



Geotechnical & Foundations
Land Planning
Structural
Environmental
Water Resources

Principals:

RECEIVED

JUL 21 2008

Jay Adam, PE
Steven Byszewski, PE, PP
Roger Hendrickson
Kenneth Quazza, PE
Michael St. Pierre, PE
William St. Pierre, PE
Christopher F. Zwingle, PE

July 18, 2008

Mr. Matthew Hubicki
Project Manager
NYSDEC
625 Broadway – 11th Floor
Albany, New York 12233

**RE: Remedial Action Work Plan and Remedial Investigation Report
Final Covers
BCP Site #C360083
River Park Center, City of Yonkers, NY aka/Chicken Island**

Dear Mr. Hubicki:

On behalf of Streuver Fidelco Cappelli, LLC (SFC), we are enclosing the final covers, title pages, and certification pages for both volumes of the Remedial Action Work Plan (RAWP) and all four volumes of the Remedial Investigation Report (RIR). Please insert the covers, title pages and certification pages into the RAWP and RIR binders.

If you have any questions, please call.

Sincerely,

SESI CONSULTING ENGINEERS

Dean Giovanetti
Project Manager
dpg@sesi.org

Michael St. Pierre, P.E.
Principal
msp@sesi.org

c: *M. Ryan (NYSDEC)*
A. Perretta (NYSDOH)
J. Apicella (SFC)
P. Klein (SFC)
B. Fonte (SFC)
L. Shaw (Knauf, Shaw)

**Encl: RAWP volume 1 and volume 2 covers, title page, and certification pages
RIR Volumes 1 through 4 covers and title page**

N:\PROJECTS\7190 - Yonkers BCP Environmental\Letters\final cover trans letter6-20-08.doc



REMEDIAL ACTION WORK PLAN

RIVER PARK CENTER
City of Yonkers, Westchester County, New York
NYSDEC BCP No.: C360083

Prepared For:

STRUEVER FIDELCO CAPPELLI, LLC.
115 Stevens Avenue
Valhalla, New York 10595

Prepared By:

SESI CONSULTING ENGINEERS, P.C.
12A Maple Avenue
Pine Brook, NJ 07058

Project No.: N-7190

December 20, 2007

CERTIFICATIONS

I, Michael St. Pierre, am currently a registered professional engineer licensed by the State of New York. I have primary direct responsibility for implementation of the remedial program for the River Park Center Site (NYSDEC BCA Index No. A3-0572-1006 Site No. C360083).

I certify that the Site description presented in this RAWP is identical to the Site descriptions presented in the Brownfield Cleanup Agreement for River Park Center and related amendments.

I certify that this plan includes proposed use restrictions, Institutional Controls, Engineering Controls, and plans for all operation and maintenance requirements applicable to the Site and provision for development of an Environmental Easement to be created and recorded pursuant ECL 71-3605. This RAWP requires that all affected local governments, as defined in ECL 71-3603, will be notified that such Easement has been recorded. This RAWP requires that a Site Management Plan must be submitted by the Applicant for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, for approval by the Department.

I certify that this RAWP has a plan for transport and disposal of all soil, fill, fluids and other material removed from the property under this Plan, and that all transport and disposal will be performed in accordance with all local, State and Federal laws and requirements. All exported material will be taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that this RAWP has a plan for import of all soils and other material from off-Site and that all activities of this type will be in accordance with all local, State and Federal laws and requirements.

I certify that this RAWP has a plan for nuisance control during the remediation and all invasive development work, including a dust, odor and vector suppression plan and that such plan is sufficient to control dust, odors and vectors and will prevent nuisances from occurring.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

080271
NYS Professional Engineer #

7/18/09
Date

A circular seal for the State of New York, Department of Education, Office of Professional Services. The seal contains the text "STATE OF NEW YORK", "DEPARTMENT OF EDUCATION", "OFFICE OF PROFESSIONAL SERVICES", and "LICENSED PROFESSIONAL ENGINEER". Overlaid on the seal is a handwritten signature in blue ink.
Signature

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

TABLE OF CONTENTS

CERTIFICATIONS	I
LIST OF ACRONYMS	IX
EXECUTIVE SUMMARY	I
1.0 INTRODUCTION	4
1.1 SITE LOCATION AND DESCRIPTION	4
1.2 CONTEMPLATED REDEVELOPMENT PLAN	5
1.3 DESCRIPTION OF SURROUNDING PROPERTY	6
2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS	6
2.1 SUMMARY REMEDIAL INVESTIGATIONS PERFORMED	7
2.1.1 Borings and Wells	7
2.1.2 Samples Collected	8
2.1.3 Chemical Analytical Work Performed	10
2.2 SIGNIFICANT THREAT	10
2.3 SITE HISTORY	10
2.3.1 Past Uses and Ownership	10
2.3.2 Phase I and Phase II Reports	11
2.3.3 Sanborn Maps	12
2.4 GEOLOGICAL CONDITIONS	13
2.5 CONTAMINATION CONDITIONS	15
2.5.1 Conceptual Model of Site Contamination	15
2.5.2 Description of Areas of Concern	16
2.5.3 Identification of Standards, Criteria and Guidance (SCG)	17
2.5.4 Soil/Fill Contamination	17
2.5.5 On-Site and Off-Site Groundwater Contamination	19
2.5.6 On-Site and Off-Site Soil Vapor Contamination	20
2.5.7 Stream Surface Water and Sediment	21
2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS	23
2.6.1 Qualitative Human Health Exposure Assessment	23
2.6.2 Fish & Wildlife Remedial Impact Analysis	24
2.7 INTERIM REMEDIAL ACTION	24
2.8 REMEDIAL ACTION OBJECTIVES	24
2.8.1 Groundwater	24
2.8.2 Soil	25
2.8.3 Surface Water	25
2.8.4 Sediment	25
3.0 DESCRIPTION OF REMEDIAL ACTION PLAN	26
3.1 EVALUATION OF REMEDIAL ALTERNATIVES	26
3.1.1 Description of Alternatives	26

<i>Source Removal of Hot Spot Areas – Excavation and Off-Site Disposal</i>	28
3.2 SELECTION OF THE PREFERRED REMEDY	31
3.2.1 Zoning	32
3.2.2 Applicable comprehensive community master plans or land use plans	32
3.2.4 Citizen participation.....	32
3.2.5 Environmental justice concerns	32
3.2.6 Land use designations	33
3.2.7 Population growth patterns.....	33
3.2.8 Accessibility to existing infrastructure	33
3.2.9 Proximity to cultural resources.....	33
3.2.10 Proximity to natural resources.....	33
3.2.11 Off-Site groundwater impacts.....	33
3.2.12 Proximity to floodplains	33
3.2.13 Geography and geology of the Site.....	34
3.2.14 Current Institutional Controls.....	34
3.3 SUMMARY OF SELECTED REMEDIAL ACTIONS	34
4.0 REMEDIAL ACTION PROGRAM	35
4.1 GOVERNING DOCUMENTS	35
4.1.1 Site Specific Health & Safety Plan (HASP).....	35
4.1.2 Quality Assurance Project Plan (QAPP)	36
4.1.3 Construction Quality Assurance Plan (CQAP).....	36
4.1.4 Soil/Materials Management Plan (SoMP)	36
4.1.5 Storm-Water Pollution Prevention Plan (SWPPP)	36
4.1.6 Community Air Monitoring Plan (CAMP)	36
4.1.7 Contractors Site Operations Plan (SOP)	37
4.1.8 Community Participation Plan.....	37
4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION	38
4.2.1 Project Organization.....	38
4.2.2 Remedial Engineer	38
4.2.3 Remedial Action Construction Schedule	39
4.2.4 Work Hours	39
4.2.5 Site Security.....	40
4.2.6 Traffic Control.....	40
4.2.7 Contingency Plan.....	40
4.2.8 Worker Training and Monitoring.....	40
4.2.9 Agency Approvals.....	40
4.2.10 NYSDEC BCP Signage.....	41
4.2.11 Pre-Construction Meeting with NYSDEC	41
4.2.12 Emergency Contact Information	41
4.2.13 Remedial Action Costs.....	41
4.3 SITE PREPARATION	41
4.3.1 Mobilization	41
4.3.2 Erosion and Sedimentation Controls.....	42
4.3.3 Stabilized Construction Entrance(s).....	42

