND	0.017 J	0.2	ND	ND	**0.2**
alpha-BHC	ND	--	ND	--	**0.18**	ND	ND	ND	ND	**0.01**
beta-BHC	ND	--	**0.06**	--	**0.13**	ND	**0.21**	ND	ND	**0.04**
Dieldrin	ND	--	ND	--	ND	ND	**0.14**	**0.027 J**	**0.031 J**	**0.004**
Endosulfan I	ND	--	ND	--	ND	ND	0.07	ND	ND	--
Endosulfan II	0.069	--	0.11	--	0.14	ND	0.14	0.016 J	ND	--
Endosulfan sulfate	ND	--	ND	--	ND	ND	0.092	ND	ND	--
Endrin aldehyde	ND	--	ND	--	ND	ND	ND	0.022 J	ND	**5**
gamma-Chlordane	0.036	--	0.041	--	**0.13**	**0.03 J**	**0.15**	ND	ND	**0.05**
Heptachlor	ND	--	ND	--	**0.11**	ND	**0.14**	ND	ND	**0.04**
Heptachlor epoxide	0.018	--	ND	--	ND	ND	ND	ND	ND	**0.03**
Methoxychlor	0.059	--	0.098	--	0.2	ND	0.16	0.024 J	ND	**35**
Inorganic Compounds (mg/L)										
Barium	0.0542	--	0.332	--	0.0985	--	0.0687	--	--	**1**
Calcium	75.6	--	119	--	123	--	150	--	--	--
Magnesium	45.3	--	107	--	98.3	--	151	--	--	--
Manganese	0.0739	--	0.204	--	0.195	--	**0.315**	--	--	**0.3**
Nickel	ND	--	ND	--	0.0159	--	ND	--	--	**0.1**
Potassium	4.5	--	6.41	--	10	--	12.2	--	--	--
Sodium	**25.1**	--	**59.2**	--	**88.8**	--	**34.4**	--	--	**20**

Notes:
1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. NYSDEC Class "GA" Groundwater Quality Standards/Guidance Values (GWQS/GV), 6 NYCRR Part 703.
3. Blind Duplicate collected at monitoring well MW-3.
4. MS/MSD collected at monitoring wells MW-2 and MW-4.

Bold Exceeds the NYSDEC TOGS 1.1.1 Groundwater Quality Standard or Guidance Value

Definitions:
N/A = Not Available
ND = Not Detected
J = Result estimated below the quantitation limit.
"--" = Not analyzed or no GWQS/GV

TABLE 6
SUMMARY OF SITE SPECIFIC STANDARDS, CRITERIA AND GUIDANCE (SCGs)

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

SCGs	Applicability to Site
6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes	YES
DER 10/Technical Guidance for Site Investigation and Remediation (May 3, 2010)	YES
CP-51/Soil Cleanup Guidance (October 21, 2010) NYSDEC Policy	YES
DER 2/Making Changes to Selected Remedies April 1, 2008	Potentially applicable
6 NYCRR Part 375 - Environmental Remediation Programs (December 2006)	YES
6 NYCRR Parts 700-706 - Water Quality Standards	YES
6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife	Not Applicable as no endangered or threatened species of fish or wildlife
6 NYCRR Part 608 - Use and Protection of Waters	YES
6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations	Not Applicable, not in tidal zone.
6 NYCRR Part 663 - Freshwater Wetlands Maps and Classification	Not Applicable, wetlands are not within 1/2 mile of site.
6 NYCRR Part 257 - Air Quality Standards	Potentially applicable
10 NYCRR Part 5 of the State Sanitary Code - Drinking Water Supplies (May 1998)	Not applicable
29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response	Potentially applicable
6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures	Potentially applicable
SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)	YES
TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations	YES
Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)	Not applicable, no receptors or nearby fish or wildlife.
Technical Guidance for Screening Contaminated Sediments (January 1999)	Not applicable, no sediment receptors.
Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorus Wildlife (July 1987)	Not applicable, no receptors or nearby fish or wildlife.
Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)	Not applicable, no receptors or nearby wildlife.
Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants	Potentially applicable
The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh	Not applicable, no receptors or nearby fishing zones.
The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh	Not applicable, no receptors or nearby fishing zones.
Criteria for the Development of Health Advisories for Sportfish Consumption	Not applicable, no receptors or nearby fishing zones.
NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)	Not applicable
NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (Final October 2006)	Not applicable
6 NYCRR Part 376 - Land Disposal Restrictions	YES
19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources	Not applicable, not on waterfront or coast.
TAGM 4051 - Early Design Strategy (August 1993)	Not applicable
CP-43 - Groundwater Monitoring Well Decommissioning Policy (November 2009)	YES
Freshwater Wetlands Regulations - Guidelines on Compensatory Mitigation (October 1993)	Not Applicable, wetlands are not within 1/2 mile of site.
USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)	Not applicable
USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies: Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)	Not applicable
USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)	Not applicable, not a municipal landill.

TABLE 6
SUMMARY OF SITE SPECIFIC STANDARDS, CRITERIA AND GUIDANCE (SCGs)

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

SCGs	Applicability to Site
DER-15 - Presumptive/Proven Remedial Technologies (February 2007)	YES
6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)	Not applicable
6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)	Not applicable
6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)	Not applicable
6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil (November 1998)	Not applicable
40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks	Not applicable
Spill Response Guidance Manual	Not applicable
Permanent Closure of Petroleum Storage Tanks (July 1988)	Not applicable
NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"	Not applicable
40 CFR Part 144 - Underground Injection Control Program	Not applicable
10 NYCRR Part 67 - Lead	Not applicable
12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)	Not applicable
6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)	Potentially applicable
6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators	Potentially applicable
6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)	Potentially applicable
6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)	Potentially applicable
6 NYCRR Part 376 - Land Disposal Restrictions	Potentially applicable
19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources	Not applicable
6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS	Not applicable
TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)	Not applicable
TAGM 4059 - Making Changes To Selected Remedies (May 1998)	Potentially applicable
Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)	YES
TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works	Not applicable
TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites	Not applicable
State Coastal Management Policies	Not applicable
OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)	Potentially applicable
NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"	Not applicable

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 7
COST ESTIMATE FOR UNRESTRICTED USE (TRACK 1) ALTERNATIVE 1

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Item	Quantity	Units	Unit Cost	Total Cost
Impacted Soil/Fill Removal				
Soil/Fill Excavation & Hauling	10900	CY	$ 22.00	$ 239,800
Disposal at TSDF (1.6 tons per CY)	17440	TON	$ 30.00	$ 523,200
Waste Characterization Analytical	10	EA	$ 800.00	$ 8,000
Post-Excavation Confirmatory Sampling	100	EA	$ 400.00	$ 40,000
Subtotal:				**$ 811,000**
Backfill Excavation with Approved Import Material				
Haul, Place & Compact	8175	CY	$ 15.00	$ 122,625
Backfill Characterization and Sampling	10	EA	$ 750.00	$ 7,500
Subtotal:				**$ 130,125**
Excavation Water Handling and Treatment				
Frac tanks, Filtration and GAC System, GAC Changeout	1	LS	$ 20,000.00	$ 20,000
Temporary Discharge Application Permit, Addt. Fee	1	LS	$ 4,000.00	$ 4,000
Excavation Water Analytical Sampling	3	EA	$ 600.00	$ 1,800
Subtotal:				**$ 25,800**
Subtotal Capital Cost				**$ 966,925**
Contractor Mobilization/Demobilization (5%)				$ 48,346
Health and Safety (2%)				$ 19,339
Engineering/Contingency (35%)				$ 338,424
Total Cost				**$ 1,373,034**

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 8
COST ESTIMATE FOR RESTRICTED-RESIDENTIAL USE (TRACK 2) ALTERNATIVE 2

