

# WEST 17TH STREET AND 10TH AVENUE SITE

NEW YORK, NEW YORK

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## Site Management Plan

**NYSDEC BCP Number: C231040**

**Prepared for:**

17th and 10th Associates LLC  
c/o The Related Companies, L.P.  
New York, NY 10022  
FLS Project Number: 10022-004

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&

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### Revisions to Final Approved Site Management Plan

Revision #	Submitted Date	Summary of Revision	DEC Approval Date
1	June 14, 2012	Reduce groundwater monitoring frequency from quarterly to semiannually	July 16, 2012
2	August 1, 2013	Eliminate groundwater monitoring and sampling	

**SEPTEMBER 27, 2013**

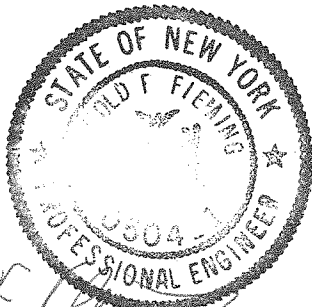
## CERTIFICATIONS

I, Arnold F. Fleming, PE, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications.

50411  
NYS Professional Engineer #

9/27/13  
Date

Arnold F. Fleming  
Signature

A circular professional seal for Arnold F. Fleming, a Professional Engineer in the State of New York. The seal contains the text "STATE OF NEW YORK" at the top, "ARNOLD F. FLEMING" in the center, and "PROFESSIONAL ENGINEER" at the bottom. The license number "50411" is also visible within the seal.

# **TABLE OF CONTENTS**

1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM.....	1
1.1 INTRODUCTION.....	1
1.1.1 General.....	1
1.1.2 Purpose.....	2
1.2 SITE BACKGROUND .....	4
1.2.1 Site Location and Description.....	4
1.2.2 Site History .....	4
1.2.3 Geological Conditions.....	5
1.3 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS.....	8
1.3.1 Summary of Remedial Investigation Findings.....	8
1.3.1.1 Soil .....	10
1.3.1.2 On-Site and Off-Site Groundwater.....	11
1.3.1.3 On-Site and Off-Site Soil Vapor .....	11
1.3.1.4 Underground Storage Tanks.....	12
1.4 DESCRIPTION OF REMEDIAL ACTIONS.....	12
1.4.1 Removal of Contaminated Materials from the Site.....	15
1.4.2 On-Site and Off-Site Treatment Systems.....	16
1.4.3 Residual Contamination.....	17
1.4.4 Engineering and Institutional Controls .....	17
2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN .....	22
2.1 INTRODUCTION.....	22
2.1.1 General.....	22
2.1.2 Purpose.....	24
2.2 ENGINEERING CONTROL COMPONENTS .....	25
2.2.1 Engineering Control Systems.....	25
2.2.1.1 Composite Cover System .....	25
2.2.1.2 Sub-Slab Vapor Mitigation System.....	25
2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems.....	27
2.2.2.1 Composite Cover System .....	27
2.2.2.2 Sub-slab Depressurization System SSDS.....	28
2.2.2.3 Monitored Natural Attenuation .....	28
2.3 INSTITUTIONAL CONTROLS COMPONENTS .....	28
2.3.1 Institutional Controls.....	28
2.3.2 Soil/Materials Management Plan (SoMP) .....	30
2.3.2.1 Soil Screening Methods.....	31
2.3.2.2 Stockpile Methods.....	31
2.3.2.3 Materials Excavation and Load Out.....	32
2.3.2.4 Materials Transport Off-Site .....	34
2.3.2.5 Materials Disposal Off-Site.....	35
2.3.2.6 Materials Reuse On-Site.....	37
2.3.2.7 Fluids Management .....	37
2.3.2.8 Demarcation .....	38
2.3.2.9 Backfill from Off-Site Sources.....	38
2.3.2.10 Stormwater Pollution Prevention .....	40

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

2.3.2.11	Contingency Plan .....	40
2.3.2.12	Community Air Monitoring Plan .....	41
2.3.2.13	Odor, Dust and Nuisance Control Plan .....	43
2.4	INSPECTIONS AND NOTIFICATIONS .....	45
2.4.1	Inspections .....	45
2.4.2	Notifications.....	45
2.4.2.1	NYSDEC-Acceptable Electronic Database.....	45
2.4.2.2	Non-Routine Notifications .....	46
3.0	MONITORING PLAN.....	48
3.1	INTRODUCTION.....	48
3.1.1	General.....	48
3.1.2	Purpose.....	48
3.2	ENGINEERING CONTROL SYSTEM MONITORING DEVICE.....	48
3.3	PERFORMANCE MONITORING OF VAPOR BARRIER/POSITIVE PRESSURE IN OUI .....	49
3.4	SITE-WIDE INSPECTION .....	49
3.5	MONITORING QUALITY ASSURANCE/QUALITY CONTROL.....	49
3.6	MONITORING REPORTING REQUIREMENTS .....	51
3.7	CERTIFICATIONS.....	52
4.0	OPERATION AND MAINTENANCE PLAN.....	53
4.1	INTRODUCTION.....	53
4.2	SSDS OPERATION AND MAINTENANCE.....	53
4.2.1.1	Scope .....	54
4.2.1.2	System Start-Up and Testing.....	54
4.2.1.3	System Operation: Routine Operation Procedures .....	56
4.2.1.4	System Operation: Routine Equipment Maintenance.....	56
4.2.1.5	System Operation: Non-Routine Equipment Maintenance.....	57
4.3	VAPOR BARRIER MAINTENANCE .....	57
4.4	MAINTENANCE REPORTING REQUIREMENTS .....	58
4.4.1	Routine Maintenance Reports.....	58
4.4.2	Non-Routine Maintenance Reports.....	58
4.5	CONTINGENCY PLAN.....	59
4.5.1	Emergency Telephone Numbers.....	59
4.5.2	Map and Directions to Nearest Health Facility.....	59
4.5.3	Response Procedures.....	60
4.5.3.1	Emergency Contacts/Notification System.....	60
5.0	SITE MANAGEMENT REPORTING PLAN.....	62
5.1	INTRODUCTION.....	62
5.2	CERTIFICATION OF ENGINEERING AND INSTITUTIONAL CONTROLS ...	62
5.3	SITE INSPECTIONS .....	63
5.3.1	Inspection Frequency .....	63
5.3.2	Inspection Forms, Sampling Data, and Maintenance Reports .....	64
5.3.3	Evaluation of Records and Reporting .....	64
5.4	SITE MANAGEMENT REPORT .....	64

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

**LIST OF FIGURES**

Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3	Soil Boring, Soil Gas Sample and Monitoring Well Locations
Figure 4	Groundwater Elevation Contour Map – 2005
Figure 4A	Groundwater Elevation Contour Map - 2007
Figure 5A	Pre-Remedy VOC Track 1 Exceedances in Soil
Figure 5B	Pre-Remedy SVOC Track 1 Exceedances in Soil
Figure 5C	Pre-Remedy Metal Track 1 Exceedances in Soil
Figure 5D	Pre-Remedy Pesticide Track 1 Exceedances in Soil
Figure 6	Pre-Remedy Groundwater Analytical Results - 2005
Figure 6A	Pre-Remedy Groundwater Analytical Results - 2007
Figure 7	Pre-Remedy Soil Gas Analytical Results
Figure 8	Waste Characterization Sampling Grid and Extent of Excavation
Figure 9	Post-Remedy Track 4 Site Specific Soil Action Level Exceedances
Figure 10A	Post-Remedy TAGM 4046 RSCO Exceedances in Bottom Samples
Figure 10B	Post-Remedy TAGM 4046 RSCO Exceedances in Sidewall Samples
Figure 11	Site Cover Types
Figure 12	Remedial Cover Type Designs
Figure 13	Sub-Slab Depressurization System Cross Sections and Details
Figure 14	Truck Transport Route
Figure 15	Route to St. Vincent's Hospital
Figure 16	Map of Sub-Slab Depressurization Systems
Figure 17	Location of ORC Advanced Injection Grid
Figure 18	Drawing FS-100 Foundation Plan

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

**LIST OF TABLES**

Table 1	Summary of Exceedances of Track 1 for Soil/Fill
Table 2	List of Track 1 SCOs
Table 3	Summary of material exported from the Site
Table 4	Summary of Site-Specific Action Levels
Tables 5A – 5E	Summary of VOCs in Post Excavation Soil Samples Compared to TAGM RSCOs
Tables 6A – 6E	Summary of SVOCs in Post Excavation Soil Samples Compared to TAGM RSCOs
Tables 7A – 7E	Summary of Metals in Post Excavation Soil Samples Compared to TAGM RSCOs
Tables 8A – 8E	Summary of Pesticides in Post Excavation Soil Samples Compared to TAGM RSCOs
Tables 9A – 9E	Summary of PCBs in Post Excavation Soil Samples Compared to TAGM RSCOs
Tables 10A – 10E	Summary of VOCs in Post Excavation Soil Samples Compared to SSSALs
Tables 11A – 11E	Summary of SVOCs in Post Excavation Soil Samples Compared to SSSALs
Tables 12A – 12E	Summary of Metals in Post Excavation Soil Samples Compared to SSSALs
Tables 13A – 13E	Summary of Pesticides in Post Excavation Soil Samples Compared to SSSALs
Tables 14A – 14E	Summary of PCBs in Post Excavation Soil Samples Compared to SSSALs
Table 15	Summary of Laboratory Analytical Qualifiers for Post Excavation Soil Samples
Table 16	Monitoring/Inspection Deliverables
Table 17	Site Information and Emergency Contact Numbers
Table 18	Summary of Monitoring Well Construction Details

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

**LIST OF APPENDICES**

- Appendix A Metes and Bounds Description
- Appendix B Environmental Easement
- Appendix C Remedial Action Work Plan (on CD)
- Appendix D Soil Waste Characterization Documentation (on CD)
- Appendix E Waste Manifests
- Appendix F Disposal Facility Approval Letters
- Appendix G Tabulated Load Summaries
- Appendix H Soil Management Plan
- Appendix I Vapor Barrier Specifications
- Appendix J Sub-Slab Depressurization System As-Built Drawings and Supporting Material
- Appendix K Health and Safety Plan
- Appendix L Community Air Monitoring Plan
- Appendix M Groundwater Sampling Logs
- Appendix N Groundwater Monitoring Well Logs
- Appendix O Quality Assurance Project Plan
- Appendix P Sample Chain-of-Custody Form
- Appendix Q Site-wide Inspection Checklists
- Appendix R Soil Vapor, Soil and Groundwater Summary Tables from FLS 2005 Remedial Investigation
- Appendix S Soil and Groundwater Summary Tables from FLS 2007 Supplemental Remedial Investigation
- Appendix T Sub-Grade Topography
- Appendix U Geologic Cross Sections
- Appendix V UST Documentation
- Appendix W Sampling Methodology Letter
- Appendix X Electronic Database (on CD)

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

**LIST OF ACRONYMS**

<b>Acronym</b>	<b>Definition</b>
FLS	Fleming-Lee Shue, Inc.
SMP	Site Management Plan
NYS	New York State
BCP	Brownfield Cleanup Program
NYSDEC	New York State Department of Environmental Conservation
BCA	Brownfield Cleanup Agreement
RAWP	Remedial Action Work Plan
COC	Certificate of Completion
ICs	Institutional Controls
ECs	Engineering Controls
NYCRR	New York City Rail Road
RI	Remedial Investigation
ft-bg	feet-below grade
TAGM	Technical and Administrative Guidance Memorandum #4046
RSCOs	Recommended Soil Cleanup Objectives
TOGS	Technical & Operational Guidance Series
VOCs	Volatile organic compounds
SVOCs	Semi-volatile organic compounds
EPA	Environmental Protection Agency
TCL	Target Compound List
TICs	Tentatively identified compounds
ppm	parts per million
ppb	parts per billion
PCBs	Polychlorinated Biphenyls
TAL	Target Analyte List
BTEX	benzene, toluene, ethyl benzene, and xylene
PCE	tetrachloroethylene
PAHs	polycyclic aromatic hydrocarbons
MTBE	methyl-tert-butyl ether
USTs	underground storage tanks
ASTM	American Society of Testing and Materials
ID	Inner diameter
SS	Stainless steel
SSDS	active sub-slab depressurization system
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
SoMP	Soil Management Plan
HASP	Health and Safety Plan
CAMP	Community Air Monitoring Plan
EPA	Environmental Protection Agency



## **SITE MANAGEMENT PLAN**

### **1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM**

#### **1.1 INTRODUCTION**

This document is required for fulfillment of Remedial Action at the West 17th Street and 10th Avenue Site (hereafter referred to as the “Site”) under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Site was remediated in accordance with the Brownfield Cleanup Agreement (BCA) Index# W2-1034-04-11, Site # C231040, which was issued on January 27, 2005.