4.3.4	Utility Marker and Easements Layout.....	42
4.3.5	Sheeting and Shoring.....	42
4.3.6	Equipment and Material Staging.....	43
4.3.7	Decontamination Area	43
4.3.8	Site Fencing.....	43
4.3.9	Demobilization	43
4.4	REPORTING	43
4.4.1	Daily Reports.....	44
4.4.2	Monthly Reports	44
4.4.3	Other Reporting.....	45
4.4.4	Complaint Management Plan.....	46
4.4.5	Deviations from the Remedial Action Work Plan.....	46
5.0	REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE	46
5.1	SOIL CLEANUP OBJECTIVES (SCOs)	46
5.2	REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)	47
5.2.1	End-Point Sampling Frequency	47
5.2.2	Methodology.....	47
5.2.3	Reporting of Results	47
5.2.4	QA/QC.....	47
5.2.5	Data Usability Summary Report (DUSR).....	48
5.2.6	Reporting of End-Point Data in Final Engineering Report (FER).....	48
5.3	ESTIMATED MATERIAL REMOVAL QUANTITIES	48
5.4	SOIL/MATERIALS MANAGEMENT PLAN	48
5.4.1	Soil Screening Methods.....	48
5.4.2	Stockpile Methods	49
5.4.3	Materials Excavation and Load Out	50
5.4.4	Materials Transport Off-Site.....	51
5.4.5	Materials Disposal Off-Site.....	52
5.4.6	Materials Reuse On-Site.....	54
5.4.7	Fluids Management.....	55
5.4.8	Demarcation.....	55
5.4.9	Backfill from Off-Site Sources	56
5.4.10	Stormwater Pollution Prevention.....	57
5.4.11	Contingency Plan	57
5.4.12	Community Air Monitoring Plan (CAMP)	58
5.4.13	Odor, Dust and Nuisance Control Plan.....	58
6.0	RESIDUAL CONTAMINATION TO REMAIN ON-SITE	60
7.0	ENGINEERING CONTROLS: COMPOSITE CAPPING SYSTEM.....	60
8.0	ENGINEERING CONTROLS: SUB-SLAB VAPOR MITIGATION AND GROUNDWATER MONITORING	61
8.1	ENGINEERING CONTROL SYSTEMS	61
8.1.1	CRITERIA FOR COMPLETION OF REMEDIATION/TERMINATION OF REMEDIAL SYSTEMS.....	61

9.0 INSTITUTIONAL CONTROLS.....	62
9.1 ENVIRONMENTAL EASEMENT	62
9.2 SITE MANAGEMENT PLAN	65
10.0 FINAL ENGINEERING REPORT	66
10.1 CERTIFICATIONS.....	67
11.0 SCHEDULE	69
12.0 SCG'S FOR SITE CHARACTERIZATION AND REMEDIAL INVESTIGATION.....	69

LIST OF TABLES

Table 1A	– Initial Sampling Summary
Table 1B	– Additional Sampling Summary
Table 2A	– Initial Soil Analytical Results Summary and Exceedances
Table 2B	– Additional Soil Analytical Results Summary and Exceedances
Table 3	– Groundwater Analytical Results Summary and Exceedances
Table 3B	– Additional Groundwater Analytical Results
Table 3C	– Deep Groundwater Analytical Results
Table 4	– Soil Vapor Data
Table 5	– Sediment and Surface water Analytical Results Summary and Exceedances
Table 6	– Soil SCOs
Table 7	– Project Organization
Table 8	– Remedial Action Schedule
Table 9	– Protocol for Acceptance/Testing of Imported Fill
Table 10	– Preliminary Remediation Cost Estimate

LIST OF FIGURES

Sheet RA-1	– Title Sheet (with USGS Topographic Map)
Sheet RA-2	– Proposed Site Development/Site Capping Plan (with Alpha-Numeric Grid)
Sheet RA-3	– Proposed Excavation Plan (with Exceedances of Soil Cleanup Objectives)
Sheet RA-4	– Proposed Sub- Slab Venting Plan and Details
Sheet RA-5	– Fill Thickness and Cross-Section Location Plan
Sheet RA-6A	– Cross-Section A-A'
Sheet RA-6B	– Cross-Sections B-B' and C-C'
Sheet RA-6C	– Proposed Stream Relocation Centerline Profile
Sheet RA-7	– Proposed Groundwater Monitoring Plan (with groundwater flow contours)

LIST OF APPENDICES

Appendix A – Well Logs

Appendix B – NYSDEC Significant Threat Determination

Appendix C – Applicable SCGs

Appendix D – Sanborn Maps

Appendix E – Health and Safety Plan

Appendix F – Quality Assurance Project Plan

Appendix G – Community Air Monitoring Plan

Appendix H – Citizen Participation Plan

Appendix I – Resumes of Key Personnel

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AST	Aboveground Storage Tank
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
CAMP	Community Air Monitoring Plan
C&D	Construction & Demolition Materials
COC	Contaminant of Concern
COPEC	Constituents of Potential Ecological Concern
cy	cubic yard
DER	Division of Environmental Remediation
DER-10	NYSDEC Technical Guidance for Site Investigation & Remediation
DUSR	Data Usability Summary Report
ECs	Engineering Controls
ECL	Environmental Conservation Law
ESA	Environmental Site Assessment
FER	Final Engineering Report
FWRIA	Fish and Wildlife Resources Impact Analysis
gpm	gallons per minute
ICs	Institutional Controls
HHEA	Human Health Exposure Assessment
MW	Monitoring Well
NYSDEC	New York State Department of Environmental Conservation
PCB	Polychlorinated Biphenyls
PID	Photoionization Detector
ppm	parts per million
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RASR	Remedial Action Selection Report
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RDD	Remedial Design Document
RI	Remedial Investigation
RIR	Remedial Investigation Report

Acronym	Definition
RIW	Remedial Investigation Work plan
SCG	Standards, Criteria, and Guidelines
SCO	Soil Cleanup Objectives
SESI	SESI Consulting Engineers, PC
SFC	Struever Fidelco Cappelli, LLC.
SMP	Site Management Plan
SSDS	Sub-Slab Depressurization System
SVOCs	Semi-Volatile Organic Compounds
S&W	S&W Redevelopment of North America, LLC.
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TOGS	Technical and Operations Guidance Series
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

EXECUTIVE SUMMARY

Site Description/Physical Setting/Site History

Struever Fidelco Cappelli, LLC, (SFC) entered into a Brownfield Cleanup Agreement (BCA) , as a Volunteer, with the New York State Department of Environmental Conservation (NYSDEC) on December 12, 2006, to investigate and remediate a 12.95± acre property located between Palisade Avenue, Elm Street, New Main Street and Nepperhan Avenue in Yonkers, Westchester County, New York (the "site").

The Site is bounded by Elm Street to the northeast, Nepperhan Avenue to the southeast, New Main Street to the Southwest, and Palisades Avenue to the northwest. A section of the Saw Mill River, approximately 1,500 feet long, traverses the Site.

The site has a long history of industrial use that spans over 150 years. Historic industrial use within the Site boundary included manufacturing operations associated with: hat factories; leather factories; gas station; brewery; automotive repair shop; chemical dye manufacturer; and laundry facilities. Mercury is a metal contaminant of concern (COC) associated with hat manufacturing operations, and volatile and semi-volatile organic compounds are potential COCs associated with the leather and dye manufacturing and gas station operations. The structures located in the southwestern part of the Site (west of New School Street) were demolished sometime between 1942 and the late 1950's and converted into the existing parking lot.

Summary of the Remedial Investigation

To investigate impacts to the soil, groundwater, surface water and sediment within the Site, various remedial investigative activities were completed in August and September, 2007, in general accordance with a NYSDEC approved Remedial Investigation Work Plan. Specifically, 26 shallow and seven (7) deep groundwater monitoring wells were installed and sampled. Five (5) vapor monitoring wells were installed and sampled. Nine (9) soil boring were completed. A total of 90 soil samples were collected during the installation of the soil borings, groundwater wells and vapor monitoring wells. Six (6) surface water and sediment samples were collected. All the samples with the exception of the vapor samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, PCBs and metals. The soil vapor samples were only analyzed for volatile organic compounds. Stream sediment

samples, and samples collected from the proposed stream relocation course, were also analyzed for Total Organic Carbon (TOC).

The results of the remedial investigation indicated that the metal concentrations above NYSDEC unrestricted use criteria were found in 35 of the soil sample locations, and concentration above NYSDEC commercial use criteria in 13 of the sample locations. In particular, mercury was identified in 26 samples at 10 locations in concentrations above NYSDEC unrestricted and commercial use criterion, respectively. SVOCs, pesticides, and metals were all identified in the site soils with concentrations above NYDEC commercial use criteria.

Unfiltered groundwater analytical results initially indicated that groundwater in all 26 sampled monitoring wells is impacted with a combination of VOCs, SVOCs, Pesticides, PCBs and metals at concentrations that exceed the Division of Water Technical and Operational Guidance Series (1.1.1) and Technical and Administrative Guidance Memorandum 4046 criterion. However, subsequent filtered shallow groundwater sample results requested by the NYSDEC indicated that the exceedances in the initial unfiltered samples were due to the presence of sediment in the groundwater samples as a result of high turbidity during sample collection procedures. Filtered samples do not contain concentrations of mercury above laboratory non-detect levels. Results of deep monitoring well samples contain limited petroleum and CVOC compounds above NYSDEC standards, and concentrations of metals above NYSDEC standards in certain locations. Deep groundwater samples did not exhibit concentrations of mercury above laboratory non-detect levels.

Concentrations of VOCs were found at each of the five soil vapor sampling locations, and one sample contained concentrations of PCE above guidance levels for indoor air even though this was an exterior sample.

Bis (2-Ethylexyl) phthalate, aluminum, and iron were detected in the Saw Mill River surface water with concentrations above the Division of Water Technical and Operational Guidance Series (1.1.1) and Technical and Administrative Guidance Memorandum 4046 criterion. This contamination likely exists as background levels and is not a result of impacts to the river from the Site.