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Item	Quantity	Units	Unit Cost	Total Cost
Impacted Soil/Fill Removal				
Soil/Fill Excavation & Hauling	7400	CY	$ 22.00	$ 162,800
Disposal at TSDF (1.6 tons per CY)	11840	TON	$ 30.00	$ 355,200
Waste Characterization Analytical	8	EA	$ 800.00	$ 6,400
Post-Excavation Confirmatory Sampling	100	EA	$ 400.00	$ 40,000
Subtotal:				**$ 564,400**
Backfill Excavation with Approved Import Material				
Haul, Place & Compact	5550	CY	$ 15.00	$ 83,250
Backfill Characterization and Sampling	8	EA	$ 750.00	$ 6,000
Subtotal:				**$ 89,250**
Excavation Water Handling and Treatment				
Frac tanks, Filtration and GAC System, GAC Changeout	1	LS	$ 20,000.00	$ 20,000
Temporary Discharge Application Permit, Addt. Fee	1	LS	$ 4,000.00	$ 4,000
Excavation Water Analytical Sampling	3	EA	$ 600.00	$ 1,800
Subtotal:				**$ 25,800**
Subtotal Capital Cost				**$ 679,450**
Contractor Mobilization/Demobilization (5%)				$ 33,973
Health and Safety (2%)				$ 13,589
Engineering/Contingency (35%)				$ 237,808
Total Capital Cost				**$ 964,819**
Institutional Controls				
Environmental Easement	1	LS	$ 15,000.00	$ 15,000
Site Management Plan	1	LS	$ 20,000.00	$ 20,000
Subtotal:				**$ 35,000**
Annual Operation Maintenance & Monitoring (OM&M):				
Annual Certification	1	Yr	$ 2,500.00	$ 2,500
Total Annual OM&M Cost				**$ 2,500**
Annual Certification OM&M Present Worth (PW):				
Number of Years (n):				30
Interest Rate (I):				3%
p/A value:				19.6
Annual Certification OM&M Present Worth (PW):				**$ 49,000**
Total OM&M Present Worth (PW):				**$ 51,500**
Total Cost				**$ 1,052,000**

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 9
COST ESTIMATE FOR RESTRICTED-RESIDENTIAL USE (TRACK 4) ALTERNATIVE 3

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

Item	Quantity	Units	Unit Cost	Total Cost
Impacted Soil/Fill Removal				
Soil/Fill Excavation & Hauling	2060	CY	$ 22.00	$ 45,320
Disposal at TSDF (1.6 tons per CY)	3296	TON	$ 30.00	$ 98,880
Waste Characterization Analytical	8	EA	$ 800.00	$ 6,400
Post-Excavation Confirmatory Sampling	30	EA	$ 400.00	$ 12,000
Subtotal:				**$ 162,600**
Backfill Excavation with Approved Import Material[1]				
Haul, Place & Compact	0	CY	$ 15.00	$ -
Backfill Characterization and Sampling	0	EA	$ 750.00	$ -
Subtotal:				**$ -**
Excavation Water Handling and Treatment				
Frac tanks, Filtration and GAC System, GAC Changeout	1	LS	$ 20,000.00	$ 20,000
Temporary Discharge Application Permit, Addt. Fee	1	LS	$ 4,000.00	$ 4,000
Excavation Water Analytical Sampling	3	EA	$ 600.00	$ 1,800
Subtotal:				**$ 25,800**
Soil Cover System				
Import and Place 2-ft cover in Greenspace areas	2200	CY	$ 20.00	$ 44,000
Cover Soil Characterization and Sampling	4	EA	$ 750.00	$ 3,000
Subtotal:				**$ 47,000**
Subtotal Capital Cost				**$ 235,400**
Contractor Mobilization/Demobilization (5%)				$ 11,770
Health and Safety (2%)				$ 4,708
Engineering/Contingency (35%)				$ 82,390
Total Capital Cost				**$ 334,268**
Institutional Controls				
Environmental Easement	1	LS	$ 15,000.00	$ 15,000
Site Management Plan	1	LS	$ 20,000.00	$ 20,000
Subtotal:				**$ 35,000**
Annual Operation Maintenance & Monitoring (OM&M):				
Annual Certification	1	Yr	$ 2,500.00	$ 2,500
Non-Routine Cover Maintenance	1	Yr	$ 500.00	$ 500
Total Annual OM&M Cost				**$ 3,000**
Annual Certification OM&M Present Worth (PW):				
Number of Years (n):				30
Interest Rate (I):				3%
p/A value:				19.6
Annual Certification OM&M Present Worth (PW):				**$ 58,800**
Total OM&M Present Worth (PW):				**$ 61,800**
Total Cost				**$ 432,000**

Notes:
1. Backfill not expected to be required based on cut/fill balance for building foundation and utilities

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 10
COST ESTIMATE FOR RESTRICTED-RESIDENTIAL USE (TRACK 4) ALTERNATIVE 3A

Alternatives Analysis Report/Remedial Action Work Plan
295 Maryland Street Site

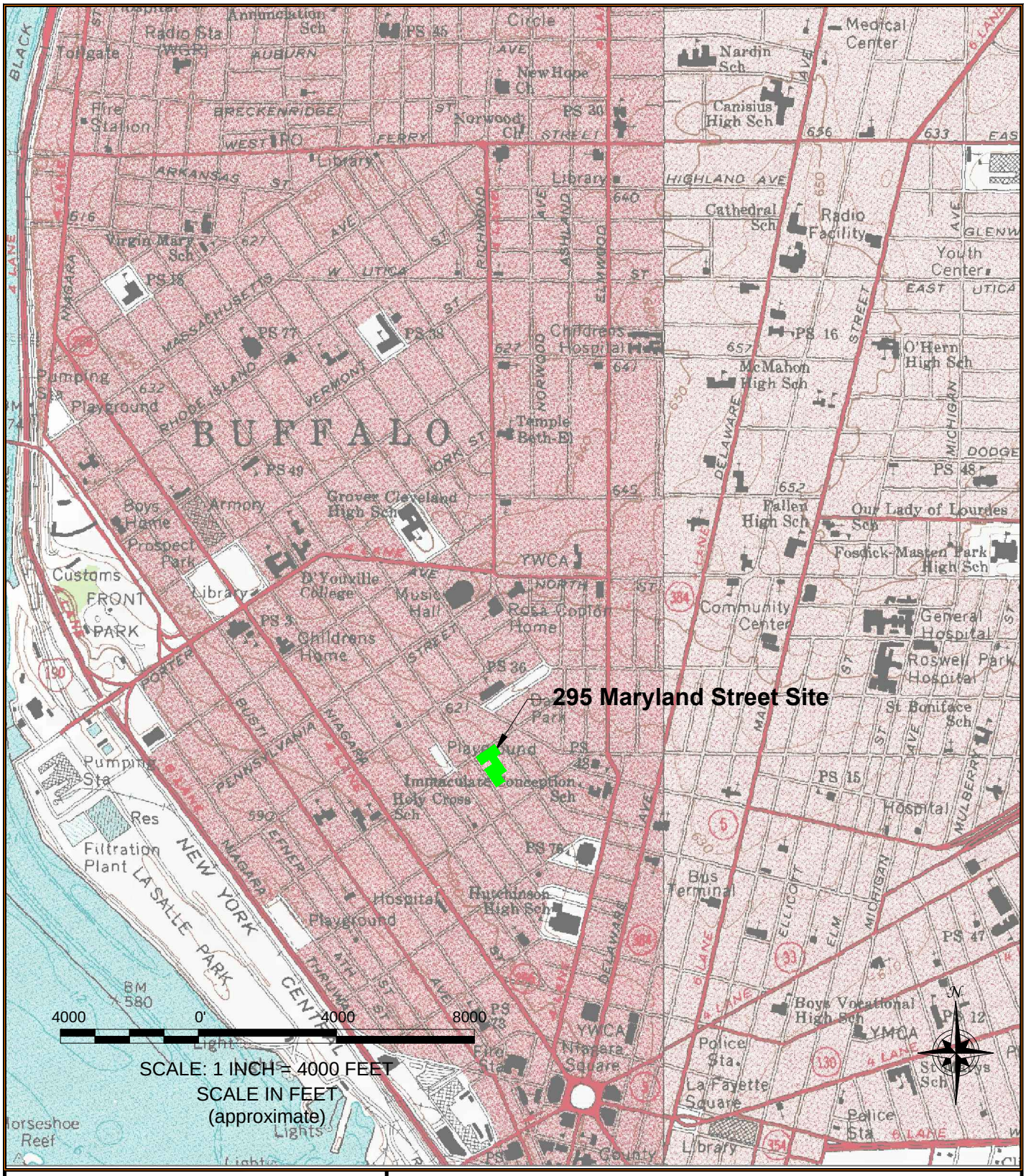
Item	Quantity	Units	Unit Cost	Total Cost
Impacted Soil/Fill Removal				
Soil/Fill Excavation & Hauling	2200	CY	$ 22.00	$ 48,400
Disposal at TSDF (1.6 tons per CY)	3520	TON	$ 30.00	$ 105,600
Waste Characterization Analytical	8	EA	$ 800.00	$ 6,400
Post-Excavation Confirmatory Sampling	46	EA	$ 400.00	$ 18,400
Subtotal:				**$ 178,800**
Backfill Excavation with Approved Import Material[1]				
Haul, Place & Compact	0	CY	$ 20.00	$ -
Backfill Characterization and Sampling	0	EA	$ 750.00	$ -
Subtotal:				**$ -**
Excavation Water Handling and Treatment				
Frac tanks, Filtration and GAC System, GAC Changeout	1	LS	$ 20,000.00	$ 20,000
Temporary Discharge Application Permit, Addt. Fee	1	LS	$ 4,000.00	$ 4,000
Excavation Water Analytical Sampling	3	EA	$ 600.00	$ 1,800
Subtotal:				**$ 25,800**
Soil Cover System				
Import and Place 2-ft cover in Greenspace areas	2200	CY	$ 20.00	$ 44,000
Cover Soil Characterization and Sampling	4	EA	$ 750.00	$ 3,000
Subtotal:				**$ 47,000**
Subtotal Capital Cost				**$ 251,600**
Contractor Mobilization/Demobilization (5%)				$ 12,580
Health and Safety (2%)				$ 5,032
Engineering/Contingency (35%)				$ 88,060
Total Capital Cost				**$ 357,272**
Institutional Controls				
Environmental Easement	1	LS	$ 15,000.00	$ 15,000
Site Management Plan	1	LS	$ 20,000.00	$ 20,000
Subtotal:				**$ 35,000**
Annual Operation Maintenance & Monitoring (OM&M):				
Annual Certification	1	Yr	$ 2,500.00	$ 2,500
Non-Routine Cover Maintenance	1	Yr	$ 500.00	$ 500
Total Annual OM&M Cost				**$ 3,000**
Annual Certification OM&M Present Worth (PW):				
Number of Years (n):				30
Interest Rate (I):				3%
p/A value:				19.6
Annual Certification OM&M Present Worth (PW):				**$ 58,800**
Total OM&M Present Worth (PW):				**$ 61,800**
Total Cost				**$ 455,000**