##### **1.1.1 General**

17th and 10th Associates LLC entered into a BCA with the NYSDEC to develop a 1.213 acre property located in the borough of Manhattan, New York, New York into a mixed use development. This BCA required the Applicant 17th and 10th Associates LLC, to investigate and remediate contaminated media at the Site. The boundary of this 1.213-acre BCP Site is more fully described in Appendix A – Metes and Bounds. A map of the Site location is shown in Figure 1. The Site Plan showing the Site boundary is shown in Figure 2.

After completion of the remedial work described in the Remedial Action Work Plan (RAWP), some contamination was left in the subsurface at this Site, which is hereafter referred to as ‘residual contamination.’ This Site Management Plan (SMP) was prepared to manage residual contamination at the Site in perpetuity or until extinguishment of the Environmental Easement in accordance with 6 NYCRR Part 375. Remedial Action work on the Site began in May 2006, and was completed in March 2007. All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

This SMP was prepared by Fleming-Lee Shue, Inc. (FLS), on behalf of 17th and 10th Associates LLC, in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002, and the guidelines provided by NYSDEC. This SMP addresses the means for implementation of Institutional Controls (ICs) and Engineering Controls (ECs), which are required by the Environmental Easement for the Site.

**1.1.2 Purpose**

The Site contains residual contamination left after completion of the Remedial Action performed under the BCP. ECs have been incorporated into the Site remedy to provide proper management of residual contamination in the future to ensure protection of public health and the environment. A Site-specific Environmental Easement has been recorded with the New York County Clerk that provides an enforceable means to ensure the continued and proper management of residual contamination and protection of public health and the environment. It requires strict adherence to all Engineering Controls and all Institutional Controls placed on this Site by NYSDEC by the grantor of the Environmental Easement and any and all successors and assigns of the grantor. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP includes all methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement for residual contamination at the Site. The SMP has been approved by the NYSDEC, and compliance with this Plan is required by the grantor of the Environmental Easement and grantor's successors and assigns. This plan is subject to change by NYSDEC.

Site management is the last phase of the remedial process and is triggered by the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) by NYSDEC. The SMP continues in perpetuity or until extinguished in accordance with 6NYCRR Part 375. It is the responsibility of the Environmental Easement grantor, and its successors and assigns to ensure that all Site Management responsibilities under this plan are performed.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

The SMP provides a detailed description of all procedures required to manage residual contamination at the Site following the completion of the Remedial Action in accordance with the NYS BCA with the NYSDEC. This includes: (1) development, implementation, and management of all Engineering and Institutional Controls; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain all treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of Site information to NYSDEC; and (5) defining criteria for termination of treatment system operation.

To address these needs, this SMP includes four plans: (1) an Engineering and Institutional Control Plan for implementation and management of EC/ICs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC.

Site Management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually.

Important notes regarding this SMP are as follows:

- This SMP defines Site-specific implementation procedures as required by the Environmental Easement. The penalty for failure to implement the SMP is revocation of the COC;
- The Brownfield Cleanup Agreement (Index #W2-1034-04-11; Site #C231040) for the Site requires conformance with this SMP, and therefore, serves as a contractual binding authority under which this SMP is to be implemented. The BCP law itself also requires the preparation of a SMP (formerly known as an Operation, Maintenance and Monitoring Plan) in ECL 27-1415 and 27-1419. Therefore, the BCA is a binding contract and the BCP

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

law is statutory authority under which this SMP is required and is to be implemented.

- At the time this report was prepared, the SMP and all Site documents related to Remedial Investigation and Remedial Action are maintained at the NYSDEC Region 2 offices in Long Island City. At the time of SMP submission [November 2007], the Site documents can also be found in the repositories established for this project, including:

New York Public Library  
Muhlenberg Branch  
209 West 23<sup>rd</sup> Street  
New York, NY 10011

## **1.2 SITE BACKGROUND**

### **1.2.1 Site Location and Description**

The Site is located in the County of New York, New York City, New York and is identified as Block 714 and Lot 1 on the New York City Tax Map. The Site is an approximately 1.213-acre area bounded by West 17th Street to the north, West 16th Street to the south, residential buildings and a small playground that is an amenity to the New York City Housing Authority Robert Fulton Houses to the east, and 10th Avenue to the west (see Figures 1 and 2). An elevated New York City Rail Road (the former High Line Viaduct) crosses over the southwest corner of the Site. A five-story residential building with street-level retail is located on the northwest corner of this geographic area; however, this structure is not part of the Site. The boundary of the Site is more fully described in Appendix A – Metes and Bounds Description.

### **1.2.2 Site History**

Prior to 1865, the original Hudson River shoreline was close to the western boundary of the Site. The Site was filled sometime prior to 1865 and has since been developed with a variety of commercial, residential, and manufacturing uses. According

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

to a Phase I Environmental Site Assessment (ESA) report prepared by Langan Engineering and Environmental Services, P.C. (Langan, 2004), various industrial businesses occupied the Site between 1920 and 2003, including: automobile and truck repair shops, trucking and transportation companies, glass, dye, rubber and textile companies.

The parcel of land was previously zoned for manufacturing use and was rezoned as part of a larger, City-led, rezoning project for the Special West Chelsea District. The rezoning was designed to allow the area to be developed for residential use. The Special West Chelsea District Rezoning was completed in June 2005.

### **1.2.3 Geological Conditions**

The following geologic data was obtained from the two Geotechnical Engineering Studies, (Langan, March 2004 and July 2005) and the remedial investigation (RI) performed by FLS in 2005. The FLS 2005 RI included a soil gas screening survey; soil gas sampling; installation and sampling of soil borings; monitoring well installation; groundwater sampling; and groundwater monitoring. FLS also performed a Supplemental Remedial Investigation (SRI) in February and March 2007, which included installation and sampling of four off-site wells and installation of one upgradient piezometer.

Geologic cross sections created by Langan are provided in Appendix U. RI sampling and monitoring well locations are shown on Figure 3. The RI included twenty-three soil borings advanced to depths of approximately 20 ft-bg, and collection of two soil samples at each boring location. Eight monitoring wells were installed and groundwater samples were collected. The SRI included installation of an additional four monitoring wells and one piezometer and collection of groundwater samples. Groundwater monitoring well logs are included as Appendix N and a summary of well construction details are provided on Table 18. Sampling and monitoring well locations for the RI and SRI are shown on Figure 3.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

The generalized subsurface profile consisted of urban fill overlying sand, with bedrock at depths between 40 and 70 feet below grade (ft-bg). Descriptions of each soil stratum are given below.

**Fill**

Fill material was encountered in all borings. The fill consisted of brown and grey, coarse to fine sand, some silt, gravel and brick fragments. Langan measured the fill thickness as ranging from about four to twelve feet.

**Sand**

Sand was encountered below the fill in each boring. The sand layer consisted of brown and reddish brown, coarse to fine sand with varying amounts of silt transitioning to coarse to fine sand and gravel over the bedrock surface. The thickness of the lower coarse to fine sand and gravelly sand ranged from 31 to 47 feet. The upper medium to fine sand extends typically to depths of about 20 ft-bg.

**Bedrock**

Bedrock was encountered in each boring below the sand. Bedrock consisted of moderately fractured, medium-hard mica schist and moderately fractured, hard pegmatite. Bedrock was found at depths ranging from about 21 to 77 ft-bg. Bedrock was found to be shallowest at the east end of the Site and slopes downward to the west toward the Hudson River.

The data obtained through the FLS RI supported Langan's findings regarding the extent of fill material and native soils. In the elevated areas of the Site, within the boundaries of the original building foundations, there was mostly rubble (brick and concrete fragments) in the upper several feet. In the soil borings on the north side of the Site, the rubble fill extended down to approximately 6 to 7 ft-bg. Below the rubble fill was brown and dark gray silty, gravelly sand. The soil became wet at approximately 10 to 14 ft-bg. To the east, rubble fill was found from the surface to depths of 11 to greater than 16 ft-bg.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Along the west side of the Site, immediately east of the overhead railroad (High Line) railroad supports, there was extensive rubble fill and, at locations near the High Line columns, there is a concrete slab at approximately 8 to 9 ft-bg., possibly an old building foundation or floor. The rubble fill extends down as deep as 16 ft-bg. The sand below the rubble fill in this location has more silt and clay than the eastern portion of the Site, a condition that was also observed while developing the monitoring wells. The former shoreline of the Hudson River was located just off-Site to the west, explaining the increase in silt.

The SRI off-Site soil data supported the previous findings: soil encountered in the borings was urban fill material, extending to depths ranging from 6 to 8 ft-bg. The fill consisted of mixtures of brick, concrete, gravel, ash, cinders, wood and schist in a matrix of silty sand. Native soils, including fluvial/alluvial sands and silts and organic clays, were found beneath the fill. The soil became saturated at approximately 9 to 11 ft-bg. Borings were terminated at approximately 20 ft-bg. Bedrock was not encountered at any of these soil borings.

### **Hydrogeology**

Site-specific hydrogeologic data was obtained from Langan's Geotechnical Engineering Study dated July 2005, the RI sampling performed by FLS in 2005 and the FLS 2007 SRI.

Information collected during the 2005 RI, indicated a net groundwater flow to the west, toward the Hudson River. A groundwater depression around well MW F-8 detected during the 2005 RI likely influenced groundwater in the western portion of the Site causing localized southerly flow towards well MW F-8. Potential explanations for the change in flow direction may include: off-Site pumping by a large car wash facility at the corner of 10<sup>th</sup> Avenue and West 15<sup>th</sup> Street (which may have a shallow supply well); the presence of underground utilities such as sewer, water and steam pipes or other subsurface objects that may locally impede and redirect the natural groundwater flow. Leaking water or sewer lines may also cause localized mounding or depressions of the groundwater table. It should also be noted that low-conductivity former river deposits

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

may be present to the west of the Site and may act as a barrier to groundwater flow. A groundwater flow map, based on data from the 2005 RI, is included as Figure 4.