All six sediment sample locations contained at least three SVOC compounds with concentrations exceeding "Ambient Water Quality Standards and Guidance Values and

Groundwater Effluent Limitations,” which are part of the New York State Division of Water Quality Technical and Operational Guidance Series (1.1.1). Four of the six samples contain pesticide compounds with concentrations above the guidance criteria. Metal concentrations above the “Severe Effect Level” criteria were detected in each sediment sample location. No trends in constituent concentrations were observed.

Qualitative Human Health Exposure Assessment

The Fish and Wildlife Impact Analysis concluded that potential migration of the Site’s Constituents of Potential Ecological Concern will not likely pose ecological risks to surrounding fish and wildlife resources.

The Human Health Exposure Assessment concluded that a low level increased risk to human health exists on a portion of the Site based on a benzene concentration in well MW-6. The report also indicated that asbestos and lead based paint must be evaluated in the buildings on Site prior to demolition

Summary of the Remedy

Soil that is grossly contaminated as defined in Environmental Conservation Law (ECL) 27-1405(15), will be removed and disposed off-Site. A composite cover system consisting of soil cover on open areas, asphalt or concrete pavement on walkways, roads and parking lots, and concrete building slabs will prevent exposure to contaminated soils. The soil cover layer will be one-foot thick and will consist of soil that meets the most restrictive of the following SCO: Commercial; Protection of Groundwater; or Protection of Environmental Resources, as listed in 6NYCRR Part 375-6 SCOs. The soil cover will overly a demarcation layer indicating the top of residual contaminated soil. The top six inches of the soil cover will be of sufficient quality to support vegetation. Slabs and paving systems (buildings, roadways, parking lots, etc.) will be at least 6 inches thick. Groundwater impacts associated with known former on-Site sources in the northern part of the property will be addressed through monitored natural attenuation.

A sub-slab depressurization system will be installed (see Sheet RA-4) to address potential indoor air quality impacts associated with the residual mercury and deeper VOC impacts.

1.0 INTRODUCTION

Struever Fidelco Cappelli, LLC, (SFC or the Applicant) entered into a Brownfield Cleanup Agreement (BCA) with the New York State Department of Environmental Conservation (NYSDEC) on December 12, 2006, to investigate and remediate the Site. SFC is a Volunteer in the Brownfield Cleanup Program (BCP). Residential, retail, and commercial development is proposed for the Site. When completed, the Site will contain the following facilities: retail and commercial buildings, as well as parking and loading areas on the ground floor; a multi-level parking deck above the ground floor; mixed commercial-residential buildings above the parking deck, including two high-rise towers; and a ballpark on the upper level. The BCP application includes additional details.

This Remedial Action Work Plan (RAWP) summarizes the nature and extent of contamination as determined from data gathered during the Remedial Investigation (RI), performed between August 13, and September 20, 2007, and subsequent investigation performed between November 17, 2007 and December 4, 2007. It provides an evaluation of a Track 1 cleanup and other applicable Remedial Action alternatives, their associated costs, and the recommended and preferred remedy. The remedy described in this document is consistent with the procedures defined in DER-10 and complies with all applicable standards, criteria and guidance. The remedy described in this document also complies with all applicable Federal, State and local laws, regulations and requirements. The RI for this Site did not identify significant fish and wildlife resources.

Per DER-10 Section 3.10, a Fish and Wildlife Resources Impact Analysis (FWRIA) has been performed and can be found in the Remedial Investigation Report (RIR), submitted to the NYSDEC by SESI Consulting Engineers PC in mid-December, 2007.

A formal Remedial Design document will be prepared. It is anticipated that the Draft Remedial Design Report will be submitted by May 2008.

1.1 SITE LOCATION AND DESCRIPTION

The Site is located in Yonkers, the County of Westchester, New York and is identified as Block 483, Lots 5, 7, 9, 10, 12, 13, 16, 50, 60 (non-street portions); Block 484, Lots 1, 3, 5, 8,

15, 51, 53, 55, 56, 57, 59, 61, 62, 63; Block 485, Lots 1, 2, 3, 4, 6, 7, 8, 10, 12, 14, 16, 18; Block 486, Lots 15, 16; Block 475, Lots 1, 9, 19, 22, 25, 26, 43, 50, 51, 53, 55, 59, 64, 65, 66, 67, 70, 75, 200 (non-street portion), 202; as well as Engine Place, James Street, John Street, Henry Herz Street, Ann Street and New School Street on the Yonkers Tax Map. A United States Geological Survey (USGS) topographical quadrangle map (Sheet RA-1) shows the Site location. The Site is situated on an approximately 12.95-acre area bounded by Elm Street to the northeast, Nepperhan Avenue to the southeast, New Main Street to the southwest, and Palisades Avenue to the northwest (see Sheet RA-1). A boundary map is attached to the BCA as required by Environmental Conservation Law (ECL) Title 14 Section 27-1419. The Site will be fully described in an Alta survey that will be prepared when the easement is developed.

A section of the Saw Mill River, approximately 1,500 feet long, traverses the Site. Of this stretch, approximately 700 feet is open, the remaining section runs through concrete culverts. The topography varies from relatively steep slopes in the northeastern part of the Site and along the banks of the Saw Mill River, to gentle slopes in the remaining parts of the Site. The surface elevations at the Site vary between 52 to 112 feet above mean sea level.

1.2 CONTEMPLATED REDEVELOPMENT PLAN

The Remedial Action to be performed per the RAWP is intended to make the Site protective of human health and the environment consistent with the contemplated end use. The Remedial Action contemplated under this RAWP will be implemented simultaneously with Site redevelopment.

Site usage at the ground level will be commercial (offices and retail businesses), and parking/loading areas. A portion of the Saw Mill River will be relocated and refurbished to provide passive recreation via a waterfront walkway. There will be no direct physical access to the water in the river. Other Site uses on the upper levels include parking areas, a 6,500-seat minor league baseball park, office space, commercial space and residential space. Two 51-story towers are also proposed. The proposed Site development plan is included as Sheet RA-2.

1.3 DESCRIPTION OF SURROUNDING PROPERTY

All adjacent property owners are on the Brownfield Site Contact list for receipt of public notices. The surroundings properties consist of City Hall and its associated parking lot structures and office buildings to the west, retail stores, commercial uses and a gas station to the north, a church and associated parking lot, as well as other commercial establishments to the east and south.

- Schools and/or day care facilities - There are no schools or day care centers on or adjacent to the Site.
- Hospitals - The nearest hospital is located at 967 North Broadway, approximately 2.5 miles north-northwest of the Site.
- Residential areas - The Site is located in a predominantly commercial area. There are potentially residents living in apartments above retail or commercial establishments.
- Rivers/streams - The Saw Mill River flows from the northeast for over 16 miles before it enters the Site. As the River exits the site, it flows for approximately 1,000 feet to the northwest (in a culvert) before it empties into the Hudson River.
- Wetlands - The wetlands, if any, in the surrounding property would be associated with the Saw Mill River.
- Human/Ecological Receptors – Ecological receptors include the surface water in the Saw Mill River. People occupying buildings, particularly those with basements, may be exposed to soil vapors. Human exposure may also occur due to construction activities (e.g. repairing subsurface utilities) due to contact with soils and/or groundwater. Potential human receptor exposures will be addressed in this RAWP.

2.0 DESCRIPTION OF REMEDIAL INVESTIGATION FINDINGS

The Site was investigated in accordance with the scope of work presented in the NYSDEC-approved Remedial Investigation (RI) Work Plan, prepared by S&W Redevelopment of North America, LLC, dated January 2007. The investigation was conducted between August 13, 2007 and September 20, 2007. A Draft RI Report was submitted to NYSDEC on November 7, 2007 for review and comment. Based on agreements with the NYSDEC, additional RI fieldwork was conducted between November 17, 2007 and December 4, 2007 to address data gaps and complete a full nature and extent investigation of the Site. Specifically, additional investigation

was requested to evaluate deep contamination and contamination present in the vicinity of the proposed Saw Mill River relocation. An updated Draft RI Report was submitted to the NYSDEC on December 18, 2007 for review and approval.

2.1 SUMMARY REMEDIAL INVESTIGATIONS PERFORMED

Between August 13 and September 20, 2007, the RI was implemented to investigate potential environmental impacts associated with the on-Site historic operations, a site wide investigation was completed by SESI in general accordance with the NYSDEC approved, RIWP. Modifications of the RIWP due to access and other Site constraint issues were approved by the Department. Additional RI fieldwork was conducted between November 17, 2007 and December 4, 2007 to address data gaps and complete a full nature and extent investigation of the Site, including a deep contamination investigation and an investigation of contamination present in the vicinity of the proposed Saw Mill River relocation.

2.1.1. Borings and Wells

In August and September 2007, 26 groundwater monitoring wells and five (5) soil vapor monitoring wells were installed. The borings were advanced to depths ranging from 7.5 feet to 40 feet bgs. Installation of four of the proposed monitoring wells could not be accomplished, and the final location of a few of the installed monitoring wells was changed, due to access constraints, conflict with location of utilities, etc. Groundwater monitoring wells were installed with 4-inch diameter well screens intersecting the water table. The depths of the wells varied from 10 to 25 feet below grade. Copies of the boring logs are included in Appendix A.