Notes:
1. Backfill not expected to be required based upon cut/fill balance for building foundation and utilities

FIGURES

F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 1 - Site Location Map.dwg

FIGURE 1



BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0222-012-100

DATE: DECEMBER 2014

DRAFTED BY: RFL

SITE LOCATION AND VICINITY MAP

AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR

295 MARYLAND, LLC

F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 2 - Aerial Map.dwg

FIGURE 2

100 0' 100 200

SCALE: 1 INCH = 100 FEET
SCALE IN FEET
(approximate)

N

LEGEND

PARCEL BOUNDARY

SITE BOUNDARY

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0222-012-100

DATE: DECEMBER 2014

DRAFTED BY: RFL

SITE PLAN (AERIAL)

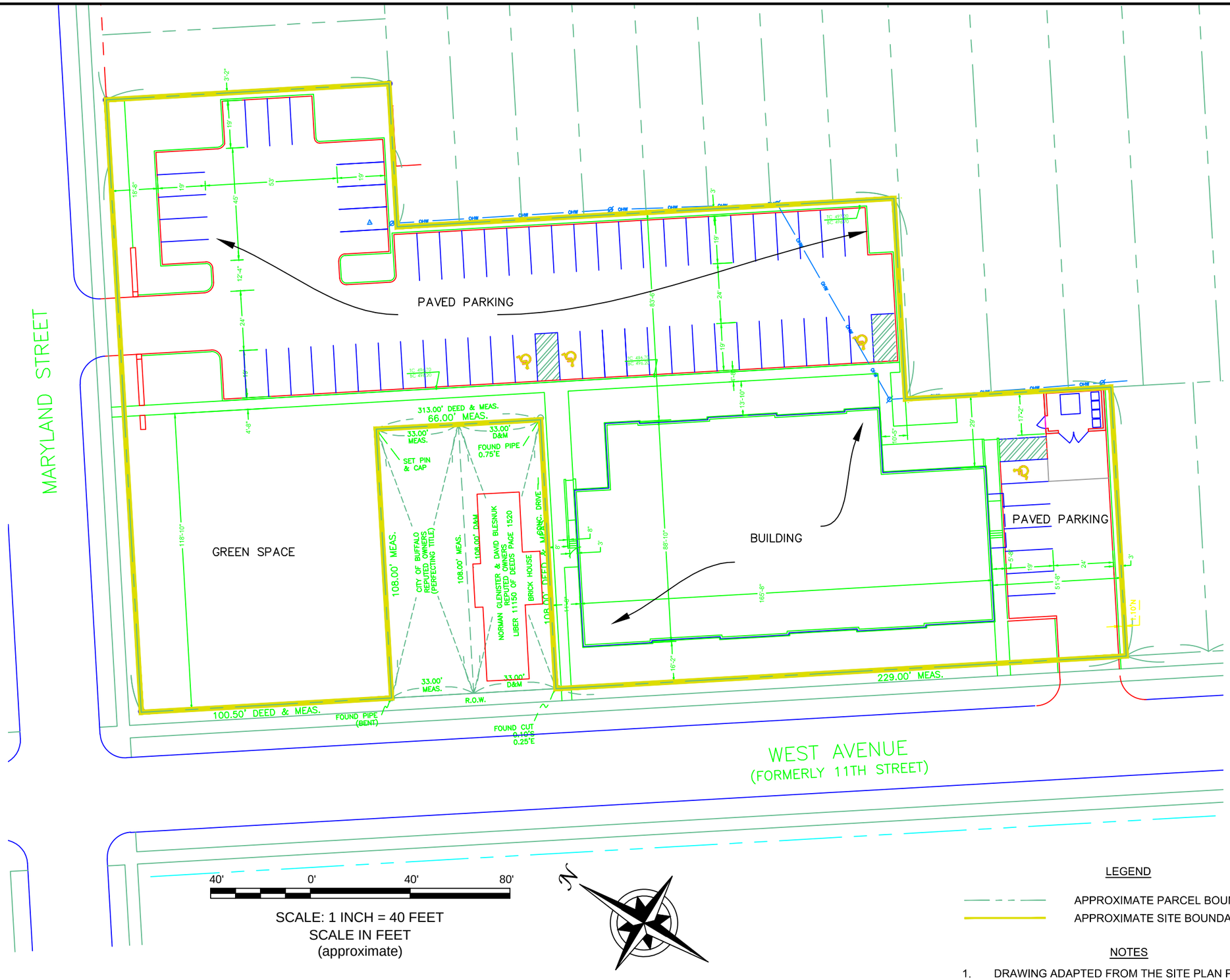
AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR

295 MARYLAND, LLC

F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 3 - Redevelopment Plan.DWG



LEGEND

APPROXIMATE PARCEL BOUNDARY

APPROXIMATE SITE BOUNDARY

NOTES

1. DRAWING ADAPTED FROM THE SITE PLAN PROVIDED BY PROFESSIONAL DRAFTING SERVICE.

DATE: DECEMBER 2014
DRAFTED BY:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0222-012-100