During the SRI, measurements indicated that groundwater flows to the southwest towards 10th Avenue and the Hudson River, and is not being influenced by off-Site pumping in the study area. The depth to water in on-Site monitoring wells was gauged twice at 8-hour intervals and no significant tidally-induced fluctuations were observed in the monitoring wells. The groundwater gradient at the site was measured as approximately 0.03 ft/ft. Groundwater flow direction, based on measurements taken during the SRI, is depicted on Figure 4A

### **1.3 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS**

The SMP and all Site documents, including the Remedial Investigation and Remedial Action Work Plan, are maintained by the NYSDEC (or successor agency). At the time of publication, these reports could be found at the Region 2 NYSDEC offices in Long Island City, New York and the New York Public Library, Muhlenberg Branch.

#### **1.3.1 Summary of Remedial Investigation Findings**

The following reports have been completed under the BCP:

Remedial Investigation Work Plan (February 2005)

Remedial Investigation Report (August 2005)

Remedial Action Work Plan (November 2005)

Revised Stipulation List (April 2006)

Remedial Action Work Plan Modification (June 2006)

Operable Unit 2 (OU2) Oxygen Release Compound (ORC) Injection Work Plan (January 2007)

Supplemental Remedial Investigation Work Plan (May 2007)

Supplemental Remedial Investigation Report (August 2007)



**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

For purposes of remediation, the site was divided into two operable units (OUs). Operable Unit 1 (OU1) is the eastern portion of the Site which will be fully occupied by the residential building. Operable Unit 2 (OU2) is the High Line area that extends along 10<sup>th</sup> Avenue and the western portion of 16<sup>th</sup> Street. OU2 will be completely occupied by commercial/retail space. Residual contamination is present in both OU1 and OU2. A Track 1 cleanup was originally envisioned for OU1 and contaminated fill and petroleum-impacted soils beneath OU1 were removed as part of Site development as per the RAWP. However, during remedy implementation, it became apparent that the remedy for OU-1 could not be implemented as described in the RAWP due to the following:

1) **Safety considerations which impacted construction methods**, specifically, the fact that sheeting could not be driven adjacent to the existing structures (the buildings located at the northwest and southeast corners of the Site) without compromising the structural integrity of the building foundations and, the inability to drive sheeting adjacent to or under the High Line because of headroom clearance limitations. As a result, the RAWP was modified in June 2006 and the site was sheeted using shoulder beams and lagging, with underpinning of the adjacent structures.

2) **The inability to attain and maintain compliance with Class GA groundwater standards and achieve Track 1 for groundwater in OU-1 and OU-2.** The above change in sheeting method (i.e., the inability to use tight sheeting) precluded a Track 1 cleanup for groundwater in OU-1. The inability to place sheeting along the 10<sup>th</sup> avenue side of the Site (west of OU-2) prevented treatment of the OU-2 groundwater, and attainment of groundwater standards in OU-2.

3) **The presence of petroleum-impacted groundwater and the urban fill in OU-2.** Soil excavation in OU2 was restricted by conditions in the Zoning Resolution that limit construction activities within 25 feet of the High Line. Prior to construction, it was discovered that the High Line was supported by piles, rather than spread footings. As a result, the piles were sheeted and soil was excavated to the foot of the High Line

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Supports. While this enabled removal of significantly more source material, petroleum-contaminated soils remain in this area below the foot of the High Line Supports, precluding a Track 1 remedy for OU-2.

Due to the above limitations, alternate Track 4 SSSALs (Part 375 Track 2 Restricted Residential) were developed for the site in consultation with NYSDEC.

## **Summary of Remedial Investigation Findings**

### **2005 Remedial Investigation**

The 2005 Remedial Investigation included a soil gas investigation; installation and sampling of soil borings; monitoring well installation and groundwater sampling; and groundwater monitoring. Soil sampling, soil vapor and monitoring well locations are shown on Figure 3. Groundwater monitoring-well logs are provided in Appendix N. Twenty-three soil borings were advanced to depths of approximately 20 feet-below grade (ft-bg), and two soil samples were collected at each boring location. Eight monitoring wells were installed and groundwater samples were collected. FLS also performed a Supplemental Remedial Investigation (SRI) in February and March 2007, which included installation and sampling of four off-site wells and installation of one upgradient piezometer (see Figure 3).

Soil analytical results from the 2005 Remedial Investigation were compared to the NYSDEC Technical and Administrative Guidance Memorandum #4046 (TAGM) Recommended Soil Cleanup Objectives (RSCOs). Groundwater analytical results were compared with the New York State Technical & Operational Guidance Series (TOGS) Ambient Water Quality Standards and Guidance, Class GA groundwater standards.

#### 1.3.1.1 Soil

Exceedances of the TAGM RSCOs are shown on the tables from the 2005 RIR, provided in Appendix R. Table 1 shows exceedances above the New York State Part 375 Track 1 Unrestricted SCOs for all soil/fill at the Site prior to the remedy. Figure 5 is a

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

spider map that indicates the location(s) of and summarizes exceedances above Track 1 Unrestricted SCOs for all soil/fill prior to the remedy.

1.3.1.2 On-Site and Off-Site Groundwater

Tables from the 2005 Remedial Investigation Report that indicate exceedances above Class GA groundwater standards in monitoring wells prior to the remedy are provided in Appendix R. A spider map that indicates the location(s) of and summarizes exceedances from GA groundwater standards prior to the remedy is shown in Figure 6.

**2007 Supplemental Remedial Investigation**

VOCs were detected in all five groundwater samples and in the field blank. VOCs detected above the Class GA Standards were: benzene, cis-1,2-dichloroethene, ethylbenzene, and total xylenes. Petroleum-fuel related SVOCs (2-methylnaphthalene and naphthalene) were detected in two of the five groundwater samples. Laboratory analytical results for VOCs and SVOCs in groundwater are provided in Appendix S and shown on Figure 6A.

1.3.1.3 On-Site and Off-Site Soil Vapor

A table of subsurface soil vapor data from the 2005 Remedial Investigation Report, collected prior to the remedy, is provided in Appendix R. A spider map that indicates the location(s) of and summarizes soil vapor data prior to the remedy is shown in Figure 7.

Additional soil vapor data was collected in accordance with the NYSDEC-approved June 2006 Modification Request to address concerns regarding potential migration of VOCs from a nearby manufactured gas plant during construction dewatering. Indoor air quality monitoring, using both Summa canisters and Gastech colorimetric tubes, was conducted in the Offsite Building (OB) located in the northwest corner of the Site. Both baseline (prior to dewatering) and monthly samples during the dewatering period (August – December 2006) were collected, as well as in January 2007, following the end of dewatering. All Summa canister measurements were more than two orders of magnitude below the 500 ppbv (parts per billion/volume of air) action limit for

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

benzene, with the data showing relatively little variation throughout the entire monitoring period.

**1.3.1.4 Underground Storage Tanks**

Six 550-gallon gasoline underground storage tanks (USTs) and a concrete encasement were removed from 455 West 16th Street in November 1991 (Franklin 1993). Reportedly, analytical results from endpoint samples warranted further investigation to determine the extent of contamination on-Site. New York State Spill #92-06441 was assigned to the Site.

One 2,000-gallon fuel oil tank and three 550-gallon fuel oil tanks were discovered during remediation. These USTs were removed in July and December 2006, respectively. The tank removal affidavits are provided in Appendix V.

**1.4 DESCRIPTION OF REMEDIAL ACTIONS**

The Site was remediated in accordance with the scope of work presented in the NYSDEC-approved Remedial Action Work Plan (RAWP) dated November 2005, the approved Stipulations List dated April 2006, the Remedial Action Work Plan Modification (June 2006) and the Operable Unit 2 (OU2) Oxygen Release Compound (ORC) Injection Work Plan (January 2007).

Below is a summary of the Remedial Actions required and implemented at the Site:

1. Implementation of a Citizen Participation Plan, including establishment of a document repository and fact sheet mailings to keep the public informed regarding remedial activities;
2. Excavation of soil/fill from OU1 exceeding Track 4 SSSALs listed in Table 4 and excavation of the top 1' of soil from OU2. Alternate Track 4 SCOs were developed for the site in conjunction with NYSDEC, based on the limitations on excavating below the High Line supports in OU2, and safety considerations which precluded the use of tight sheeting in OU1.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

3. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during all intrusive site work to facilitate removal and appropriate disposal of contaminated material;
4. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;
5. Removal of three (3) 550-gallon underground storage tanks (USTs) from the southern portion of the Site and one (1) 2,000-gallon UST from the northern portion of the Site. Approximately 1,176 gallons of #2 fuel oil were removed from the 2,000-gallon UST. All tanks were cleaned and removed intact by a certified tank removal contractor. UST removal certifications are included in Appendix V.
6. Construction dewatering of OU1 with groundwater treatment prior to discharge to the New York City sewer system as per a NYCDEP Permit to Discharge;
7. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attaining Track 4 SSSALs.
8. Installation and maintenance of a Preprufe® vapor membrane beneath OU1 and OU2 to prevent human exposure to potential soil vapor intrusion;
9. Construction and maintenance of an engineered composite cover consisting of the building's concrete foundation beneath OU-1 and a concrete slab beneath OU-2 to prevent human exposure to residual contaminated soil/fill remaining under the Site;
10. Implementation of a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) during all remedial activities to address exposure of workers and the public to potential airborne contaminants; air monitoring for particulates and VOCs was conducted in the worker breathing zone and on a continuous basis at upwind and downwind monitoring stations and along the Site boundaries;

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

11. Oxygen-Release Compound (ORC) injection program in OU2, including post-remedial groundwater monitoring for VOCs, SVOCs and Monitored Natural Attenuation (MNA) parameters to evaluate the effectiveness of the ORC; groundwater monitoring for Monitored Natural Attenuation will be performed under this Site Management Plan;
12. Installation and operation of a sub-slab depressurization system (SSDS) in OU2;
13. Maintenance of positive pressure in the occupied areas of the subgrade level;
14. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, addressed in accordance with all applicable Federal, State and local rules and regulations.
15. Recording of an Environmental Easement to prevent future exposure to any residual contamination remaining at the Site (a copy of the Environmental Easement is provided in Appendix B).
16. A Site Management Plan for long term management of residual contamination as required by the Part 375 Regulations to be included as part of the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;
17. Preparation of a Final Engineering Report (FER) which describes the remedial activities, certifies that the remedial requirements have or will be achieved, defines the Site boundaries, and describes any institutional or engineering controls to be implemented at the Site.

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved RAWP for the West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site (November 2005), the approved Stipulations List (April 2006), the Remedial Action Work Plan Modification (June 2006), and the Operable Unit 2 (OU2) Oxygen Release Compound (ORC) Injection Work Plan (January 2007). The approved RAWP is included in

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Appendix C. With the exception of revising the cleanup track from Track 1 to Track 4, there were no deviations from the RAWP.

#### **1.4.1 Removal of Contaminated Materials from the Site**

In order to characterize the soil prior to disposal, FLS performed waste characterization sampling based on disposal facility requirements and using a grid system, shown on Figure 8. A description of the sampling methodology and analytical requirements was described in a June 16, 2006 letter to Urban F/E, LLC and is included as Appendix W. The waste characterization analytical results are provided in Appendix D.

A total of approximately 28,115 cubic yards or 42,173 tons of soil was removed during remediation, as shown on Table 3. Tabulated daily load summaries are provided in Appendix G.