In November and early December 2007, nine supplemental soil borings were advanced to depths of approximately 17 to 30 feet bgs (approximately 15 to 20 feet below the lowest level of the proposed redevelopment grade). Six of these borings were drilled in the proposed location of the relocated Saw Mill River, and three were drilled in the proposed building footprint. Additionally, seven (7) deep supplemental monitoring wells were installed to the top of bedrock at depths ranging from 35 to 51 feet bgs with 2 or 4-inch diameter well screens. Copies of the boring logs are included in Appendix A.

2.1.2 Samples Collected

SESI collected 40 soil samples during the installation of the 26 shallow monitoring wells, although this was not required per the NYSDEC-approved RIWP. Subsequently, groundwater, soil vapor, sediment and surface water samples were collected. A summary of the samples collected is listed on Table 1 and their locations are depicted on Sheet RA-3.

SESI collected 50 soil samples during the installation of the additional 7 deep monitoring wells and 9 soil borings. Subsequently, deep groundwater samples were collected in the monitoring wells. A summary of the samples collected is listed on Table 1 and their locations are depicted on Sheet RA-3.

Soil

During shallow groundwater and vapor well installation, soil samples were collected only in the vadose zone, based on PID readings and visual or olfactory indicators of presence of impacted soil. A total of 40 soil samples were collected at depths ranging from 5 feet to 20 feet bgs. Additional soil samples could not be obtained due to the subsurface conditions encountered (e.g. numerous boulders and cobbles). During deep well installation, and well advancing soil borings, soil samples were collected from deeper depths to characterize soils near the proposed development sub-grades, immediately above the bedrock elevation, and at the sub-grade elevations along the planned relocated Saw Mill River alignment.

Groundwater

Shallow groundwater samples were collected from a total of 26 wells and deep groundwater samples were collected from a total of 7 wells. Groundwater depths ranged from 0.3 to 19 feet below grade. Groundwater sampling included collection of the following information prior to, during, and after sample collection: pH, specific conductivity, temperature, dissolved oxygen concentration and depth to water. Three well volumes were purged prior to sample collection. During the first round of sampling, despite purging the wells, high turbidity was noted in several of the groundwater samples collected. High turbidity may cause elevated metals concentrations in the samples. To determine if metal concentrations were a result of high turbidity, the second round of shallow well sampling included collecting filtered and unfiltered samples. The deep

monitoring well sampling included monitoring water turbidity, and, if elevated turbidity was noted, low flow purge techniques were implemented.

The first round of shallow and the deep groundwater samples were analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-Volatile Organic Compounds, Target Analyte List (TAL) metals and cyanide, pesticides and PCBs. Field Blanks were included each day sampling was conducted. The second round of shallow groundwater samples, including both the filtered and unfiltered samples, were analyzed for TAL metals only.

Surface Water and Sediment

Six (6) surface water and six (6) surface water samples were collected. Surface water and sediment at one other proposed location could not be collected due to access constraints. Surface and sediment samples were collected directly into sampling jars at three (3) locations. At the remaining three (3) locations (the section of the river that is not open), surface water samples were collected utilizing disposable bailers and sediment samples were collected using a hand auger (access was through on-site manholes located on top of the river). Sediment samples were collected from the six inch interval from 0-6 inches beneath the river bed. The water and sediment samples were analyzed for TCL VOCs, SVOCs, PCBs, pesticides, TOC, and TAL metals.

In November 2007, six borings SB-1 thru SB-6 were advanced, at locations along the planned relocated Saw Mill River alignment, to depths ranging from 0 feet to 30 feet below the ground surface. The borings were advanced to evaluate the soil/sediment quality along the length of the planned alignment. Soil samples were collected from each boring location at multiple depths. The samples were subsequently analyzed for VOCs, SVOCs, PCBs, pesticides, metals and TOC.

Soil Vapor

Soil vapor samples were collected, in accordance with protocol outlined in the RIWP, at soil vapor well locations SV-1, SV-2, SV-3, SV-8 and SV-9. Soil vapor wells are 4-inches in diameter and extend to a depth of 5 feet above the groundwater table, within the vadose zone. Three well volumes of soil vapor were purged. During the sampling a tracer gas was utilized to evaluate the integrity of seals around the monitoring wells and connections between sampling

equipment and monitoring wells. Negative pressure stainless steel canisters were utilized to collect the soil vapor samples following the well purge.

2.1.3 Chemical Analytical Work Performed

Soil, groundwater, sediment and surface water samples collected by SESI were analyzed for Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), Polychlorinated Biphenyls (PCBs), pesticides, and Target Analyte List (TAL) metals, and in stream sediment locations, Total Organic Carbon (TOC). Soil vapor samples were analyzed only for VOCs in accordance with USEPA method TO-15. A summary table documenting these analytical tests and associated samples is included as Table 1.

2.2 SIGNIFICANT THREAT

The NYSDEC and NYSDOH have not yet made a No Significant Threat Determination for this site.

2.3 SITE HISTORY

2.3.1 Past Uses and Ownership

The Site has a long history of industrial use that spans over 150 years. Historic industrial use within the Site boundary included manufacturing operations associated with:

- Several hat factories (1886 – 1898);
- Leather factories (1886 – 1917);
- A gas station (1951 – Present);
- A brewery (1898 – 1917);
- An automotive repair shop (1951 – 1956);
- A chemical dye manufacturer (1971 – 1991); and
- Laundry facilities (1886 – 1917).

Contaminants of concern discovered during the RI include mercury, which is associated with hat manufacturing operations, VOCs and SVOCs, which are associated with the leather and chemical dye manufacturing, and gas station operations.

The structures located in the southwestern part of the Site (west of New School Street) were demolished sometime between 1942 and the late 1950's and converted into the existing parking lot.

2.3.2 Phase I and Phase II Reports

Advanced Cleanup Technologies, Inc. and S&W Redevelopment of North America, LLC

Several Phase I Environmental Site Assessments (ESA) for various lots within the Site were completed by Advanced Cleanup Technologies, Inc., between February and May 2006. A site wide Phase 1 ESA, dated August 2006, was completed by S&W Redevelopment of North America, LLC. Several areas of concern were identified by the ESAs, including Underground Storage Tank releases.

The ESA reports associated with these investigations were submitted to the NYSDEC as a part of the BCP application.

Warren and Panzer Engineers, P. C. (WPE)

A Phase 1 ESA was completed by WPE in August 2004. Subsequently, on October 28, 2004, WPE completed a limited subsurface investigation to evaluate subsurface geotechnical characteristics specifically at 78 and 90-93 Elm Street located in the northeast corner of the Site. WPE advanced three (3) temporary borings, B-1, B-2 and B-3, to depths ranging from 17.5 feet to 19 feet bgs.

The analytical results associated with the soil samples indicated that the concentrations of a few metal exceeded the applicable Standards, Criteria, and Guidelines (SCGs – see Appendix C). However, lead (3,600 mg/kg) was detected at relatively high concentration in the composite samples collected from boring location B-1. Trace levels of VOCs and CVOCs were detected in samples from boring locations B-2 and B-3.

USEPA Mobile Lab Investigation Implemented by PS&S

- PS&S conducted a limited investigation to evaluate the metals and VOC impacts at various locations throughout the site.
- Soil samples collected by PS&S were analyzed for VOCs and PP Metals. EPA's mobile lab cannot sample for SVOCs.

The information gathered during this initial investigation of the parking lot site yielded limited results since the geoprobe equipment could not penetrate the boulder and cobble layer at the Site.

2.3.3 Sanborn Maps

All Sanborn Maps available for this Site were reviewed prior to preparation of the RAWP. They are included in Appendix D. The Site has been developed since at least 1889, however, no historic Sanborn information dates back to the early 1800's. From 1889 until the present, the perimeter properties have been occupied by 1 and 2 story wood framed and brick retail/commercial type buildings. The interior portion of the "Site" that is presently a parking lot was at one time occupied by larger industrial businesses including, but not limited to a hat factory (Waring Hat Manufacturing Company), brewery (Yonkers Brewery), leather factories, chemical plants and a contractor's yard. Other smaller buildings within the interior of the site consisted of garages, carpenter shops, auto repair businesses, wagon sheds, a laundry business, a bakery, etc. Most of these structures were demolished sometime between 1942 and the late 1950's and replaced with the current parking lot.

According to Sanborn maps:

1889 - A portion of the Site was an island surrounded by the waters of the Saw Mill River. This portion of the Site is occupied by the Yonkers Brewery and other brick and wood structures, horse stables and sheds. The properties along the perimeter of the Site are 1, 2, and 3 story wood and brick structures. Included are a fire engine house and a hardware store. The interior portions of the Site also have 1, 2, and 3 story wood and brick structures including a Hat Factory and a Bottling Works Company.

1908 - The water body on the north side of the island was filled. Most of the buildings/structures are similar to the 1889 map.

1917 - The portion of the Saw Mill River located in the northwestern vicinity of the Site is covered with reinforced concrete. The Yonkers Brewery is still in operation with buildings for storage, machine shop, coal bins and bottling. The Hat Factory has been demolished and the land is undeveloped. The interior of the property is being used for a garage, carpenter shops, auto repair businesses, wagon sheds, a contractor's yard, a laundry business, a bakery and retail businesses.