REDEVELOPMENT PLAN

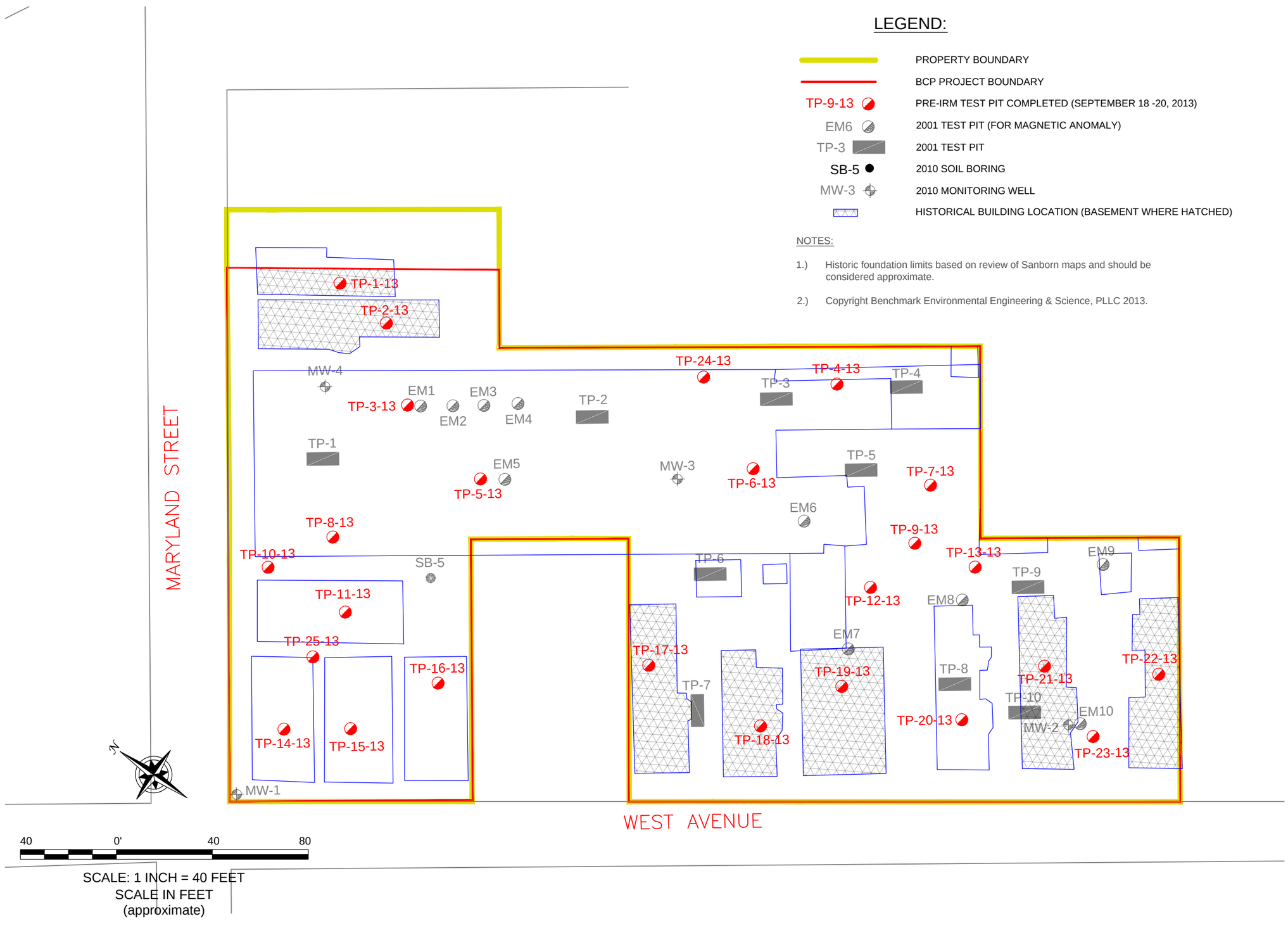
AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR
295 MARYLAND, LLC

FIGURE 3

F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 4 Exploration Location Plan.dwg



SCALE: 1 INCH = 40 FEET
SCALE IN FEET
(approximate)

LEGEND:

	PROPERTY BOUNDARY
	BCP PROJECT BOUNDARY
TP-9-13	PRE-IRM TEST PIT COMPLETED (SEPTEMBER 18 -20, 2013)
EM6	2001 TEST PIT (FOR MAGNETIC ANOMALY)
TP-3	2001 TEST PIT
SB-5	2010 SOIL BORING
MW-3	2010 MONITORING WELL
	HISTORICAL BUILDING LOCATION (BASEMENT WHERE HATCHED)

NOTES:

1.) Historic foundation limits based on review of Sanborn maps and should be considered approximate.

2.) Copyright Benchmark Environmental Engineering & Science, PLLC 2013.