The soil was determined to be either non-hazardous urban fill or petroleum-contaminated, non-hazardous urban fill. Approximately 4,418 cubic yards of petroleum-contaminated, non-hazardous urban fill and 23,697 cubic yards of urban fill were removed from the Site. Approximately 520 cubic yards of concrete were removed from the Site.

The waste manifests are included as Appendix E. The excavated materials were sent to four facilities: approximately 36,634 tons were disposed at Clean Earth of Philadelphia, PA; approximately 5,496 tons were disposed at FDP of Jersey City, NJ; 255 tons were disposed at Clean Earth of Carteret, NJ, and, approximately 2,220 tons of native material were sent to the GATX site (380 Development Site), Staten Island, NY for use as fill material. The disposal facility approval letters are provided in Appendix F.

Soil was not imported to the Site to be used as backfill. Gravel, which is an approved engineered construction material, was used in some areas, as necessary.

A list of the Track 4 SSSALs for this project is shown below. The SSSALs for each parameter are provided in Table 4.

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

<b>Contaminant</b>	<b>SSSAL</b>
Individual volatile organic compounds	Part 375 Track 2 Restricted Residential Soil Cleanup Objectives
Individual semi-volatile organic compounds (excluding polycyclic aromatic hydrocarbons)	Part 375 Track 2 Restricted Residential Soil Cleanup Objectives
Total semi-volatile organic compounds (including polycyclic aromatic hydrocarbons )	200 ppm
Metals	Part 375 Track 2 Restricted Residential Soil Cleanup Levels

A map of the location of original sources and areas where excavation was performed is shown in Figure 8.

A contour map of the subgrade topography showing the base of the excavation is included in Appendix T.

**1.4.2 On-Site and Off-Site Treatment Systems**

Remediation of OU1 consisted of excavation of contaminated fill and petroleum-impacted soils; construction and maintenance of an engineered composite cover including a vapor barrier and a cap consisting of the building’s concrete foundation, with continued maintenance of the cap; an environmental easement to prevent future exposure to any residual contamination remaining at the Site. Groundwater was remediated via construction dewatering and treated to meet NYCDEP Sewer Discharge limits prior to discharge into the sewer system.

Remediation of OU2 included: excavation of the top 1’ of surface materials; installation of a vapor barrier; capping the area with asphalt and/or cement, with continued maintenance of the cap; treatment of groundwater and subsurface soils via enhanced biodegradation using ORC®; installation of a sub-slab depressurization system; an environmental easement to prevent future exposure to residual contamination; and



**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

post-remediation groundwater monitoring, including monitoring for Monitored Natural Attenuation parameters.

### **1.4.3 Residual Contamination**

The original intent of the Applicant was to remove all contaminated soils in both OU-1 and OU-2. Due to the prohibition of certain types of invasive work (including excavation) within a specified distance from the High Line in the New York City Zoning Resolution establishing the Special West Chelsea District, petroleum-contaminated soils remain within OU-2, below the base of the High Line supports. This residual contamination is being treated via application of ORC to enhance biodegradation. Safety considerations and the presence of some constituents above Track 1 SCOs in native materials have resulted in residual contamination and a revision of the cleanup track to Track 4 in OU1.

Tables 5 through 9 and Figure 10 (spider map) summarize results of all soil samples remaining at the Site after completion of Remedial Action that exceed TAGM RSCOs.

Tables 10 through 14 and Figure 9 (spider map) summarize results of all soil samples remaining at the Site after completion of Remedial Action that exceed the Track 4 SCOs or Site-Specific Soil Action Levels (SSSALs).

The survey map of the top elevation of the Residual Contamination Zone is provided in Appendix T.

### **1.4.4 Engineering and Institutional Controls**

Since residual contamination is present at this Site, Engineering Controls and Institutional Controls will be implemented to protect public health and the environment in the future. The Controlled Property has two primary Engineering Controls. Exposure to residual contaminated soils is prevented by an engineered, composite cover system that has been built on the Site. This composite cover system is comprised of a concrete building foundation at OU1, a concrete slab at OU2, a vapor barrier beneath OU1 and OU2, and a sub-slab depressurization system (SSDS) at OU-2.. In addition, natural

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

attenuation of groundwater contaminants has been implemented via ORC injection and is monitored via post-remedial groundwater sampling to assess Monitored Natural Attenuation which includes analysis for and evaluation of monitored natural attenuation (MNA) parameters.

The vapor barrier consists of a Preprufe<sup>®</sup> 300R high density polyethylene (HDPE) vapor membrane, which was applied at the bottom and sides of the foundation of both buildings at OU1 and OU2. Vapor barrier specifications are provided in Appendix W. In OU1, the vapor barrier will prevent groundwater as well as any soil vapor from entering the basement of the building.

In OU2, the vapor barrier will be used in conjunction with the SSDS to prevent any soil vapor from entering the building through joints or cracks in the floor slab. The SSDS was designed to create a slight pressure differential between the interior and sub slab environment of the buildings to be located in OU2. A SSDS was not installed beneath OU-1 as excavation in this area extended into native soil below the water table and therefore, soil vapor headspace should not exist below the building. Positive air pressure will be maintained at all times in the occupied areas of the subgrade level of the buildings through manipulation of the HVAC system.

A start-up plan and procedures for operating and maintaining the SSDS are documented in the Operation and Maintenance Plan in Section 4 of this SMP. The procedures for monitoring the systems are included in Section 3 of this SMP.

Monitored natural attenuation of groundwater contamination in OU2 will be performed under this Site Management Plan. Post-remedial groundwater monitoring includes sampling for and evaluation of monitored natural attenuation (MNA) parameters to determine the effectiveness of the ORC portion of the remedy and the potential need for an additional ORC injection along the downgradient property boundary. Post-remedial groundwater sampling will be conducted until 1) Class GA groundwater concentrations are achieved; or, 2) asymptotic conditions are established and the Volunteer petitions NYSDEC to discontinue the monitoring program. In either case, the

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

program can be discontinued, with NYSDEC's concurrence, with an approved amendment to this Site Management Plan.

A series of Institutional Controls are required to implement, maintain and monitor these Engineering Controls. The Environmental Easement requires compliance with these Institutional Controls. These Institutional Controls consist of the following:

- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property (the Site) must be inspected and certified at a frequency and in a manner defined in this SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;
- On-Site environmental monitoring devices, including but not limited to groundwater monitoring wells and soil vapor probes must be protected and replaced as necessary to ensure continued functioning in the manner specified in this SMP. There are currently no on-site environmental monitoring devices at this Site.
- Compliance with the Environmental Easement by the Grantor and the Grantor's successors and adherence to all elements of the SMP is required;
- A composite cover system consisting of a concrete building foundation at OU1, a concrete slab at OU2, and a vapor barrier beneath OU1 and OU2 must be inspected, certified and maintained as required in the SMP;
- The SSDS must be inspected, certified, operated and maintained as required by the SMP;
- Engineering Controls may not be discontinued without an amendment or extinguishment of the Environmental Easement.

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

- A positive air pressure must be maintained at all times in the basement at OU-1.

The Controlled Property has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required under the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Raising of livestock or producing animal products for human consumption is prohibited;
- Single family housing is prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for the intended use. Approval by the New York State Department of Health must be obtained prior to any such intended use;
- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in this SMP;
- The Controlled Property may be used for restricted residential and commercial use only provided the long-term Engineering and Institutional Controls included in the SMP remain in use.
- The controlled property may not be used for a higher level of use such as unrestricted and/or residential use without an amendment or the extinguishment of this Environmental Easement.
- Grantor of Environmental Easement or successor to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

These EC/ICs should:

- Prevent ingestion of groundwater with contamination levels that exceed drinking water standards;
- Prevent exposure to or inhalation of volatiles from contaminated groundwater and soil;
- Prevent infiltration/intrusion of soil vapor into occupied areas of the subgrade level;
- Restore groundwater to pre-disposal/pre-release conditions, to the extent practicable;
- Remove the source of ground or surface water contamination;
- Prevent contaminated groundwater from migrating off-Site;
- Prevent ingestion/direct contact with contaminated soil;
- Prevent migration of contaminants that would result in off-Site groundwater contamination.

## **2.0 ENGINEERING AND INSTITUTIONAL CONTROL PLAN**

### **2.1 INTRODUCTION**

#### **2.1.1 General**

Remedial activities completed at the Site were conducted in accordance with the NYSDEC-approved RAWP for the West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site (November 2005), provided in Appendix C. The original remedial goals included attainment of Track 1 Soil Cleanup Objectives (SCOs) for OU-1 on-Site soils for unrestricted use. As previously discussed, attainment of Track 1 SCOs on OU1 was not feasible and the resulting Track 4 SCOs, or SSSALs, were developed in conjunction with NYSDEC and are listed in Table 4. A summary of the remedial strategies and EC/ICs implemented at the Site are as follows:

1. Implementation of a Citizen Participation Plan, including establishment of a document repository and fact sheet mailings to keep the public informed regarding remedial activities;
2. Excavation of soil/fill from OU1 exceeding Track 4 SSSALs listed in Table 4 and excavation of the top 1' of soil from OU2. Alternate Track 4 SCOs were developed for the site in conjunction with NYSDEC, based on the limitations on excavating below the High Line supports in OU2, and safety considerations which precluded the use of tight sheeting in OU1.
3. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during all intrusive site work to facilitate removal and appropriate disposal of contaminated material;
4. Appropriate off-Site disposal of all material removed from the Site in accordance with all Federal, State and local rules and regulations for handling, transport, and disposal;

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

5. Removal of three (3) 550-gallon underground storage tanks (USTs) from the southern portion of the Site and one (1) 2,000-gallon UST from the northern portion of the Site. Approximately 1,176 gallons of #2 fuel oil were removed from the 2,000-gallon UST. All tanks were cleaned and removed intact by a certified tank removal contractor. UST removal certifications are included in Appendix V.
6. Construction dewatering of OU1 with groundwater treatment prior to discharge to the New York City sewer system as per a NYCDEP Permit to Discharge;
7. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attaining Track 4 SSSALs.
8. Installation and maintenance of a Preprufe® vapor membrane beneath OU1 and OU2 to prevent human exposure to potential soil vapor intrusion;
9. Construction and maintenance of an engineered composite cover consisting of the building's concrete foundation beneath OU-1 and a concrete slab beneath OU-2 to prevent human exposure to residual contaminated soil/fill remaining under the Site;
10. Implementation of a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) during all remedial activities to address exposure of workers and the public to potential airborne contaminants; air monitoring for particulates and VOCs was conducted in the worker breathing zone and on a continuous basis at upwind and downwind monitoring stations and along the Site boundaries;
11. Oxygen-Release Compound (ORC) injection program in OU2, including post-remedial groundwater monitoring for VOCs, SVOCs and Monitored Natural Attenuation (MNA) parameters to evaluate the effectiveness of the ORC; groundwater monitoring for Monitored Natural Attenuation will be performed under this Site Management Plan;
12. Installation and operation of a sub-slab depressurization system (SSDS) in OU2;

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

13. Maintenance of positive pressure in the occupied areas of the subgrade level;
14. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, addressed in accordance with all applicable Federal, State and local rules and regulations.
15. Recording of an Environmental Easement to prevent future exposure to any residual contamination remaining at the Site (a copy of the Environmental Easement is provided in Appendix B).
16. A Site Management Plan for long term management of residual contamination as required by the Part 375 Regulations to be included as part of the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;
17. Preparation of a Final Engineering Report (FER) which describes the remedial activities, certifies that the remedial requirements have or will be achieved, defines the Site boundaries, and describes any institutional or engineering controls to be implemented at the Site.