1942 - Many of the building depicted along New Main Street and Palisades Avenue are still present today. The Yonkers Brewery is now the State Cereal Beverage Company.

1957, 1971, 1973, 1978, 1989 and 1991 - the Site appears mainly as it does today.

2.4 GEOLOGICAL CONDITIONS

The Site is located within the Highlands Province (Hudson Highlands region) of New York. A review of the regional bedrock geology (USGS Map 1-514-A - Engineering Geology of the Northeast Corridor Washington D.C., to Boston, Massachusetts: Bedrock Geology) in the vicinity of the Site indicates that the Site overlies two bedrock lithologic units:

- Gneiss: biotite-quartz-feldspar gneiss with associated migmatite, granulite, amphibolites, and granitic rocks
- Marble, crystalline limestone, and dolomite

A review of the Soil Survey of Putnam and Westchester Counties, New York, dated September 1994, prepared by United States Department of Agriculture, Soil Conservation Service, reveals that surficial soils in the vicinity of the site are classified as follows:

Uf – Urban land: "...at least 60 percent if the land surface is covered with buildings or other structures. The areas include parking lots, shopping centers...slopes range from 0 to 8 percent. Included in the mapping are small areas of soil that have not been appreciably altered...The undisturbed soils are in areas between buildings or other structures..."

During the Remedial Investigation activities completed by SESI, borings were extended to depths ranging from 8 to 51 feet below ground surface (bgs). A significant amount of cobbles, boulders and rubble was encountered in the upper 10 to 20 feet of the Site, and a significant

amount of cobbles and boulders was encountered to the completion depth of the borings. Drilling to facilitate monitoring well installation was extremely difficult, even when using a large air powered rotary drill rig.

A review of the SES1 boring logs and the Preliminary Geotechnical Report, dated January 30, 2007, prepared by McLaren Engineering Group of West Nyack, NY, reveals the following site stratigraphy (from the top to the bottom):

- Fill: man-made fill extending to a maximum depths of about 5-feet to 28-feet, was encountered throughout the site and is predominantly, gray to brown sand with a little gravel, a little silt with fragments of brick/wood/concrete, and cobbles and boulders.
- Glacial Till: encountered below the fill and extending to a maximum depth of about 85' bgs, consists of gray to brown sand, with a little gravel, a little silt with numerous cobbles and boulders.
- Bedrock: generally present beneath the glacial till, bedrock was encountered at depths ranging from 3' to 85' bgs.

Fill depths, rock elevations and geologic cross sections are shown on sheets RA-5, RA-6A, RA-6B, and RA-6C.

During the monitoring well sampling event between September 14 and 18, 2007, groundwater was encountered at depths ranging from 0.3 ft below ground surface (bgs) at MW-10 to 19 ft bgs at MW-14. The direction of groundwater flow, on-Site is generally west to east. The groundwater hydraulic gradient ranges from 10% on the eastern side (steeply sloped side of the site) to approximately 3% across the remainder of the site. A second round of well sampling was performed in December 2007. Additionally, seven deep groundwater wells were installed. Groundwater elevations collected during the second sampling event as well as groundwater elevations collected from the deep wells indicates similar groundwater flow direction and hydraulic gradients. Groundwater elevation contours and direction of groundwater flow are presented on sheet RI-2 submitted with the RIR.

2.5 CONTAMINATION CONDITIONS

2.5.1 Conceptual Model of Site Contamination

Historic records, primarily found on Sanborn Maps included as part of the Phase I studies encompassing the site, depict many former uses at the Site that may have impacted the Site soils and groundwater. Historic industrial use within the Site boundary includes several hat factories, leather factories, and chemical dye manufacturers. Historic petroleum spills were identified at 127-129 New Main Street as well as spills at adjacent properties on Palisade Avenue. The Yonkers Fire Station located at 5-7 New School Street also has a history of petroleum spills. In addition to spill data, visual evidence of USTs (fill and vent pipes) was identified during the Phase I site inspections. Soil and groundwater samples collected near the operating gas station at the Site indicate possible releases from associated USTs.

General Site geology is discussed in section 2.4. In summary, three stratigraphic layers were identified at the Site:

- Fill: man-made fill extending to a maximum depths of about 5-feet to 28-feet, was encountered throughout the site and was predominantly, gray to brown sand with a little gravel, a little silt with fragments of brick/wood/concrete.
- Glacial Till: encountered below the fill and extending to a maximum depth of about 85' bgs, consisting of gray to brown sand, with a little gravel, a little silt with numerous cobbles and boulders.
- Bedrock: generally present beneath the glacial till, bedrock was encountered at depths ranging from 3' to 85' bgs.

Fill depths, rock elevations and associated geologic cross sections are shown on sheets RA-5, RA-6A, RA-6B, and RA-6C. Soil impacts were identified in the both the fill and glacial till layers; however, higher concentrations were observed in the fill layer. A summary of the type and level of impacts identified and the soil layer where the impact was identified is presented in Section 2.5.4.

The shallow monitoring wells were installed between 8 and 25 feet below grade. Most extend into the glacial till. During the monitoring well sampling event between September 14

and 18, 2007, groundwater was encountered at depths ranging from 0.3 ft below ground surface (bgs) at MW-10 to 19 ft bgs at MW-14. The direction of groundwater flow, on-site, is generally west to east. The Saw Mill River is the outcropping of the groundwater table at the ground surface. The groundwater hydraulic gradient ranges from 10% on the eastern side (steeply sloped side of the site) to approximately 3% across the remainder of the site. Rising head tests were performed in three shallow groundwater wells during the September sampling event. Hydraulic conductivity was determined based on data collected during those tests, and found to be approximately 1.18×10^{-4} cm/sec.

Groundwater elevation contours and direction of groundwater flow are presented on sheet RI-2 of the RIR. A summary of the impacts identified is presented in Section 2.4.5. Isopleths depicting the extent impacts to groundwater are presented on Sheet RI-2D of the RIR and Sheet RA-3 of the RAWP.

A second round of well sampling was performed in December 2007. Additionally, seven deep groundwater wells were installed. Groundwater elevations collected during the second sampling event as well as groundwater elevations collected from the deep wells indicates similar groundwater flow direction and hydraulic gradients as those identified during the September 2007 sampling event.

2.5.2 Description of Areas of Concern

As stated above, the Site had numerous historical industrial uses which adversely impacted soil and groundwater. The businesses were located throughout the entire site.

Visual evidence of USTs (fill and vent pipes) was identified during the Phase 1 site inspections. Many buildings at the Site may have historically used heating oil, and it is planned that any currently unidentified USTs will be discovered and properly removed during construction operations. An operating gas station is located at the intersection of Elm and New School Streets, and it contains several in-use USTs.

As stated above, historic petroleum spills were identified at 127-129 New Main Street as well as spills at adjacent properties on Palisade Avenue. The Yonkers Fire Station located at 5-7 New School Street also has a history of petroleum spills.

Numerous roof downspouts and underground storm drains have been observed at the Site. However, most of the Site is occupied by buildings or parking areas and is impervious. Several stormwater culverts discharge into the Saw Mill River.

There is a possibility that some of the groundwater contamination is being caused by off-Site current use and historic use sources. Upgradient dry cleaners are present along Nepperhan Avenue, which may be the source of some of the deeper VOC contamination not present in shallow on-Site soils or groundwater.

2.5.3 Identification of Standards, Criteria and Guidance (SCG)

The following Standards, Criteria and Guidance (SCG) documents were used for evaluating the analytical results of soil, groundwater, stream surface water, stream sediment and soil vapor samples collected during the RI:

- TAGM 4046 - Determination of Soil Cleanup Objectives (SCOs) and Cleanup Levels (January 1994)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations (June 1998)
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006)

2.5.4 Soil/Fill Contamination

The RIR presented the analytical results for the 90 soil samples that were collected during the RI. The samples were submitted to Accutest Laboratories Inc. and Hampton Clarke/Veritech, both NYS Department of Health certified labs, for analysis. The ASP protocol laboratory data packages and related Data Usability Summary Reports are included in the RIR.

2.5.4.1 Summary of Soil/Fill Data

For purposes of evaluating the remedial alternatives associated with the proposed site redevelopment, the analytical results of the soil samples were compared to the NYSDEC soils

Unrestricted Use and Commercial Use SCOs. RIR Sheet RI-3 shows the locations of all exceedances above the Unrestricted Use Criteria and the Commercial Use Criteria. The following table summarizes the results of the soil investigation.

TABLE 1

Parameter	# Samples Collected	# Samples Analyzed	# Exceedances of Unrestricted Use Criteria	# Exceedances of Commercial Use Criteria
VOCs	90	90	7	0
SVOCs	90	80	17	11
PCBs	90	82	9	2
Pesticides	90	82	12	0
Metals	90	82	82	16

Of the 90 soil samples collected, 84 contained concentrations of one or more of the above listed criteria. A breakdown of the type of soil the samples were collected from and the level of exceedance is presented on the following table:

Table 2

Soil Type	Fill	Glacial Till
Exceedances	47	37
Above Unrestricted Use Criteria (Below Commercial)	25	36
Above Commercial Use Criteria	22	1

2.5.4.1 Comparison of Soil/Fill with SCGs

Of the 90 soil samples collected as part of the RI, 84 contained concentrations above Track 1. Table #2 indicates exceedances from Track 1 Unrestricted SCOs for all soil/fill at the Site. Exceedances were noted in both the fill layer and the glacial till layer; however, the exceedance concentrations were higher in the fill layer. Approximately one-half of the exceedances obtained in the fill layer samples contained concentrations above NYS Commercial Criteria, while only one sample, MW-29-8-10, in the glacial till contained a concentration above NYS Commercial levels.