DATE: DECEMBER 2014
DRAFTED BY: RFL

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0222-012-100

EXPLORATION LOCATION PLAN

AAR/RAWP
295 MARYLAND STREET SITE
BUFFALO, NEW YORK

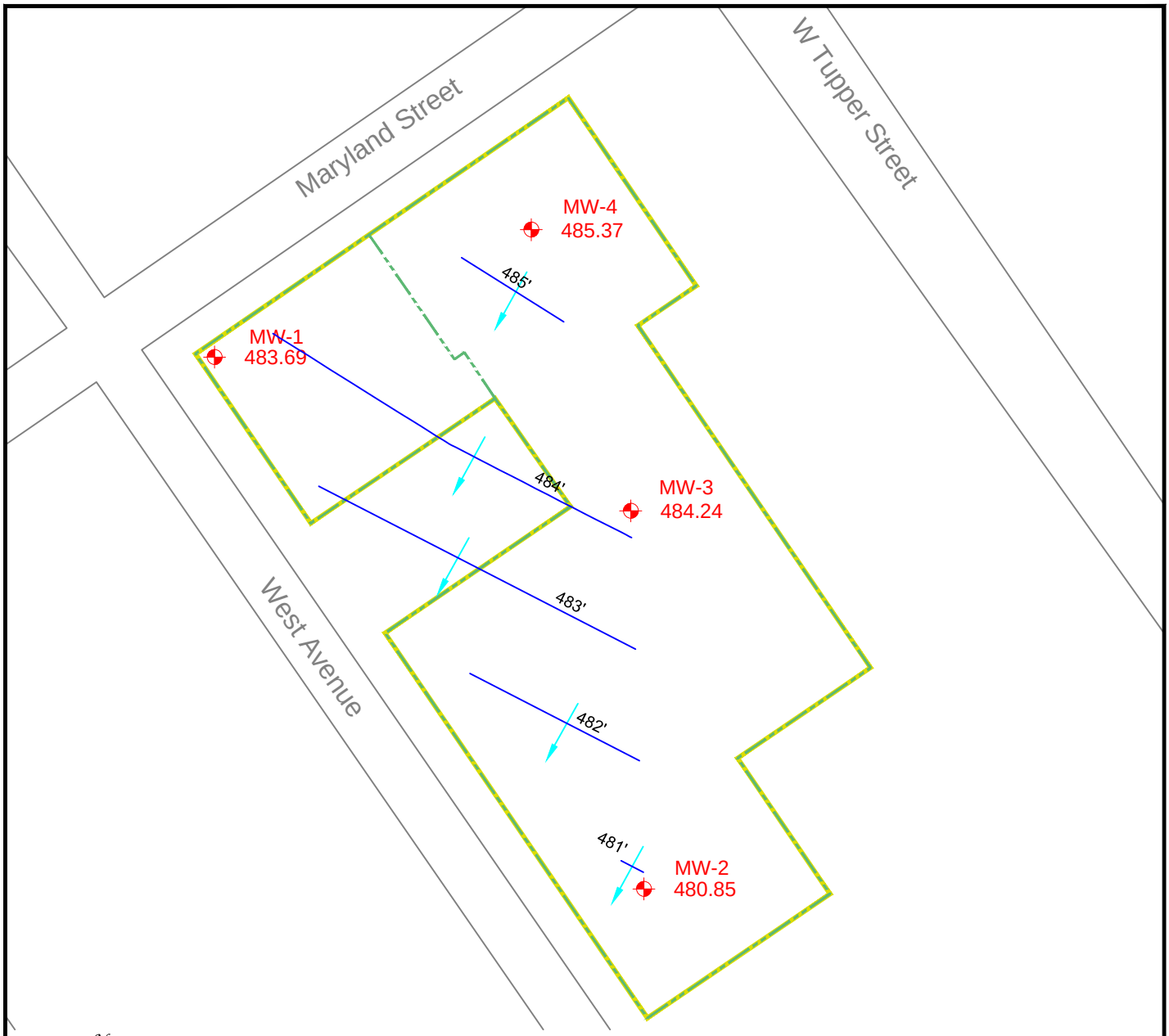
PREPARED FOR
295 MARYLAND LLC

FIGURE 4

DISCLAIMER:
PROPERTY OF BENCHMARK EES, PLLC. IMPORTANT: THIS DRAWING PRINT IS LOANED FOR MUTUAL ASSISTANCE AND AS SUCH IS SUBJECT TO RECALL AT ANY TIME. INFORMATION CONTAINED HEREON IS NOT TO BE DISCLOSED OR REPRODUCED IN ANY FORM FOR THE BENEFIT OF PARTIES OTHER THAN NECESSARY SUBCONTRACTORS & SUPPLIERS WITHOUT THE WRITTEN CONSENT OF BENCHMARK EES, PLLC.

F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 5 - Groundwater Elevation (Sept 2010).dwg

FIGURE 5



N

80' 0' 80' 160'

SCALE: 1 INCH = 80 FEET
SCALE IN FEET
(approximate)

LEGEND

- PARCEL BOUNDARY
- SITE BOUNDARY
- MW-3 484.24 — MONITORING WELL & GROUNDWATER ELEVATION
- 482' — GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

PROJECT NO.: 0222-012-100

DATE: MAY 2011

DRAFTED BY: JCT

GROUNDWATER ISOPOTENTIAL MAP (SEPTEMBER 2010)

AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR
295 MARYLAND, LLC

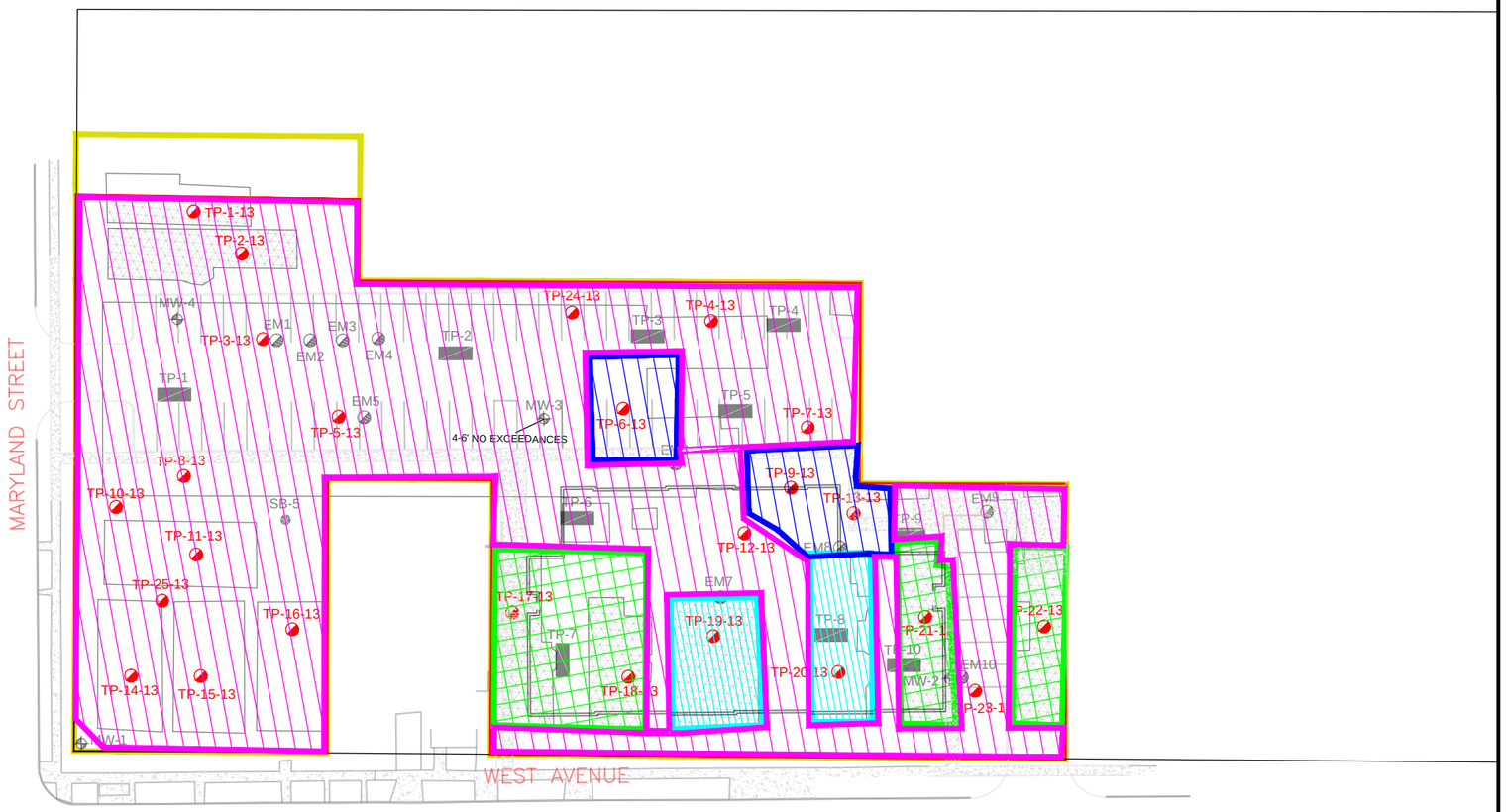
F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 6; TRACK Alt 1 Excavation Extent.dwg

LEGEND:

- PROPERTY BOUNDARY
- BCP PROJECT BOUNDARY
- TP-9-13 — PRE-IRM TEST PIT COMPLETED (SEPTEMBER 18 -20, 2013)
- EM6 — 2001 TEST PIT (FOR MAGNETIC ANOMALY)
- TP-3 — 2001 TEST PIT
- SB-5 — 2010 SOIL BORING
- MW-3 — 2010 MONITORING WELL
- HISTORICAL BUILDING LOCATION (BASEMENT WHERE HATCHED)

ASSUMED EXCAVATION DEPTH (FBGS)

- 4'
- 6'
- 7'
- 15'



NOTES:

1.) Actual excavation limits will be based on observations in the field (PID measurements) and analytical testing. Initial excavation extents will include a five foot off-set from impacted sample locations.

2.) Copyright Benchmark Environmental Engineering & Science, PLLC 2013.