Since residual contaminated soil and groundwater exists beneath the Site, Engineering Controls and Institutional Controls (EC/ICs) are required to protect human health and the environment. This Engineering and Institutional Control Plan describes the procedures for the implementation and management of all EC/ICs at the Site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

### **2.1.2 Purpose**

The purpose of this Plan is to provide:

- A description of all EC/ICs on the Site;
- The basic operation and intended role of each implemented EC/IC;
- A description of the key components of the ICs created as stated in the Environmental Easement;



**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

- A description of the features that should be evaluated during each annual inspection and compliance certification period;
- A description of plans and procedures to be followed for implementation of EC/ICs, such as the implementation of the Soil Management Plan for the safe handling of residual contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Any other provisions necessary to identify or establish methods for implementing the EC/ICs required by the Site remedy, as determined by the NYSDEC.

## **2.2 ENGINEERING CONTROL COMPONENTS**

### **2.2.1 Engineering Control Systems**

#### 2.2.1.1 Composite Cover System

Exposure to residual contaminated soil/fill is prevented by an engineered composite cover system built on-Site. This composite cover system is comprised of the concrete building foundation beneath OU1 and a concrete slab beneath OU2. Figure 12 shows the NYSDEC-approved design for each remedial cover type used on this Site. Figure 11 shows the location of each cover type at the Site. A Soil Management Plan (SoMP) is included in Appendix H, and outlines the procedures required in the event the composite cover system and underlying residual contamination are disturbed. The Soil Management Plan is also discussed in greater detail in Section 2.3 of this EC/IC Plan. Issues related to maintenance of this cover are provided in the Monitoring Plan included in Section 4 of this SMP.

#### 2.2.1.2 Sub-Slab Vapor Mitigation System

##### **Conceptual Remedial Approach and System Design and Installation**

A sub-slab vapor mitigation system has been installed on-Site to prevent potential intrusion of VOC vapors into the building. The vapor mitigation system consists of a vapor barrier beneath both the OU1 and OU2 buildings and a sub-slab depressurization

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

system (SSDS) under OU2. A Preprufe<sup>®</sup> 300R high density polyethylene (HDPE) vapor membrane was applied at the bottom and sides of the foundation of both buildings. Vapor barrier specifications are provided in Appendix I. In OU1, the vapor barrier will prevent groundwater as well as any soil vapor from entering the basement of the building. A SSDS was not installed beneath OU-1 as excavation in this area extended into native soil below the water table; therefore, soil vapor headspace does not exist below the building.

In OU2, the vapor barrier will be used in conjunction with the SSDS to prevent any soil vapor from entering the building through joints or cracks in the floor slab. The SSDS was designed to create a slight pressure differential between the interior and sub slab environment of the buildings to be located in OU2.

As per EPA guidance (Radon Prevention in the Design and Construction of Schools and Other Large Buildings, 1994, included in Appendix J), a six-inch layer of clean, 1.5-inch gravel was placed below the slab and above a layer of geotextile fabric, which should prevent significant amounts of soil from entering the SSDS. The suction pit was constructed with four 8 by 8 by 12-inch concrete blocks overlain by a 4 by 4-foot sheet of 0.75-inch thick plywood. A 20-foot long, 4-inch diameter Schedule (SCH) 5S stainless steel suction pipe was inserted into the middle of the suction pit and run through the building to a DynaVac HS5000 regenerative blower via 4-inch diameter SCH 40 chlorinated polyvinyl chloride pipe (CPVC), which was connected to the stainless steel pipe with a rubber fernco coupling. All horizontal piping runs were slightly pitched back towards the suction pit to allow for drainage of any moisture. Although EPA guidance recommends a slope of 1/8 inch per foot, the piping was installed at a slope of approximately 1/16 inch per foot due to site restrictions.

The DynaVac HS5000 is located outside of the building within a mechanical room that is accessed from the roof and sealed from the interior of the building encompassing OU1 and will generate a flow of 28 cubic feet per minute (cfm) at 35 inches of water column (“WC). A manometer will be installed on the influent pipe as a vacuum indicator and a low-vacuum alarm will notify the building manager in the event

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

low vacuum conditions (less than 0.5" WC) occur, which can identify leaks in the system.

The discharge location is above the roof of the mechanical room located on the 12th Floor set-back of the building in OU1. The placement was dictated by NYSDOH and EPA requirements. The discharge point will be fitted with a 2-inch diameter CPVC tee to prevent precipitation from entering the pipe without impeding air flow.

As per EPA guidance, above-grade piping not sealed within the trash chute is labeled to indicate that it is part of the SSDS system. Labels were placed approximately every 10 feet stating "This is a component of a Subslab Ventilation System / DO NOT ALTER OR DISCONNECT". A label on the vent stack at the roof level reads, "Soil gas vent stack. DO NOT PLACE AIR INTAKE WITHIN 10 FEET."

A figure showing the SSDS is provided in Attachment J. A cross-section showing the aggregate, geotextile fabric, vapor barrier, suction pit, vent pipe and concrete slab and wall of OU2 and OU1, respectively, is included as Figure 13. The exhaust route throughout the building is shown in Figure 14. Calculations for the sizing of the fan are included in Appendix J.

Procedures for operating and maintaining the SSDS system are documented in the Operation and Maintenance Plan (Section 4 of this SMP). Procedures for monitoring the system are included in the Monitoring Plan (Section 3 of this SMP). The Monitoring Plan also addresses severe condition inspections in the event that a severe condition, which may affect controls at the Site, has occurred.

## **2.2.2 Criteria for Completion of Remediation/Termination of Remedial Systems**

### **2.2.2.1 Composite Cover System**

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

**2.2.2.2 Sub-slab Depressurization System SSDS**

The active SSDS will not be converted to a passive system without written approval by NYSDEC and NYSDOH. A proposal to convert the active SSD system may be submitted by the property owner based on confirmatory data that justifies such request. Confirmatory data will include sampling of the air vented through the SSDS during both active and passive modes, as detailed in Section 3. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

**2.2.2.3 Monitored Natural Attenuation**

Groundwater monitoring activities to assess natural attenuation will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities are outlined in the Monitoring Plan of the SMP.

**2.3 INSTITUTIONAL CONTROLS COMPONENTS**

**2.3.1 Institutional Controls**

A series of Institutional Controls are required under the RAWP to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to residual contamination by controlling disturbances of the subsurface contamination; and, (3) restrict the use of the Site to restricted residential and commercial uses only. Adherence to these Institutional Controls on the Site (Controlled Property) is required under the Environmental Easement and will be implemented under this Site Management Plan. These Institutional Controls are:

- Compliance with the Environmental Easement by the Grantor and the Grantor's successors and assigns with all elements of this SMP;

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

- All Engineering Controls must be operated and maintained as specified in this SMP;
- A composite cover system consisting of concrete building slabs with a vapor barrier and waterproofing must be inspected, certified and maintained as required in this SMP;
- A soil vapor mitigation system consisting of an SSDS under OU-2 must be inspected, certified, operated and maintained as required in this SMP;
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in this SMP;
- On-Site environmental monitoring devices, including but not limited to groundwater monitoring wells and soil vapor probes must be protected and replaced as necessary to ensure the devices function in the manner specified in this SMP.
- Engineering Controls may not be discontinued without an amendment or the extinguishment of this Environmental Easement.

The Site (Controlled Property) has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Raising of livestock or producing animal products for human consumption is prohibited;
- Single family housing is prohibited;
- The use of the groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose. Approval by the

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

New York State Department of Health must be obtained prior to any such intended use;

- All future activities on the Controlled Property that will disturb residual contaminated material are prohibited unless they are conducted in accordance with the soil management provisions in this SMP;
- The Controlled Property may only be used for restricted residential and commercial use provided that the long-term Engineering and Institutional Controls included in this SMP are employed.
- The Controlled Property may not be used for a higher level of use, such as unrestricted residential use without an amendment or the extinguishment of this Environmental Easement.
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This annual statement must be certified by an expert that the NYSDEC finds acceptable.

### **2.3.2 Soil/Materials Management Plan (SoMP)**

The Site has been fully remediated for restricted residential and commercial use. Although not anticipated to occur, any future intrusive work that will disturb the residual contamination and modifications or repairs to the existing composite cover system will be performed in compliance with the SoMP, which is included in this SMP. Intrusive construction work must also be conducted in accordance with the procedures defined in a

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the Site. The SoMP is presented in Appendix H and the CAMP is presented in Appendix L of the SMP. The HASP is provided in Appendix K and is in compliance with DER-10 Technical Guide and 29 CFR 1910 and 1926, and all other applicable Federal, State and local regulations. Any intrusive construction work must be certified as compliant with the SMP and included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 5).

2.3.2.1 Soil Screening Methods

All projects involving disturbance of soil containing contaminant concentrations above the RSCOs (located beneath the site cover) must be overseen by a full-time qualified environmental professional. NYSDEC will be notified of all such work, and the work will be certified according to this SMP.

Visual, olfactory and PID soil screening and assessment will be performed by a qualified environmental professional during all remedial and development excavations into known or potentially contaminated material (Residual Contamination Zone). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Screening will be performed by qualified environmental professionals. Resumes will be provided in the Annual Site Management Report for all personnel conducting invasive work field screening (i.e. those representing the Remedial Engineer) for unknown contaminant sources during remediation and development work.

Particulate air monitoring of fugitive dust will be conducted on the Site at all times when soil below the Site cover is disturbed. Air monitoring will be conducted consistent with the air monitoring plan, as described in Section 2.3.12.

2.3.2.2 Stockpile Methods

There are currently no soil stockpiles on-Site, and stockpiling of soil is not anticipated in the future. However, the following protocol will be followed in case stockpiling is needed.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Any soil excavated from below the Site cover will be staged in separate stockpiles of approximately 500 cubic yards (yd<sup>3</sup>) to be characterized for potential on-Site reuse as backfill in accordance with Section 2.3.2.1. During the excavation and stockpiling, environmental personnel will be present on Site, constantly monitoring excavated soil for evidence of contamination and conduct periodic screening for VOCs using a photo-ionization detector (PID). Soil exhibiting obvious contamination (e.g., staining, odors, and elevated PID readings) will be stockpiled separately to prevent mixing with potentially non-contaminated excavated soil.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

All soil stockpiles will be placed on minimum 6-mil plastic sheeting. Soil stockpiles will not have side angles exceeding 60° or side slopes exceeding 2:1. Soil stockpiles will be continuously encircled with silt fences. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

A dedicated water truck equipped with a water cannon will be available on-Site for dust control.

**2.3.2.3 Materials Excavation and Load Out**

The Remediation Engineer or a qualified environmental professional under his/her supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the Controlled Property and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.



**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

The presence of utilities and easements on the Site will be investigated by the Remedial Engineer. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-Site. The Remediation Engineer will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the remedial construction is complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-Site sediment tracking.

The Remedial Engineer will be responsible for ensuring that all egress points for truck and equipment transport from the Site will be clean of dirt and other materials derived from the Site during Site remediation and development. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site-derived materials.

The Applicant and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all invasive work, the structural integrity of excavations, and for structures that may be affected by excavations (such as building foundations and bridge footings).