Sixteen (16) metal exceedances, eight (8) of which were mercury, eleven SVOC exceedances and two (2) PCB exceedances were detected above NYS Commercial Criteria. Most are in areas of historic on-Site uses where mercury was a known contaminant.

2.5.5 On-Site and Off-Site Groundwater Contamination

On-site groundwater was evaluated using 26 shallow groundwater monitoring wells installed as part of the remedial investigation. Samples were collected from each well and analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, Target Analyte List (TAL) metals and cyanide, pesticides and PCBs. A secondary round of sampling of the existing wells included total and dissolved TAL metals.

Additionally, the DEC requested seven (7) groundwater wells to be installed to characterize the groundwater at deeper depths. The seven wells were installed to depths just above the bedrock, approximately between 35 to 51 feet bgs. The deep well locations were chosen to evaluate potential deep groundwater contamination where the highest impacts were identified in the shallow groundwater and at up-gradient and down-gradient flow locations. Samples were collected from each well and analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, Target Analyte List (TAL) metals and cyanide, pesticides and PCBs.

2.5.5.1 Summary of Groundwater Data

Analytical results of groundwater samples collected from the monitoring wells are depicted on Table 3 and Sheets RI-2A, RI-2B and RI-2C of the RIR. The extent of the impacts associated

with the different contamination categories are depicted on Sheet RI-2D of the RIR and sheet RA-3 of the RAWP.

As presented in the RIR, a review of the analytical results indicates that groundwater in all the sampled monitoring wells is impacted by a combination of VOCs, SVOCs, PCBs and metals, at concentrations that exceed the NYSDEC standards. The constituent concentrations were compared to the more stringent of these two applicable standards: Division of Water Technical and Operational Guidance Series (1.1.1) and Technical and Administrative Guidance Memorandum 4046. A detailed description of the analytical results is presented in the RIR.

2.5.5.2 Comparison of Groundwater with SCGs

As stated above, a review of the analytical results indicates that groundwater in all the sampled monitoring wells is impacted by a combination of VOCs, SVOCs, PCBs and metals, at concentrations that exceed the NYSDEC standards. A table that indicates exceedances from GA groundwater standards in monitor wells prior to the remedy is shown in Table 3. Isopleths depicting the extent impacts to groundwater are presents on Sheet RI-2D of the RIR and Sheet RA-3 of the RAWP. Selection of the proposed long-term groundwater monitoring wells was based on the results depicted on Sheet RI-2D and the groundwater flow which is depicted on Sheet RI-2A of the RIR.

2.5.6 On-Site and Off-Site Soil Vapor Contamination

Air monitoring during groundwater and soil vapor monitoring well installations did not indicate any ambient concentrations of organic vapors, mercury, or dust. Organic and mercury vapors were detected in several borings at very low levels; the results are indicated on the boring logs which are included in Appendix G in the RIR.

On-Site soil vapor was collected from five soil vapor collection wells. Concentrations of 25 VOCs were detected above the laboratory minimum detection limits (MDL), with each soil vapor location containing some compounds. SV-1 contains eight compounds with concentrations above MDL, SV-3 and SV-9 contain 12 compounds with concentrations above MDL, and SV-2 and SV-8 contain 14 compounds with concentrations above MDL.

The State of New York Department of Health (NYSDOH) does not have any standards, criteria or guidance values for concentrations of volatile chemicals in subsurface vapors from exterior probes (DOH, October 2006). However, NYS has developed guidelines for concentrations of chemicals in indoor air and from sub slab samples. The soil vapor results were compared to the air guidelines developed by NYSDOH. Only one compound was detected above NYSDOH guidelines. Well SV-2 contained tetrachloroethene at 286 ug/m³. The compounds detected above MDLs are indicated on Figure RI-5 of the RIR. A complete list of the soil vapor analytical results is presented on Table 4-Soil Vapor Results which is included in Appendix C of the RIR.

2.5.6.1 Comparison of Soil Vapor with SCGs

Only one compound was detected above NYSDOH guidelines for indoor air, which were merely used as a tool for comparison. Well SV-2 contained tetrachloroethene at 286 ug/m³. A table of soil vapor data collected is shown in Table 44. Planned construction will include sub-slab venting in all enclosed areas (see Sheet RA-4).

2.5.7 Stream Surface Water and Sediment

Seven (7) surface water and stream sediment locations were proposed in the RIWP submitted by S&W. One location, SED/SW-7, was located approximately 400 feet from the entrance to the culvert, and could not be accessed; therefore, it was not sampled. DEC was made aware of the inability to access this sample location in the July 2007 Progress Report. Sheet RI-4 of the RIR shows the surface water and stream sediment sample locations. The water and sediment samples were analyzed for TCL VOCs, SVOCs, PCBs, pesticides and TAL metals. Stream sediment samples were also analyzed for TOC.

The surface water results were compared to "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations" which are part of the New York State Division of Water Quality Technical and Operational Guidance Series (1.1.1). The river's sediment results were compared to the criteria listed in NYSDEC "Technical Guidance for Screening Contaminated Sediments - January 1999".

Surface Water

One VOC, one SVOC, and seven metal compounds were detected with concentrations above the MDL. Bis (2-Ethylexyl)phthalate, aluminum, and iron were detected with concentrations above the applicable Water Quality Standard. No trends in sample concentrations were observed. Generally, the surface water samples throughout the river contain approximately equal concentrations of the same COCs. This suggests that contamination from the site is not migrating to/or impacting the Saw Mill River, and the slight water quality criteria exceedances exist as background conditions.

The compounds detected above MDLs are indicated on Sheet RI-5 of the RIR. A complete list of the surface water analytical results is presented on Table 5-Stream Sediment and Surface Water Results, which is included in Appendix C of the RIR.

Stream Sediment

The analyte concentrations in the sediment samples were normalized with respect to the total organic carbon content associated with the sample locations. All stream sediment sample locations contained at least three SVOC compounds (benzo(a)anthracene, benzo(a)pyrene, and bis(2-Ethylhexyl)phthalate) with concentration above the 1999 guidance criteria and ecological SCOs. Four of the six samples contained pesticide compounds with concentrations above the criteria. Metals concentrations above the "Severe Effect Level" criteria were detected in each sediment sample location. No trends in sample concentrations were observed.

Proposed Stream Relocation Course Sample Results

A review of the analytical results associated with samples collected from borings advanced in the vicinity of the proposed re-alignment of the Saw Mill River indicates that samples SB-3 (16'-18'), MW-15 (18'-20') and MW-38 (4'-6') are impacted. A combination of PCBs and semi-volatile organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, etc.) were detected at concentrations which exceeded the applicable most stringent sediment criteria..

Additionally, several metals exceeded the applicable Lowest Effect Level. However, only manganese and nickel were detected in samples SB-2 (1,600 mg/Kg at a depth of about 15'-17' bgs) and SB-6 (79 mg/kg at depth of about 28'-30' bgs) at concentrations that exceeded the applicable Severe Effects Level, respectively.

Analytical results of the surface water and stream sediment samples are depicted on Table 5 of this report and Sheet RI-4 of the RIR. The boring locations along the proposed Saw Mill River Re-alignment are presented on Sheet RA-3.

2.6 ENVIRONMENTAL AND PUBLIC HEALTH ASSESSMENTS

2.6.1 Qualitative Human Health Exposure Assessment

A qualitative human health exposure assessment (HHEA) was conducted as part of the Remedial Investigation, and is included as Appendix C to the Remedial Investigation Report. The HHEA makes the following conclusions:

- Based on soil, sediment, soil vapor, and groundwater test results available at the time of this report, the only carcinogen with an increased lifetime risk is benzene, found in one soil sample at the gas station sampling point (MW6) (Table I, in Appendix C of the RIR). The increased risk is only slightly above the one-in-a-million risk and must be described as "LOW," which would indicate the need for further assessment or corrective action. Based on a single sample, the prudent approach is to conduct additional sampling during the remedial work to more clearly identify the extent of the contamination. This will allow a clearer determination of cancer risk and any possible corrective action.

- Also based on the site testing, no concentration of non-carcinogens exceeded the Reference Dose risk, and thus, the risk is considered minimal to the surrounding population (Table II, in Appendix C of the RIR).

- Site activities for the 2 to 3 years of Site development may impact workers and the surrounding community. The presence of benzene at the gas station, residual carcinogens, pesticides, PCB's, and heavy metals and their exposure potential must be addressed during construction and Site development as part of a Site specific Health and Safety Plan (HASP).

- A Site specific HASP must be developed to evaluate site workers' exposure potential and risk to surrounding population. The HASP must include initial site testing, exposure potential, protection/corrective measures, and regulatory compliance. There is a high probability that at least some of the Site buildings may contain asbestos and lead-based paint. Surveys are required to determine the presence of these materials. The asbestos must be removed prior to demolition. The contractors must be informed of the possible presence of lead-based paint in order to properly protect their workers and comply with OSHA regulations.