60' 0' 60' 120'

SCALE: 1 INCH = 60 FEET
SCALE IN FEET
(approximate)

N

DATE: DECEMBER 2014
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599

JOB NO.: 0222-012-001

CONCEPTUAL EXCAVATION EXTENTS TRACK 1 ALTERNATE 1

AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR
295 MARYLAND LLC

FIGURE 6

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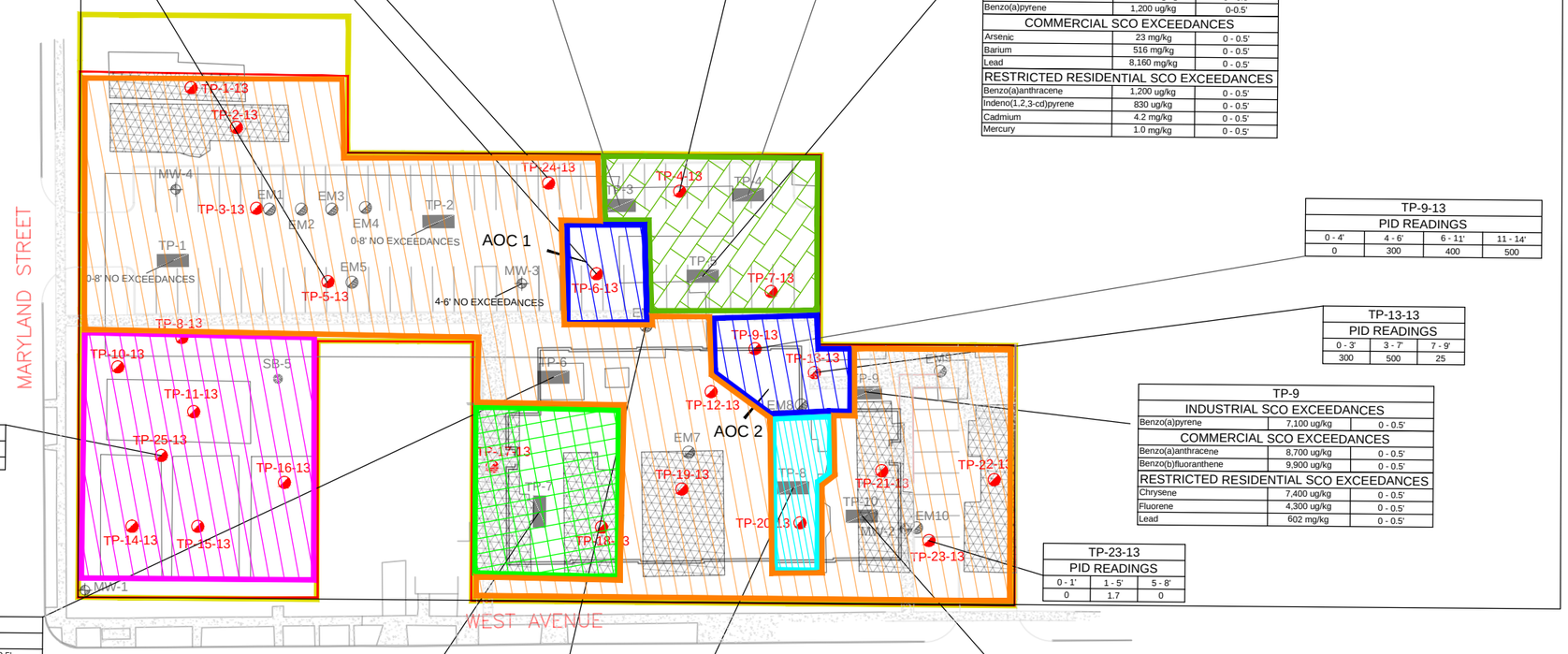
F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 7; 7 Track2 Alt 2 Excavation Extent.dwg

LEGEND:

- PROPERTY BOUNDARY
- BCP PROJECT BOUNDARY
- TP-9-13 — PRE-IRM TEST PIT COMPLETED (SEPTEMBER 18 -20, 2013)
- EM6 — 2001 TEST PIT (FOR MAGNETIC ANOMALY)
- TP-3 — 2001 TEST PIT
- SB-5 — 2010 SOIL BORING
- MW-3 — 2010 MONITORING WELL
- HISTORICAL BUILDING LOCATION (BASEMENT WHERE HATCHED)

ASSUMED EXCAVATION DEPTH (FBGS)

- 1'
- 2'
- 4'
- 5'
- 6'
- 7'
- 15'



TP-24-13		
COMMERCIAL SCO EXCEEDANCES		
Mercury	3.7 mg/kg	0.5 - 4'

TP-4		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	3,600 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Arsenic	16 mg/kg	0 - 0.5'
Lead	3270 mg/kg	0 - 0.5'
RESTRICTED RESIDENTAIL SCO EXCEEDANCES		
Benzo(a)anthracene	4,900 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	5,100 ug/kg	0 - 0.5'
Chrysene	4,100 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	1,700 ug/kg	0 - 0.5'
Mercury	0.94 mg/kg	0 - 0.5'

NOTES:

1.) Actual excavation limits will be based on observations in the field (PID measurements) and analytical testing. Initial excavation extents will include a five foot off-set from impacted sample locations.

2.) Copyright Benchmark Environmental Engineering & Science, PLLC 2013.

TP-6-13			
PID READINGS			
0 - 5.5'	5.5 - 7'	7 - 9'	9 - 11'
0	400	1,000	1,300

TP-4-13		
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Lead	920 mg/kg	0 - 3'
Mercury	1.3 mg/kg	0 - 3'

TP-3		
COMMERCIAL SCO EXCEEDANCES		
Lead	3,610 mg/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(b)fluoranthene	1,100 ug/kg	0 - 0.5'
Mercury	1.0 mg/kg	0 - 0.5'

TP-5-13		
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Mercury	1.1 mg/kg	0 - 3'

TP-5		
INDUSTRIAL SCO EXCEEDANCES		
Arsenic	23 mg/kg	0 - 0.5'
Lead	8,160 mg/kg	0 - 0.5'
Benzo(a)pyrene	1,200 ug/kg	0-0.5'
COMMERCIAL SCO EXCEEDANCES		
Arsenic	23 mg/kg	0 - 0.5'
Barium	516 mg/kg	0 - 0.5'
Lead	8,160 mg/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	1,200 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	830 ug/kg	0 - 0.5'
Cadmium	4.2 mg/kg	0 - 0.5'
Mercury	1.0 mg/kg	0 - 0.5'

TP-9-13			
PID READINGS			
0 - 4'	4 - 6'	6 - 11'	11 - 14'
0	300	400	500

TP-13-13		
PID READINGS		
0 - 3'	3 - 7'	7 - 9'
300	500	25

TP-9		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	7,100 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Benzo(a)anthracene	8,700 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	9,900 ug/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Chrysene	7,400 ug/kg	0 - 0.5'
Fluorene	4,300 ug/kg	0 - 0.5'
Lead	602 mg/kg	0 - 0.5'

TP-25-13		
COMMERCIAL SCO EXCEEDANCES		
Mercury	4 mg/kg	0.5 - 4'

TP-23-13		
PID READINGS		
0 - 1'	1 - 5'	5 - 8'
0	1.7	0

TP-6		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	2,100 ug/kg	0-0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	1,800 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	3,000 ug/kg	0 - 0.5'
Dibenzo(a,h)anthracene	420 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	1,800 ug/kg	0 - 0.5'
Lead	632 mg/kg	0 - 0.5'

TP-7		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	3,000 ug/kg	0-0.5'
COMMERCIAL SCO EXCEEDANCES		
Barium	552 mg/kg	0.5 - 5.5'
Lead	1,420 mg/kg	0.5 - 5.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	1,700 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	3,900 ug/kg	0 - 0.5'
Dibenzo(a,h)anthracene	610 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	3,000 ug/kg	0 - 0.5'

TP-8		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	2,000 ug/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	2,000 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	3,000 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	1,300 ug/kg	0.5 - 8'
Indeno(1,2,3-cd)pyrene	1,300 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	550 ug/kg	0.5 - 8'
Lead	503 mg/kg	0.5 - 8'
Mercury	0.92 mg/kg	0.5 - 8'

TP-10		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)anthracene	17,000 ug/kg	0 - 0.5'
Benzo(a)pyrene	13,000 ug/kg	0 - 0.5'
Benzo(a)pyrene	1,600 ug/kg	0.5 - 8'
Benzo(b)fluoranthene	19,000 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Indeno(1,2,3-cd)pyrene	7,000 ug/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(k)fluoranthene	8,100 ug/kg	0 - 0.5'
Chrysene	14,000 ug/kg	0 - 0.5'
Benzo(a)anthracene	2,000 ug/kg	0.5 - 8'
Benzo(b)fluoranthene	2,600 ug/kg	0.5 - 8'
Indeno(1,2,3-cd)pyrene	740 ug/kg	0.5 - 8'

EM-6		
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	2,700 ug/kg	0 - 6'

60' 0' 60' 120'