The Remedial Engineer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, remedial activities proposed in this Remedial Action Work Plan.

Although unlikely to be found on-Site, each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and end-point remedial performance sampling completed before excavations related to Site development commence proximal to the hotspot or structure.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Mechanical processing of historical fill and contaminated soil on-Site is prohibited.

All primary contaminant sources (including but not limited to tanks and hotspots) identified during Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a surveyor licensed to practice in the State of New York. The survey information will be shown on maps to be reported in the Annual Site Management Report.

2.3.2.4 Materials Transport Off-Site

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Truck transport routes are as follows: from Site, proceed north on 10<sup>th</sup> Avenue, which is a local through street, to West 23<sup>rd</sup> Street, which is also a local through street. Turn left and proceed west to Route 9A, which is a through truck street and runs north and south. A map showing the truck transport route is given on Figure 14. . All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. The Site is located one block south of the NYSDOT Chelsea Limited Truck Zone, meaning that trucks are not permitted to stop, stand, or park on the streets in that zone unless making a delivery. The Limited Truck Zone is shown on Figure 14.

Proposed in-bound and out-bound truck routes to the Site are shown in Figure 14. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-Site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Off-Site queuing will be prohibited.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

2.3.2.5 Materials Disposal Off-Site

The disposal locations will be identified and reported to NYSDEC in the Annual Site Management Report.

No material is expected to be disposed off-Site. However, in the event that any material is disposed off-Site, the intention to dispose of material offsite will be reported to NYSDEC prior to performance of work. This will include quantity, breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc.

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to NYSDEC's Project Manager. Unregulated off-Site management of materials from this Site is prohibited without formal NYSDEC approval.

Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

The following documentation will be obtained and reported by the Remedial Engineer for each disposal location used in this project to fully demonstrate and document that the disposal of material derived from the Site conforms with all applicable

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

laws: (1) a letter from the Remedial Engineer or BCP Applicant to the receiving facility describing the material to be disposed and requesting formal written acceptance of the material. This letter will state that material to be disposed is contaminated material generated at an environmental remediation site in New York State. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at a minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2

Historical fill and contaminated soils from the Site are prohibited from being disposed at Part 360-16 Registration Facilities (also known as Soil Recycling Facilities).

Soils that are contaminated but non-hazardous and are being removed from the Site are considered by the Division of Solid & Hazardous Materials (DSHM) in NYSDEC to be Construction and Demolition (C/D) materials with contamination not typical of virgin soils. These soils may be sent to a permitted Part 360 landfill. They may be sent to a permitted C/D processing facility without permit modifications only upon prior notification of NYSDEC Region 2 DSHM. This material is prohibited from being sent or redirected to a Part 360-16 Registration Facility. In this case, as dictated by DSHM, special procedures will include, at a minimum, a letter to the C/D facility that provides a detailed explanation that the material is derived from a DER remediation Site, that the soil material is contaminated and that it must not be redirected to on- Site or off-Site Soil Recycling Facilities. The letter will provide the project identity and the name and phone number of the Remedial Engineer. The letter will include as an attachment a summary of all chemical data for the material being transported.

The Annual Site Management Report will include an accounting of the destination of all material removed from the Site during work performed under this plan, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the Annual Site Management Report.

Bill of Lading system or equivalent will be used for off-Site movement of non-hazardous wastes and contaminated soils. This information will be reported in the Annual Site Management Report.

Hazardous wastes derived from on-Site will be stored, transported, and disposed of in full compliance with applicable local, State, and Federal regulations.

Appropriately licensed haulers will be used for material removed from this Site and will be in full compliance with all applicable local, State and Federal regulations.

Waste characterization will be performed for off-Site disposal in a manner suitable to the receiving facility and in conformance with applicable permits. Sampling and analytical methods, sampling frequency, analytical results and QA/QC will be reported in the FER. All data available for soil/material to be disposed at a given facility must be submitted to the disposal facility with suitable explanation prior to shipment and receipt.

2.3.2.6 Materials Reuse On-Site

The Site is completely covered by the Site structures. Any further disturbance will be minimal and not require stockpiling or concrete crushing. Soil will not be reused on-Site.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site is prohibited for reuse on-Site.

Contaminated on-Site material, including historic fill and contaminated soil, removed for grading or other purposes will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

2.3.2.7 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable local, State, and Federal

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

regulations. Liquids discharged into the New York City sewer system will be addressed through approval by NYCDEP.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be discharged into the New York City sewer system in accordance with NYCDEP sewer discharge regulations or managed off-Site.

Discharge of water generated during remedial construction to surface waters (i.e. a local pond, stream or river) is prohibited without a SPDES permit.

2.3.2.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, as necessary, a land survey will be performed by a New York State licensed surveyor. The survey will define the top elevation of residual contaminated soils. A physical demarcation layer, consisting of orange snow fencing material or equivalent material will be placed on this surface to provide a visual reference. This demarcation layer will constitute the top of the 'Residuals Management Zone', the zone that requires adherence to special conditions for disturbance of contaminated residual soils defined in this Site Management Plan. The survey will measure the grade covered by the demarcation layer before the placement of cover soils, pavement and sub-soils, structures, or other materials. This survey and the demarcation layer placed on this grade surface will constitute a modification of the physical and written record of the upper surface of the 'Residuals Management Zone' in the Site Management Plan. A map showing the survey results will be included in the Annual Site Management Report and updates to the Site Management Plan.

2.3.2.9 Backfill from Off-Site Sources

At this time, there is no backfill proposed for use on-Site. However, should this change, a map of backfill locations will be developed and the methods to be followed for import and usage of backfill material will follow the guidelines in this section.

Any off-Site material used as backfill will be documented as having originated from locations having no evidence of disposal or release or hazardous, toxic, or radioactive substances, wastes, or petroleum products. If the contractor designates a

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

source of soil, it shall be further documented in writing to be soil from areas not having supported any known prior industrial or commercial development, or agricultural use. Soil recycling facilities and Part 360 registration facilities will not be used without approval from NYSDEC.

All material including native soil will be tested via collection of one composite sample per 500 yd<sup>3</sup> of material from each source. Material will not be taken from the processing facility without NYSDEC approval. Samples will be analyzed for VOCs using EPA Method 8260, SVOCs using EPA Method 8270, TAL metals using EPA Method 6000/7000 series, PCBs using EPA Method 8082, pesticides using EPA Method 8081, and herbicides using EPA Method 8151.

All imported soils will meet NYSDEC approved backfill or cover soil quality objectives for this Site. These NYSDEC approved backfill or cover soil quality objectives are the NYSDEC Part 375-6 Track 1 SCOs listed on Table 2 and the protection of groundwater SCOs, whichever is lower. Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved SMP or its approval by NYSDEC should be construed as an approval for this purpose.

Off-Site material to be used as backfill will be staged in separate stockpiles of approximately 500 cubic yards (yd<sup>3</sup>). The stockpiles will be managed and handled as described in 2.3.2.2. If off-Site material is stored on-Site, stockpiles will be shown on a figure in the annual report.

All materials proposed for import onto the Site will be approved by the Remedial Engineer and will be in compliance with provisions in this SMP prior to receipt at the Site.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in this SMP should be construed as an approval for this purpose.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers.

2.3.2.10 Stormwater Pollution Prevention

Stormwater from the Site will be collected via roof drains, which will be directly connected to the NYCDEP combined sewers, located on 16<sup>th</sup> and 17<sup>th</sup> Streets. Stormwater pollution prevention measures are not required as the site is completely covered by the Site building and stormwater will not encounter any contamination prior to discharge to the sewer.

2.3.2.11 Contingency Plan

All excavation activities will be continuously monitored for the presence of buried tanks, drums or other containers, and sludge, or soil which shows evidence of obvious contamination, such as heavy staining or strong odors. If any of these are detected, excavation in the area will be halted, and the NYSDEC will be notified.

The affected area will be cordoned off and no further work will be performed at the location until the appropriate contingency response plan is implemented. Work zone air monitoring will be conducted during all contingency response actions, as described in the project HASP (see Appendix K). In addition, community air monitoring will be conducted as described in Section 2.3.2.12 and Appendix L.

If underground tanks or other previously unidentified contaminant sources are found during on-Site remedial excavation or development related construction, sampling will be performed on product, sediment and surrounding soils, etc in accordance with the Quality Assurance Project Plan, provided in Appendix O. Chemical analytical work will be for full scan parameters (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs). These analyses will not be limited to STARS parameters where tanks are identified without prior approval by NYSDEC. Analyses will not be otherwise limited without NYSDEC approval.



**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

Identification of unknown or unexpected contaminated media identified by screening during invasive Site work will be promptly communicated by phone to NYSDEC's Project Manager. These findings will be also included in daily and periodic electronic media reports.

2.3.2.12 Community Air Monitoring Plan

Community air monitoring for particulates and volatile organic compounds will be conducted if on-Site soil is disturbed. The specific locations of both roving and fixed air monitoring stations will depend on where the soil disturbance occurs and will be established based on the prevailing wind direction.

Air quality will be continuously monitored using a PID at the downwind perimeter of the work area during any soil disturbance. specific locations must be presented for both roving and fixed air monitoring stations with a note that the exact locations monitored on a given day will be established based on the prevailing wind direction.

Real-time particulate monitors will be used to monitor airborne total particulate levels during all excavation and all moving or loading of soil with a TSI DustTrak Model 8520, MIE PDR 1000 or equivalent. Particulate levels will be continuously monitored within and at the upwind and downwind ends of the work area. If the work area is limited to under a 50-foot radius, then only upwind and downwind levels will be measured.

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

The action levels and required responses are listed in the table below.

<b>ACTION LEVEL</b>	<b>RESPONSE ACTION</b>
VOCs less than 5 ppm above background level AND Downwind particulates less than 150 ug/m <sup>3</sup> above upwind particulates over 15 minutes	Continue work
VOCs greater than 5 ppm but less than 10 ppm above background OR Downwind particulates more than 150 ug/m <sup>3</sup> above upwind particulates over 15 minutes	Implement vapor emission response plan (see below)
More than 10 ppm above background	Stop work. Perform downwind monitoring in accordance with vapor emission response plan.

**Vapor Emission Response Plan**

When vapor concentrations at the downwind edge of the work area exceed 5 ppm over background then work will be temporarily suspended. Work may be resumed if:

Concentrations at the downwind edge of the work area fall below 5 ppm over background; **OR,**

Concentrations measured 200 feet downwind or at half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the downwind concentrations measured 200 feet downwind or at half the distance to the nearest downwind residential or commercial structure, whichever distance is less, exceed 5 ppm over background, then all work will be halted. If the concentrations measured at the downwind location persist above 5 ppm over background after the cessation of work, then monitoring will be performed within 20 feet of the nearest

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

downwind residential or commercial structure. The major vapor emission response plan will be put into effect if levels measured in the 20-foot zone either:

1. Exceed 10 ppm over background; **OR**,
2. Exceed 5 ppm over background for a period greater than 30 minutes.

**Major Vapor Emission Response Plan**

The Health and Safety Manager will contact the local police authorities and all contacts listed under Emergency Response and inform them of the situation. Air monitoring will be conducted in the 20-foot zone at 30-minute intervals. Air monitoring may be halted or modified if two successive readings are below 5 ppm over background.