2.6.2 Fish & Wildlife Remedial Impact Analysis

A Fish and Wildlife Impact Analysis (FWIA) was completed in conjunction with the RI. The report concluded that potential adverse effects and ecological risks to fish and wildlife resources will be unlikely from migration of Constituents of Potential Ecological Concern (COPEC). The FWIA is included as Appendix D to the RIR.

2.7 INTERIM REMEDIAL ACTION

An Interim Remedial Action Work Plan (IRM WP) was prepared by S&W Redevelopment of North America, LLC in September 2006, and subsequently approved by the NYSDEC. Some of the actions proposed in the IRM WP are still valid, however the IRM WP was not implemented, and this RAWP will now be the remedial plan for the Site.

2.8 REMEDIAL ACTION OBJECTIVES

Based on the results of the Remedial Investigation, the following Remedial Action Objectives (RAOs) have been identified for this Site.

2.8.1 Groundwater

RAOs for Public Health Protection:

1. Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards.
2. Prevent contact with, or inhalation of, volatiles emanating from contaminated groundwater.

RAOs for Environmental Protection:

3. Prevent the migration of contaminants from on-site groundwater to surface water or off-site groundwater.
4. Remove the potential sources of groundwater contamination.

2.8.2 Soil

RAOs for Public Health Protection:

1. Prevent ingestion/direct contact with contaminated soil.
2. Prevent inhalation of, or exposure to, contaminants volatilizing from contaminated soil.

RAOs for Environmental Protection

3. Prevent migration of soil contaminants that would result in off-site groundwater or surface water contamination.
4. Remove sources of soil contamination.

2.8.3 Surface Water

RAOs for Environmental Protection:

1. Ensure existing surface water quality is not impacted by the Site contaminants of concern.
2. Ensure relocation/restoration of the Saw Mill River does not impact existing surface water quality.

2.8.4 Sediment

RAOs for Public Health Protection:

1. Prevent direct contact with contaminated sediments.

RAOs for Environmental Protection:

1. Prevent release(s) of contaminant(s) from sediments that would result in surface water levels in excess of (ambient water quality criteria).
2. Remove contaminated sediments.

3.0 DESCRIPTION OF REMEDIAL ACTION PLAN

3.1 EVALUATION OF REMEDIAL ALTERNATIVES

3.1.1 Description of Alternatives

Track 1

The Track 1 cleanup alternative would allow the Site to be redeveloped for any purpose without restrictions on future use. This alternative would involve the removal and/or remediation of all contaminated soils above bedrock to achieve Unrestricted Use Soil Cleanup Criteria for the site. This alternative may also involve a future restriction on groundwater use following the bulk reduction of contamination from the Site if not fully successful. Feasible remedial technologies for soil that may be used to implement this alternative include:

SVOCs - Chemical Oxidation – Chemical oxidation converts hazardous contaminants to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. The oxidizing agents most commonly used are ozone, hydrogen peroxide, or permanganate. Oxidant delivery systems often employ vertical or horizontal injection wells and sparge points with forced advection to rapidly move the oxidant into the subsurface.

SVOCs, Metals, Pesticides, and PCB Contamination - Excavation and Off-Site Disposal - This technology involves the removal of metals impacted soil/sediment, and transportation to an off-site facility for disposal. This alternative may require treatment (e.g. stabilization) prior to transportation depending on potential land disposal restrictions and/or local regulations and would result in a mass excavation of the Site down to bedrock, which in some locations is down to 85 feet.

Tracks 2 and 3

Track 2 and 3 cleanup alternatives involve remediation of the Site to less stringent criteria than a Track 1 alternative. The Track 2 alternative would meet a less stringent Commercial Soil

Cleanup Objective (SCO) in the 6 NYCRR Part 375 Section 6.8(b) regulations for each Site contaminant than a Track 1 SCO in the 6 NYCRR Part 375 Section 6.8(a) regulations, or alternatively, the Department may approve a site-specific modification to these objectives for a Track 3. Both tracks would involve remediation of impacted soil to bedrock or a depth of 15 feet below proposed finished grades, whichever is encountered first. Long-term institutional and engineering controls would be implemented to address contamination in groundwater or soil vapor. Feasible remedial technologies that may be used to implement this alternative include:

SVOCs, Pesticide, and PCB Contamination – Excavation and off-Site Disposal - Thermal Desorption - Thermal Desorption involves excavating and heating the contaminated soil to volatilize water and organic compounds. A carrier gas or vacuum system transports volatilized water and organics to the gas treatment system, and groundwater treatment concentrates the collected contaminants. After treatment, the clean soil could be returned to the Site.

Soil Contamination - Excavation and Off-Site Disposal of Source Areas and other soils until Track 2 Commercial SCOs are achieved or Track 3 negotiated SCOs are achieved – Refer to description in Track 1.

Track 4

The Track 4 cleanup alternative would involve hot spot removal of contaminated soils that exceed Commercial SCOs and constructing a capping system over the remaining contaminated soils. The cap would consist of concrete slabs, asphalt pavement, or soil meeting the more stringent of the following SCO: Commercial; Protection of Groundwater; or Protection of Environmental Resources, as listed in 6NYCRR Part 375-6 SCOs, unless less strict criteria is agreed to by the NYSDEC. Below the capping containment system, contaminated soil could remain; however, areas that are determined to be source areas will need to be addressed by removal, and if necessary treatment. Restrictions would be placed on future site use. The remedial alternative for a Track 4 cleanup would rely on the use of long-term institutional and engineering controls to address all media, including soil. Feasible remedial technologies that may be used to implement this alternative include:

Source Removal of Hot Spot Areas – Excavation and Off-Site Disposal

Site Capping – This technology involves constructing a separation layer (e.g. a one-foot soil capping layer with a geotextile marker layer or 6 inches of concrete or asphalt) to prevent direct contact with the contaminants, and restrict storm water from entering the subsurface. This alternative may be combined with another treatment method to reduce the volume/concentration of contamination remaining on Site under the cap. Methods to prevent migration of volatilized contaminants through the cap may be integrated into the design (e.g. sub-slab vapor extraction system).

3.1.2 REMEDIAL ALTERNATIVE EVALUATION

The Remedial Alternative Evaluation compares how each track, as described above, would meet several performance factors/criteria, which are based on documents including, but not limited to:

1. 6 NYCRR Part 375-6 Soil Cleanup Objectives to evaluate soil conditions at the Site;
2. New York State Groundwater Quality Standards – 6 NYCRR Part 703 to evaluate groundwater at the Site;
3. NYSDEC Ambient Water Quality Standards and Guidance Values – TOGS 1.1.1 to evaluate groundwater at the Site;
4. NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation - December 2002 (or later version if available);
5. NYSDEC Draft Brownfield Cleanup Program Guide – May 2004 to evaluate compliance with the program;
6. New York State Department of Health (NYSDOH) Soil Vapor Intrusion Guidance October 2006 and the Generic Community Air Monitoring Plan to evaluate and monitor soil vapor and air quality at the Site both during and after remediation ;
7. NYS Waste Transporter Permits – 6 NYCRR Part 364 to manage contaminated soil and water waste disposal; and
8. NYS Solid Waste Management Requirements – 6 NYCRR Part 360 and Part 364 to manage solid waste disposal.

The following table outlines the Site-specific evaluation of Tracks 1 through 4. A discussion of the abilities to meet these performance factors/criteria in each track is included below the table.

REMEDIAL ALTERNATIVES EVALUATION									
	Protection of Human Health & Environment	Compliance with SCGs	Short-Term Effectiveness & Impacts	Long-Term Effectiveness & Performance	Reduction in Toxicity, Mobility, & Volume of Contaminants	Implementability	Cost Effectiveness	Community Acceptance	Land Use
Track 1	■	■	●	■	■	●	●	●	●
Track 2	▲	▲	●	▲	▲	●	●	▲	▲
Track 3	▲	▲	●	▲	▲	▲	▲	▲	▲
Track 4	▲	▲	■	▲	▲	■	■	■	■
■ = most favorable; ▲ = moderately favorable; ● = less favorable									

Protection of human health and the environment:

Although all tracks will provide adequate protection of human health and the environment, Track 1 would be the most favorable because it involves the removal of all soil contamination and the removal of the bulk of groundwater contamination, ultimately leaving the least amount of contamination on-Site. However, it would be cost prohibitive to implement a Track 1 clean-up, and the redevelopment and RA might not occur.

Compliance with standards, criteria, and guidelines (SCGs):

Similar to the reasons discussed above, Track 1 would achieve clean-up to the most stringent SCGs.

Short-term effectiveness and impacts:

Tracks 1 through 3 are the least favorable in terms of short-term effectiveness primarily because they involve removal and/or treatment of the extensive volumes of soil to depths extending far beneath the proposed construction grades. This is less favorable than the Track 4 approach because it would expose construction workers to a greater volume of contaminated soil, prolong the remediation schedule, and result in a greater potential for migration of the open excavation (e.g. wind erosion, storm water intrusion, etc.)