SCALE: 1 INCH = 60 FEET
SCALE IN FEET
(approximate)

DATE: DECEMBER 2014
DRAFTED BY: RFL

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
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(716) 856-0599

JOB NO.: 0222-012-001

CONCEPTUAL EXCAVATION EXTENTS TRACK 2 ALTERNATE 2

AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR
295 MARYLAND LLC

FIGURE 7

DISCLAIMER:
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F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 8; Track 4 Alt 3 Excavation Extent.dwg

LEGEND:

- PROPERTY BOUNDARY
- BCP PROJECT BOUNDARY
- TP-9-13 — PRE-IRM TEST PIT COMPLETED (SEPTEMBER 18 -20, 2013)
- EM6 — 2001 TEST PIT (FOR MAGNETIC ANOMALY)
- TP-3 — 2001 TEST PIT
- SB-5 — 2010 SOIL BORING
- MW-3 — 2010 MONITORING WELL
- HISTORICAL BUILDING LOCATION (BASEMENT WHERE HATCHED)

ASSUMED EXCAVATION DEPTH (FBGS)

- 1'
- 15'

TP-24-13		
COMMERCIAL SCO EXCEEDANCES		
Mercury	3.7 mg/kg	0.5 - 4'

TP-4		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	3,600 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Arsenic	16 mg/kg	0 - 0.5'
Lead	3270 mg/kg	0 - 0.5'
RESTRICTED RESIDENTAIL SCO EXCEEDANCES		
Benzo(a)anthracene	4,900 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	5,100 ug/kg	0 - 0.5'
Chrysene	4,100 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	1,700 ug/kg	0 - 0.5'
Mercury	0.94 mg/kg	0 - 0.5'

NOTES:

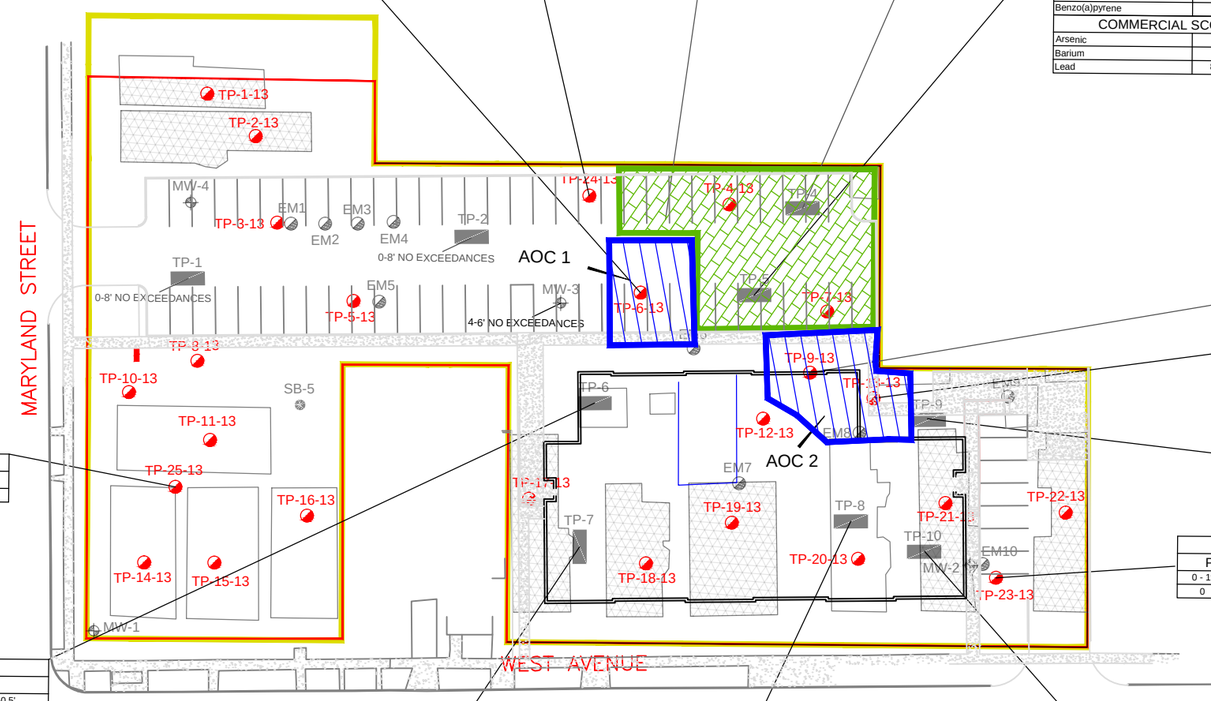
1.) Actual excavation limits will be based on observations in the field (PID measurements) and analytical testing. Initial excavation extents will include a five foot off-set from impacted sample locations.

2.) Copyright Benchmark Environmental Engineering & Science, PLLC 2013.

TP-6-13			
PID READINGS			
0 - 5.5'	5.5 - 7'	7 - 9'	9 - 11'
0	400	1,000	1,300

TP-3		
COMMERCIAL SCO EXCEEDANCES		
Lead	3,610 mg/kg	0 - 0.5'

TP-5		
INDUSTRIAL SCO EXCEEDANCES		
Arsenic	23 mg/kg	0 - 0.5'
Lead	8,160 mg/kg	0 - 0.5'
Benzo(a)pyrene	1,200 ug/kg	0-0.5'
COMMERCIAL SCO EXCEEDANCES		
Arsenic	23 mg/kg	0 - 0.5'
Barium	516 mg/kg	0 - 0.5'
Lead	8,160 mg/kg	0 - 0.5'



TP-9-13			
PID READINGS			
0 - 4'	4 - 6'	6 - 11'	11 - 14'
0	300	400	500

TP-13-13		
PID READINGS		
0 - 3'	3 - 7'	7 - 9'
300	500	25

TP-9		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	7,100 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Benzo(a)anthracene	8,700 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	9,900 ug/kg	0 - 0.5'

TP-23-13		
PID READINGS		
0 - 1'	1 - 5'	5 - 8'
0	1.7	0

TP-25-13		
COMMERCIAL SCO EXCEEDANCES		
Mercury	4 mg/kg	0.5 - 4'

TP-6		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	2,100 ug/kg	0-0.5'

TP-7		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	3,000 ug/kg	0-0.5'
COMMERCIAL SCO EXCEEDANCES		
Barium	552 mg/kg	0.5 - 5.5'
Lead	1,420 mg/kg	0.5 - 5.5'

TP-8		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)Pyrene	2,000 ug/kg	0 - 0.5'

TP-10		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)anthracene	17,000 ug/kg	0 - 0.5'
Benzo(a)pyrene	13,000 ug/kg	0 - 0.5'
Benzo(a)pyrene	1,600 ug/kg	0.5 - 8'
Benzo(b)fluoranthene	19,000 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Indeno(1,2,3-cd)pyrene	7,000 ug/kg	0 - 0.5'

N

60' 0' 60' 120'

SCALE: 1 INCH = 60 FEET
SCALE IN FEET
(approximate)