The specific locations of both roving and fixed air monitoring stations will depend on where the soil disturbance occurs and will be established based on the prevailing wind direction. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

2.3.2.13 Odor, Dust and Nuisance Control Plan

2.3.2.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site and on-Site, if there are residents or tenants on the property. Odor control will not be needed on a routine basis, as the entire Site is capped. During any Site disturbance, odor control will be implemented as needed in conjunction with the Community Air Monitoring outlined in Section 2.3.2.12. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of all odor controls, including the halt of work, will be the responsibility of the Controlled Property owner's Remediation Engineer, who is responsible for certifying the Annual Site Management Report.

All necessary means will be employed to prevent on- and off-Site nuisances. At a minimum, procedures will include: (a) limiting the area of open excavations; (b)

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils; spraying exposed soil with water. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for off-Site disposal; (e) use of chemical odorants in spray or misting systems; and, (f) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

#### 2.3.2.13.2 Dust Control Plan

A dust suppression plan that addresses dust management during invasive on-Site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated on-Site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-Site roads will be limited in total area to minimize the area required for water truck sprinkling.

#### 2.3.2.13.3 Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and Site grubbing, and during all remedial work. A plan will be developed and utilized by the contractor for all remedial work and will conform, at a minimum, to NYCDEP noise control standards.

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

## **2.4 INSPECTIONS AND NOTIFICATIONS**

### **2.4.1 Inspections**

Inspections of all systems installed on-Site will be conducted at the frequency specified in SMP Monitoring Plan schedule (annually). A comprehensive Site-wide inspection will be conducted annually. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If Site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system;

Inspections will be conducted in accordance with the procedures set forth in the Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Site Management Reporting Plan (Section 5).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted to verify the effectiveness of the EC/ICs implemented at the Site by a qualified environmental professional as determined by NYSDEC.

### **2.4.2 Notifications**

#### **2.4.2.1 NYSDEC-Acceptable Electronic Database**

The following information is presented in Appendix X in an electronic database format:

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

- A Site summary;
- The name of the current Site owner and/or the remedial party implementing the SMP for the Site;
- The location of the Site;
- The current status of Site remedial activity;
- A copy of the Environmental Easement; and
- A contact name and phone number of a person knowledgeable about the Environmental Easement's requirements, in order for NYSDEC to obtain additional information, as necessary.

This information should be: 1) modified as conditions change; (2) revised in Appendix X of this document; and, (3) submitted to NYSDEC in the Annual Site Monitoring Report. Should the Environmental Easement be modified or terminated, the copy of the revised Environmental Easement will also be updated in this manner.

2.4.2.2 Non-Routine Notifications

Non-routine notifications are to be submitted by the property owner(s) to the NYSDEC on an as-needed basis for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are consistent with the terms of the Brownfield Cleanup Agreement.
- 10-day advance notice of any proposed ground-intrusive activities.
- Notice within 48-hours of any damage or defect to the foundations structures that reduces or has the potential to reduce the effectiveness of other Engineering Controls and likewise any action taken to mitigate the damage or defect.
- Notice within 48-hours of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, including a summary of action taken and the impact to the environment and the public.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

## **3.0 MONITORING PLAN**

### **3.1 INTRODUCTION**

#### **3.1.1 General**

This Monitoring plan discusses the SSDS monitoring alarm. Monitoring/Inspection frequency and deliverables are summarized on Table 16. Groundwater monitoring is no longer required. NYSDEC approved termination of groundwater sampling in a letter dated July 17, 2013.

#### **3.1.2 Purpose**

This Monitoring Plan describes the methods to be used for:

- Preparing the necessary reports for the various monitoring activities.
- Assessing compliance with NYSDEC publication "Air Guide 1";

To adequately address these issues, this Monitoring Plan provides information on:

- Sampling locations, protocol, and frequency;
- Annual inspection and certification.

### **3.2 ENGINEERING CONTROL SYSTEM MONITORING DEVICE**

The SSDS has a warning device with telemetry to the building manager's office to indicate if the system is not operating properly, as indicated by a loss of pressure at the exhaust end of the vent pipe. In the event that the warning device is activated, applicable maintenance and repairs will be conducted, as specified in the Operation and Maintenance Plan, and the SSDS restarted. Operational problems will be noted in the Annual Site Management Report.



### **3.3 PERFORMANCE MONITORING OF VAPOR BARRIER/POSITIVE PRESSURE IN OU1**

Subsequent to the completion of construction and prior to the start of operations for the health club located in the subgrade level, indoor air quality samples will be collected to verify the effectiveness of the vapor barrier and maintenance of positive pressure in the OU1 area.

### **3.4 SITE-WIDE INSPECTION**

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections should also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (Appendix Q). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General Site conditions at the time of the inspection;
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection;
- Compliance with permits and schedules included in the Operation and Maintenance Plan; and
- Confirm that Site records are up to date.

### **3.5 MONITORING QUALITY ASSURANCE/QUALITY CONTROL**

All sampling and analyses will be performed in accordance with the requirements of the Quality Assurance Project Plan (QAPP) prepared for the Site (Appendix O). Main Components of the QAPP include:

- QA/QC Objectives for Data Measurement;
- Sampling Program:

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

- Sample containers will be properly washed, decontaminated, and appropriate preservative will be added (if applicable) prior to their use by the analytical laboratory. Containers with preservative will be tagged as such.
- Sample holding times will be in accordance with the NYSDEC ASP requirements.
- Field QC samples (e.g., trip blanks, coded field duplicates, and matrix spike/matrix spike duplicates) will be collected as necessary.
- Sample Tracking and Chain of Custody;
- Calibration Procedures:
  - All field analytical equipment will be calibrated immediately prior to each day's use. Calibration procedures will conform to manufacturer's standard instructions.
  - The laboratory will follow all calibration procedures and schedules as specified in USEPA SW-846 and subsequent updates that apply to the instruments used for the analytical methods.
- Analytical Procedures;
- Data Reduction and Validation:
  - Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:
    - Verification of 100% of all QC sample results (both qualitative and quantitative);
    - Verification of the identification of 100% of all sample results (both positive hits and non-detects);
    - Recalculation of 10% of all investigative sample results; and

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

- A Data Usability Summary Report (DUSR) which will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.
- Internal QC and Checks;
- QA Performance;
- Preventative Maintenance Procedures and Schedules;
- Corrective Action Measures.

### **3.6 MONITORING REPORTING REQUIREMENTS**

Forms and any other information generated during regular monitoring events and inspections will be kept on file on-Site. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Annual Site Management Report, as specified in the Reporting Plan of the SMP.

All monitoring results will be reported to NYSDEC on an Annual basis in the Site Management Report. A report or letter will be prepared for submission, subsequent to each sampling event. The report (or letter) will include, at a minimum:

- Date of event;
- Personnel conducting sampling;
- Description of the activities performed;
- Type of samples collected (sub-slab vapor, groundwater);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation, etc.);
- Sampling results in comparison to appropriate standards/criteria;

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (also to be submitted electronically in the NYSDEC-identified format);
- A copy of the laboratory certification;
- Any observations, conclusions, or recommendations; and
- A determination as to whether plume conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC. A summary of the monitoring program deliverables are summarized in Table 16.

### **3.7 CERTIFICATIONS**

Site inspections and sampling activities will take place as outlined above. Frequency of inspection is subject to change by NYSDEC. Inspection certification for all ICs and ECs will be submitted to NYSDEC on a calendar year basis and must be submitted by May 30 of the following year. A qualified environmental professional, as determined by NYSDEC, will perform inspection and certification. Further information on the certification requirements are outlined in the Reporting Plan of the SMP.

## **4.0 OPERATION AND MAINTENANCE PLAN**

### **4.1 INTRODUCTION**

The Operation and Maintenance Plan describes the measures necessary to operate and maintain any mechanical components of the remedy selected for the Site (i.e., SSD system). This Operation and Maintenance Plan:

- Includes the steps necessary to allow individuals unfamiliar with the Site to operate and maintain the SSD system;
- Includes an operation and maintenance contingency plan; and,
- Will be updated periodically to reflect changes in Site conditions or the manner in which the SSD system is operated and maintained.

Information on non-mechanical Engineering Controls (i.e. composite cover) can be found in Section 3 - Engineering and Institutional Control Plan. A copy of this Operation and Maintenance Plan, along with the complete SMP, will be kept at the Site. This Operation and Maintenance Plan is not to be used as a stand-alone document, but as a component document of the SMP. The Operation and Management Plan is subject to NYSDEC revision.

### **4.2 SSDS OPERATION AND MAINTENANCE**

An active SSDS has been installed to mitigate possible soil vapor intrusion into occupied buildings located in OU2. System design information, manufacturer's instructions and drawings are located in Appendix J. The system start date was the 3<sup>rd</sup> quarter 2009.

The following components are part of the SSDS:

- twelve-inch thick concrete slab and vapor barrier in OU2;
- six-inch layer of clean, coarse aggregate;
- centrally-located suction pit;

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

- geotextile fabric overlaying soil;
- horizontal and vertical piping to exhaust point;
- ball valve;
- pressure gauges and alarms;
- exhaust sampling ports;
- high-pressure suction fan, and
- monitoring points through slab in OU2, shown on Figure 16.

4.2.1.1 Scope

The SSDS is designed in accordance with EPA guidance (Radon Prevention in the Design and Construction of Schools and Other Large Buildings, 1994). The system will be operated at a point where the sub-slab pressure is approximately -0.02 inches of water (5 pascals). The measured pressure drops will be as uniform as possible underneath the OU2 slab.

The SSDS will consist of a DynaVac HS5000 regenerative fan with a design flow rate of 28 cubic feet per minute (cfm) at 35 inches of water column (WC). A low pressure alarm will be wired to the manager's office to serve as notification if the wellhead vacuum is less than 0.5" WC.

4.2.1.2 System Start-Up and Testing

System design information, manufacturer's instructions and drawings are located in Appendix J.

Prior to system start-up, a visual inspection of all accessible piping, gauges, fan and other components will be conducted. Any loose connections or unsecured components will be remedied.

Immediately after system start-up, check for any signs of obvious leaks.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

After the system is engaged and operating at steady-state conditions, the sub-slab pressure will be measured at the monitoring points shown on Figure 16 (not there) using a magnehelic pressure meter. The ball valve will be used to create an operating condition where the sub-slab pressure is approximately -0.02“ WC and similar in all monitoring points.

A magnehelic pressure meter will be used to measure the system vacuum pressure. The ball valve will be used to create an operating condition with a head pressure less than the maximum recommended for the fan. The maximum operating pressure for the installed fan is 40“ WC.

A smoke test will be conducted upon startup to determine if leaks are present in the concrete slab. If leaks are identified, they will be resealed and another smoke test will be conducted. Tests will be repeated until no leaks are identified. If any leaks are identified and resealed, the system operating condition will be reevaluated as described above.

Natural-draft combustion appliances used in OU2 will be identified. The SSDS may create a backdraft condition for these appliances. A backdraft condition increases the risk of carbon monoxide as a health concern. A carbon monoxide meter will be used to measure the concentration of carbon monoxide in the area of the appliance exhausts. If carbon monoxide is detected and a backdraft condition is being caused by the SSDS, smoke tests will be conducted to identify any leaks in the concrete slab. If leaks are identified, they will be resealed and another smoke test will be conducted. Tests will be repeated until no leaks are identified. If any leaks are identified and resealed, the system operating condition will be reevaluated as described above.

As a test, the warning device will be triggered at the control panel to confirm that a signal is being sent to the building engineer’s office.

Thirty days after system start-up, a sample of the off-gas will be collected for analysis of Target Compound List (TCL) VOCs by EPA Method TO-15 utilizing SUMMA canisters. If this sampling round is not conducted within the heating season

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

(approximately October 1 to May 31), an additional sample will be collected after heating season begins.

Start-up testing results will be summarized in the first Annual Site Management Report.

The system testing described above will be conducted if, in the course of the SSDS lifetime, significant changes are made to the system, and the system restarted.

4.2.1.3 System Operation: Routine Operation Procedures

The SSDS is designed to run continuously and without an operator. If any troubleshooting, adjustments or repairs are necessary, please refer to section 4.2.1.4, System Operation: Non-Routine Equipment Maintenance.

4.2.1.4 System Operation: Routine Equipment Maintenance

Routine equipment maintenance and inspection will be conducted on the SSDS. System design information, manufacturer's instructions and drawings are located in Appendix J. On a monthly basis, the building engineer will confirm that the high-suction fan is operating. On an annual basis, the system will be inspected by a qualified professional for the following:

- Visual inspection of all accessible piping, gauges, fan and other components. Any obvious leaks will be remedied. Any faulty components will be repaired or replaced. If there is any indication that the fan requires repair, it must be returned to the factory for repair as it has no user-serviceable parts.
- Inspect exhaust location to ensure that it is in compliance with NYSDOH requirements with respect to air intakes and operable windows.
- Determine if any HVAC modifications were made during the year and which may affect the operation of the SSDS.
- Inspect the concrete slab in OU2 for cracks or holes. Any obvious cracks or holes will be repaired.



**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

- A calibrated PID will be utilized to determine effluent VOC concentrations. If effluent VOC concentrations exceed 10 ppm, an air sample will be collected by EPA Method T0-15 for VOCs. An activated carbon filter will be designed if there are any exceedances of the NYSDOH Air Guideline Values.

**4.2.1.5 System Operation: Non-Routine Equipment Maintenance**

In the event that the warning device is triggered, which may indicate reduced effectiveness at the operating conditions, or the system becomes damaged the following actions will be taken:

- A qualified professional will inspect the system, as described in Section 4.2.1.3, above.
- After making any repairs, the system will be restarted, as described in Section 4.2.1.2, above.
- If the system cannot provide a sub-slab pressure of approximately -0.02 inches of water, it will be redesigned.

**4.3 VAPOR BARRIER MAINTENANCE**

The basement floor and perimeter will be inspected by building maintenance personnel at regular intervals to check for signs of water intrusion. In the event that this intrusion is attributed to a leak below the basement floor, indicating that the vapor barrier has been compromised, the leak will be appropriately addressed. This may involve injection of grout into the affected area or localized dewatering and slab removal, patching of the vapor barrier, reinstallation of the slab and follow-up air testing. Inspection of the basement floor and perimeter for signs of moisture intrusion will also be conducted as part of the annual Site Inspection.

#### **4.4 MAINTENANCE REPORTING REQUIREMENTS**

Maintenance reports and any other information generated during regular operations at the Site will be kept on-file on-Site. All reports, forms, and other relevant information generated will be available upon request to the NYSDEC and submitted as part of the Annual Site Management Report, as specified in the Section 5 of this SMP.

##### **4.4.1 Routine Maintenance Reports**

Checklists or forms (see Appendix Q) will be completed during each routine maintenance event. Checklists/forms will include, but not be limited to the following information:

- Date;
- Name, company, and position of person(s) conducting maintenance activities;
- Maintenance activities conducted;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and,
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

##### **4.4.2 Non-Routine Maintenance Reports**

During each non-routine maintenance event, a form will be completed which will include, but not be limited to, the following information:

- Date;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Presence of leaks;

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

- Date of leak repair;
- Other repairs or adjustments made to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and,
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

#### **4.5 CONTINGENCY PLAN**

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

##### **4.5.1 Emergency Telephone Numbers**

In the event of any environmentally related situation or unplanned occurrence requiring assistance the Owner or Owner's representative(s) should contact the appropriate party from the contact list provided on Table 17. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to Arnold F. Fleming, PE. These emergency contact lists must be maintained in an easily accessible location at the Site.

##### **4.5.2 Map and Directions to Nearest Health Facility**

A map showing the route to the nearest hospital is shown on Figure 15 and below.

Site Location: 16<sup>th</sup> /17<sup>th</sup> Streets and 10<sup>th</sup> Avenue, New York, NY

Nearest Hospital Name: St. Vincent's Hospital

Hospital Location: 170 West 12<sup>th</sup> Street, New York, NY

Hospital Telephone: (212) 604-7000

Directions to the Hospital:

1. Drive east on 16<sup>th</sup> Street to 9<sup>th</sup> Avenue.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

2. Turn Right onto 9<sup>th</sup> Avenue
3. Turn left onto W 14<sup>th</sup> Street
4. Turn right onto 7<sup>th</sup> Avenue
5. Turn left onto W 12<sup>th</sup> Street and drive to the hospital at 170 W 12<sup>th</sup> Street.

Total Distance: <0.7 miles

Total Estimated Time: 10 minutes



### **4.5.3 Response Procedures**

#### **4.5.3.1 Emergency Contacts/Notification System**

As appropriate, the fire department and other emergency response group will be notified immediately by telephone of the emergency. The emergency telephone number list is found on Table 17 and has been incorporated into this text below. The list is also posted prominently at the Site and made readily available to all personnel at all times.

EMERGENCY

911

**Site Management Plan  
West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site  
BCP # C231040**

TABLE 17 – Site Information and Emergency Contact Numbers

<u><b>SITE</b></u>		
<b>West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site</b>		
<b>450 West 17th Street</b>		
<b>New York, NY</b>		
<u><b>CONTACT INFORMATION</b></u>		
<b>Company</b>	<b>Title</b>	<b>Contact Number</b>
<b>Fleming-Lee Shue, Inc.</b>		
(212) 675-3225		
158 West 29th Street, 9 <sup>th</sup> Floor		
New York, NY 10001		
Arnold Fleming	Project Director	(917) 885-1475 (cell)
Peter Helseth	Project Manager	(212) 675-3225
<b>The Related Companies, L.P.</b>		
60 Columbus Circle		
New York, NY 10023		
Greg Gushee		(212) 801-1160
<b>EMERGENCY</b>		<b>911</b>
<b>HOSPITAL</b>		(212) 604-8220
St. Vincent’s Hospital Midtown		
170 West 12th Street		
between 6th and 7th Avenue		
New York, NY 10011		
<b>EMERGENCY SPILL RESPONSE</b>		(800) 457-7362
New York State Department of Environmental Conservation (NYSDEC) Hotline		
<ul style="list-style-type: none"> <li>• Oil or Abandoned Chemicals</li> <li>• Releases from Underground Petroleum Storage Tanks</li> <li>• Hazardous Waste</li> </ul>		

If a spill occurs or is observed, the NYSDEC Spill Hotline should be contacted at (800) 457-7362. Evacuation plans will be developed by the building management and distributed to the commercial and residential tenants. Any amendments to this contingency plan will be included in the Annual Report.

## **5.0 SITE MANAGEMENT REPORTING PLAN**

### **5.1 INTRODUCTION**

An annual Site Management Report will be submitted to NYSDEC following the calendar year reporting period, by May 30. The Site Management Report will be prepared in accordance with NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation requirements. This Site Management Reporting Plan and its requirements are subject to revision by NYSDEC.

This report will include the following:

- Identification of all required EC/ICs required by the Remedial Action Work Plan for the Site;
- An evaluation of the Engineering and Institutional Control Plan and the Monitoring Plan for adequacy in meeting remedial goals;
- Assessment of the continued effectiveness of all Institutional and Engineering Controls for the Site;
- Certification of the EC/ICs;
- Results of the required periodic Site Inspections; and
- All deliverables generated during the reporting period, as specified in Section 2 EC/IC Plan, Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan.

The Site Management Reporting Plan is subject to NYSDEC revision.

### **5.2 CERTIFICATION OF ENGINEERING AND INSTITUTIONAL CONTROLS**

Information of EC/ICs can be found in the Engineering and Institutional Control Plan portion of the SMP. Inspection of the EC/ICs will occur at a frequency described in Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan. After the last

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

inspection of the reporting period, a Professional Engineer licensed to practice in New York State will sign and certify the document. The document will certify that:

- On-Site ECs/ICs are unchanged from the previous certification;
- They remain in-place and effective;
- The systems are performing as designed;
- Nothing has occurred that would impair the ability of the controls to protect the public health and environment;
- Nothing has occurred that would constitute a violation or failure to comply with any operation and maintenance plan for such controls;
- Access is available to the Site by NYSDEC and NYSDOH to evaluate continued maintenance of such controls; and
- Site usage is compliant with the environmental easement.

The signed certification will be included in the annual Site Management Report (see Section 5.3).

## **5.3 SITE INSPECTIONS**

### **5.3.1 Inspection Frequency**

All inspections will be conducted at the frequency specified in the schedules provided in Section 3 Monitoring Plan and Section 4 Operation and Maintenance Plan of this SMP. At a minimum, a Site-wide inspection will be conducted:

- Annually;
- When a breakdown of the treatment system has occurred; and
- Whenever a severe condition has taken place, such as an erosion or flooding event that may affect the ECs.

**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

### **5.3.2 Inspection Forms, Sampling Data, and Maintenance Reports**

All inspections and monitoring events for the SSDS will be recorded on the appropriate forms (refer to Appendices Q). Additionally, a general Site-wide inspection form will be completed during the Site-wide inspection (see Appendix Q). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records (including all sampling data of any media at the Site and system maintenance reports) generated for the Site during the calendar year will be included in the annual Site Management Report.

### **5.3.3 Evaluation of Records and Reporting**

The results of the inspection and Site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- EC/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; and, based on the above items,
- The Site remedy continues to be protective of public health and the environment and is performing as designed in the RAWP and FER.

## **5.4 SITE MANAGEMENT REPORT**

The Site Management Report will be submitted annually and will be submitted by May 30 of the calendar year following the reporting period. Other activities will be submitted quarterly for the first year, and as determined by NYSDEC thereafter, with those results also incorporated into the annual Site Management Report. The report will include:

- EC/IC certification;
- All applicable inspection forms and other records generated for the Site during the reporting period;



**Site Management Plan**  
**West 17<sup>th</sup> Street and 10<sup>th</sup> Avenue Site**  
**BCP # C231040**

- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions;
- Cumulative data summary tables and/or graphical representations of contaminants of concern by media (groundwater), which include a listing of all compounds analyzed along with the applicable standards, with all exceedances highlighted;
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables required for all points sampled during the calendar year (also to be submitted electronically in the NYSDEC-specified format);
- A Site evaluation, which will address the following:
  - The compliance of the remedy with the requirements of the Site-specific RAWP and FER;
  - The performance and effectiveness of the remedy;
  - The operation of the SSDS, including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored; and
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan.
- A figure showing sampling and well locations, and significant analytical values at sampling locations; and
- Comments, conclusions, and recommendations, based on an evaluation of the information included in the report, regarding EC/ICs at the Site.

The Site Management Report will be submitted, in hard-copy format, to the Region 2 NYSDEC offices, located at 41-40 21<sup>st</sup> Street, Long Island City, New York, and in electronic format to NYSDEC and NYSDOH.