DATE: DECEMBER 2014
DRAFTED BY: RFL

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(716) 856-0599

JOB NO.: 0222-012-001

CONCEPTUAL EXCAVATION EXTENTS TRACK 4 ALTERNATE 3

AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR
295 MARYLAND LLC

FIGURE 8

DISCLAIMER:
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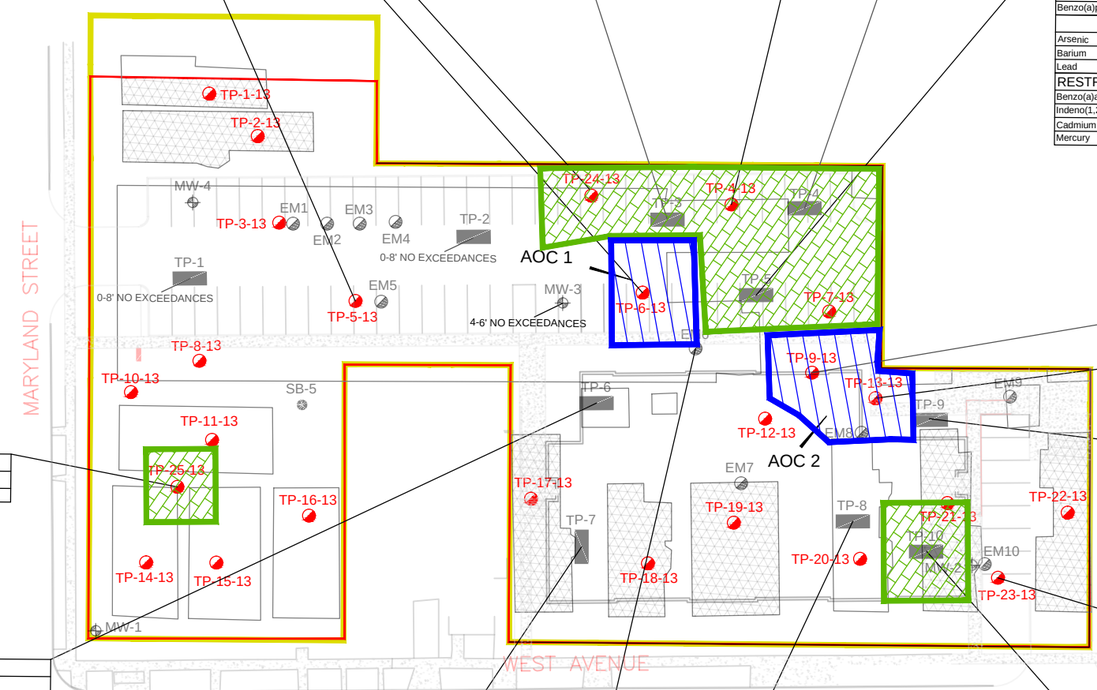
F:\CAD\Benchmark\295 Maryland\2014 IRM\Figure 9 - Track 4 Alt 3A Excavation Extent.dwg

LEGEND:

- PROPERTY BOUNDARY
- BCP PROJECT BOUNDARY
- TP-9-13 — PRE-IRM TEST PIT COMPLETED (SEPTEMBER 18 -20, 2013)
- EM6 — 2001 TEST PIT (FOR MAGNETIC ANOMALY)
- TP-3 — 2001 TEST PIT
- SB-5 — 2010 SOIL BORING
- MW-3 — 2010 MONITORING WELL
- HISTORICAL BUILDING LOCATION (BASEMENT WHERE HATCHED)

ASSUMED EXCAVATION DEPTH (FBGS)

- 1'
- 15'



TP-24-13		
COMMERCIAL SCO EXCEEDANCES		
Mercury	3.7 mg/kg	0.5 - 4'

TP-4		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	3,600 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Arsenic	16 mg/kg	0 - 0.5'
Lead	3270 mg/kg	0 - 0.5'
RESTRICTED RESIDENTAIL SCO EXCEEDANCES		
Benzo(a)anthracene	4,900 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	5,100 ug/kg	0 - 0.5'
Chrysene	4,100 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	1,700 ug/kg	0 - 0.5'
Mercury	0.94 mg/kg	0 - 0.5'

NOTES:

1.) Actual excavation limits will be based on observations in the field (PID measurements) and analytical testing. Initial excavation extents will include a five foot off-set from impacted sample locations.

2.) Copyright Benchmark Environmental Engineering & Science, PLLC 2013.

TP-6-13			
PID READINGS			
0 - 5.5'	5.5 - 7'	7 - 9'	9 - 11'
0	400	1,000	1,300

TP-4-13		
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Lead	920 mg/kg	0 - 3'
Mercury	1.3 mg/kg	0 - 3'

TP-3		
COMMERCIAL SCO EXCEEDANCES		
Lead	3,610 mg/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(b)fluoranthene	1,100 ug/kg	0 - 0.5'
Mercury	1.0 mg/kg	0 - 0.5'

TP-5-13		
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Mercury	1.1 mg/kg	0 - 3'

TP-5		
INDUSTRIAL SCO EXCEEDANCES		
Arsenic	23 mg/kg	0 - 0.5'
Lead	8,160 mg/kg	0 - 0.5'
Benzo(a)pyrene	1,200 ug/kg	0-0.5'
COMMERCIAL SCO EXCEEDANCES		
Arsenic	23 mg/kg	0 - 0.5'
Barium	516 mg/kg	0 - 0.5'
Lead	8,160 mg/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	1,200 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	830 ug/kg	0 - 0.5'
Cadmium	4.2 mg/kg	0 - 0.5'
Mercury	1.0 mg/kg	0 - 0.5'

TP-9-13			
PID READINGS			
0 - 4'	4 - 6'	6 - 11'	11 - 14'
0	300	400	500

TP-13-13		
PID READINGS		
0 - 3'	3 - 7'	7 - 9'
300	500	25

TP-9		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	7,100 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Benzo(a)anthracene	8,700 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	9,900 ug/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Chrysene	7,400 ug/kg	0 - 0.5'
Fluorene	4,300 ug/kg	0 - 0.5'
Lead	602 mg/kg	0 - 0.5'

TP-25-13		
COMMERCIAL SCO EXCEEDANCES		
Mercury	4 mg/kg	0.5 - 4'

TP-23-13		
PID READINGS		
0 - 1'	1 - 5'	5 - 8'
0	1.7	0

TP-6		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	2,100 ug/kg	0-0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	1,800 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	3,000 ug/kg	0 - 0.5'
Dibenzo(a,h)anthracene	420 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	1,800 ug/kg	0 - 0.5'
Lead	632 mg/kg	0 - 0.5'

TP-7		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	3,000 ug/kg	0-0.5'
COMMERCIAL SCO EXCEEDANCES		
Barium	552 mg/kg	0.5 - 5.5'
Lead	1,420 mg/kg	0.5 - 5.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	1,700 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	3,900 ug/kg	0 - 0.5'
Dibenzo(a,h)anthracene	610 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	3,000 ug/kg	0 - 0.5'

TP-8		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)pyrene	2,000 ug/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	2,000 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	3,000 ug/kg	0 - 0.5'
Benzo(b)fluoranthene	1,300 ug/kg	0.5 - 8'
Indeno(1,2,3-cd)pyrene	1,300 ug/kg	0 - 0.5'
Indeno(1,2,3-cd)pyrene	550 ug/kg	0.5 - 8'
Lead	503 mg/kg	0.5 - 8'
Mercury	0.92 mg/kg	0.5 - 8'

EM-6		
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(a)anthracene	2,700 ug/kg	0 - 6'

TP-10		
INDUSTRIAL SCO EXCEEDANCES		
Benzo(a)anthracene	17,000 ug/kg	0 - 0.5'
Benzo(a)pyrene	13,000 ug/kg	0 - 0.5'
Benzo(a)pyrene	1,600 ug/kg	0.5 - 8'
Benzo(b)fluoranthene	19,000 ug/kg	0 - 0.5'
COMMERCIAL SCO EXCEEDANCES		
Indeno(1,2,3-cd)pyrene	7,000 ug/kg	0 - 0.5'
RESTRICTED RESIDENTIAL SCO EXCEEDANCES		
Benzo(k)fluoranthene	8,100 ug/kg	0 - 0.5'
Chrysene	14,000 ug/kg	0 - 0.5'
Benzo(a)anthracene	2,000 ug/kg	0.5 - 8'
Benzo(b)fluoranthene	2,600 ug/kg	0.5 - 8'
Indeno(1,2,3-cd)pyrene	740 ug/kg	0.5 - 8'

60' 0' 60' 120'

SCALE: 1 INCH = 60 FEET
SCALE IN FEET
(approximate)

N

DATE: DECEMBER 2014
DRAFTED BY: RFL

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CONCEPTUAL EXCAVATION EXTENTS TRACK 4 ALTERNATE 3A

AAR/RAWP

295 MARYLAND STREET SITE
BUFFALO, NEW YORK

PREPARED FOR
295 MARYLAND LLC

FIGURE 9

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