Long-term effectiveness and permanence:

Because Track 1 would involve removal of the greatest amount of contaminated soil, it would provide the most long-term effectiveness; however, it is cost prohibitive. The Site capping system involved with the Track 4 approach will serve as an effective long-term remedial strategy; however, it involves the highest level of long-term maintenance out of the four tracks.

Reduction of toxicity, mobility, or volume of contaminated material:

Tracks 1 through 4 all involve an ultimate reduction of toxicity and volume of contaminated material. While Track 4 provides a lesser amount of reduction than the other tracks, it relies primarily on the decrease in contaminant mobility and removal of source areas to serve as an effective remedial alternative.

Implementability:

Based on the site redevelopment plan, Track 4 is the most feasible remedial alternative. A net excavation of approximately 25,000 cy of soil will be implemented to remove source areas. Additionally, the proposed paving, concrete, and foundations will serve as a site cap.

Cost effectiveness:

The preferred alternative should provide optimal suitability of the eight accompanying evaluation factors with minimal remedial cost. Because of the potential vertical extent of contamination at the Site, Tracks 1 through 3 will involve the application of more complex technologies, and a longer remedial construction schedule. Additionally, Tracks 1 through 3 would require constructing costly and deep excavation support systems during remediation to prevent subsidence of buildings and side walls and. The large boulders present at the Site would be extremely difficult to excavate and cause difficulties in constructing a deep excavation

support system. Furthermore, a deep excavation would require an elaborate dewatering and groundwater treatment system prior to discharge. Track 4 minimizes these factors, while satisfying the other eight evaluation criteria; therefore, it is the most cost effective remedial alternative.

Community Acceptance:

The Citizen's Participation Plan will continue to be implemented during all remedial alternatives, per the BCP law and regulations. After evaluating all factors, Track 4 cleanup should result in the widest level of acceptance throughout the community because it would allow for the RA and the redevelopment of the Site to proceed expeditiously and without significant community impact, yet result in a remedy protection of human health and the environment. The other tracks, particularly Track 1, would be cost prohibitive, and therefore, the redevelopment might not occur.

Land use:

Based on the technologies described in Section 3.1.1, the least favorable alternative for this Site is Track 1 because it requires deep mass excavations and the installation and operation of a long-term groundwater remedial system that may interfere with the proposed development plans. Track 4 would achieve the remedial goals with little to no impact on the community and the project.

3.2 SELECTION OF THE PREFERRED REMEDY

Based on the analyses outlined above, the preferred remedy is a Track 4 cleanup involving:

- Removal and off-site disposal of all major source areas of soil and groundwater contamination, any grossly contaminated soil existing in areas to be excavated during redevelopment, as well as any underground storage tanks and content;
- Installation of a site capping system that incorporates a sub-slab venting system to prevent potential migration of volatilized contaminants entering the future buildings;
- Removal of contaminated sediment in the Saw Mill River, and subsequent relocation and restoration, to prevent migration of contaminants to the surface water.

- Restricting the use of groundwater at the site, controlling storm water, and instituting a program to monitor the natural attenuation of contaminants.

The following sections examine the acceptability of the preferred remedy in accordance with the criteria required by Article 27, Title 14 of the Environmental Conservation Law 27-1415.

3.2.1 Zoning

The Site is part of the Getty Square Urban Renewal District. As a result, the Site is subject to Planned Urban Redevelopment or PUR zoning. The Getty Square Urban Renewal Plan permitted the Site to be redeveloped as planned by the applicant with the exception of the ballpark. Therefore, the Getty Square Urban Renewal Plan is being amended during the zoning, site plan and environmental quality review process going on at the same time as this BCP project.

3.2.2 Applicable comprehensive community master plans or land use plans

As noted above, the Site is part of an existing Getty Square Urban Renewal District subject to an Urban Renewal Plan.

3.2.3 Surrounding property uses

The surrounding property uses are predominantly commercial, which is consistent with the contemplated predominantly commercial reuse. Where residential units will exist on the Site such units will not be on ground level, which is also consistent with the residential apartment above commercial establishments in the area.

3.2.4 Citizen participation

The project has not only been subject to intensive citizen participation by the City as the ballpark concept for the Site has evolved, the applicant has engaged in a series of public forums to describe the project not only to the public in the vicinity of the site, but to all citizens in Yonkers.

3.2.5 Environmental justice concerns

There are no known environmental justice concerns.

3.2.6 Land use designations

There are no known land use designations. All of the historic industrial structures were demolished in the 1950's.

3.2.7 Population growth patterns

Yonkers population is growing and it may become the third largest city in New York State surpassing Rochester, which unfortunately has a shrinking population. Therefore, the contemplated use will enhance the quality of life for the increasing number of Yonkers residents and individuals relocating from New York City seeking more affordable housing options.

3.2.8 Accessibility to existing infrastructure

Yonkers downtown has infrastructure, but it is aged. This project will replace old infrastructure with new infrastructure.

3.2.9 Proximity to cultural resources

The cultural resources that exist in Yonkers are present in the downtown area in which the Site is located.

3.2.10 Proximity to natural resources

The Site is approximately one mile from the Hudson River, a tremendous natural resource. The Site will be connected to the Hudson through the planned river walk along the Saw Mill River.

3.2.11 Off-Site groundwater impacts

Based on the results of the surface water sampling, and the ecological assessment, there does not appear to be any off-site surface water or groundwater impacts.

3.2.12 Proximity to floodplains

A large portion of the Site is located in a floodplain.

3.2.13 Geography and geology of the Site

See Section 2.4 above.

3.2.14 Current Institutional Controls

There are no current institutional controls; however, the Site will be subject to a number of controls that will be in an environmental easement.

3.3 SUMMARY OF SELECTED REMEDIAL ACTIONS

The following section provides a summary of the proposed remedial actions to achieve a Track 4 cleanup. A detailed description of these tasks is provided in Sections 5 through 9 of this plan.

The proposed Remedial Action is outlined as follows:

Excavation of soil/fill to remove hot spots. Major source areas of grossly contaminated soil would be excavated and disposed of off-site;

1. Construction and maintenance of an engineered composite capping system consisting of asphalt, concrete, building foundations, and vegetated soil cover to prevent human and ecological exposure to residual contaminated soil/fill remaining under the Site;
2. Recording of an Environmental Easement, including Institutional Controls to maintain the capping system and restrict use of groundwater, to prevent future exposure to any residual contamination remaining at the Site. The Environmental Easement will be provided in the FER;
3. Excavation of contaminated sediments in the Saw Mill River, and restoration of the River to prevent migration of contaminants to the surface water. This includes placement of a clean fill cap over geofabric in the proposed relocated Saw Mill River;
4. Publication of a Site Management Plan for long term management of residual contamination as required by the Environmental Easement, including plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting;
5. Screening for indications of contamination (by visual means, odor, and monitoring with PID) of all excavated soil during any intrusive Site work;
6. Collection and analysis of end-point samples to evaluate the performance of the remedy with respect to attainment of Track [4] SCOs;

7. 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;
8. Import of materials to be used for backfill and cover in compliance with: (1) chemical limits and other specifications included in Table 6, (2) all Federal, State and local rules and regulations for handling and transport of material;
9. All responsibilities associated with the Remedial Action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and local rules and regulations.

Remedial activities will be performed at the Site in accordance with this NYSDEC-approved RAWP, and the NYSDEC-approved IRM, submitted by S&W Redevelopment of North America. All deviations from the RAWP will be promptly reported to NYSDEC for approval and fully explained in the FER.

4.0 REMEDIAL ACTION PROGRAM

4.1 GOVERNING DOCUMENTS

4.1.1 Site Specific Health & Safety Plan (HASP)

SESI has prepared a site-specific HASP for this project; it is included as Appendix E. All remedial work performed under this plan will be in full compliance with governmental requirements, including Site and worker safety requirements mandated by Federal OSHA.

The Volunteer and associated parties preparing the remedial documents submitted to the State and those performing the construction work, are completely responsible for the preparation of an appropriate Health and Safety Plan and for the appropriate performance of work according to that plan and applicable laws.

The HASP and requirements defined in this RAWP pertain to all remedial and invasive work performed at the Site until the issuance of a Certificate of Completion. Future work plans and documents associated with the Remedial Action and Site redevelopment will have applicable HASPs.

The Site Safety Coordinator will be identified prior to the start of remedial construction. A resume will be provided to NYSDEC prior to the start of remedial construction.

Confined space entry will comply with all OSHA requirements to address the potential risk posed by combustible and toxic gasses.

4.1.2 Quality Assurance Project Plan (QAPP)

A copy of the SESI QAPP is included as Appendix F. All field sampling procedures will be implemented in accordance with this QAPP.

4.1.3 Construction Quality Assurance Plan (CQAP)

A copy of the SESI CQAP will be submitted to the NYSDEC as an addendum to this plan prior to the start of remedial construction.

4.1.4 Soil/Materials Management Plan (SoMP)

The SoMP for the remedy is described in Section 5.4. A final SoMP for future soil excavation work after the remedy has been implemented and will be submitted to the NYSDEC as an attachment to the Final Engineering Report (FER).

4.1.5 Storm-Water Pollution Prevention Plan (SWPPP)

Preparation of design documents associated with the site redevelopment are currently underway. A SWPPP will be prepared to address requirements of New York State Storm-Water Management Regulations including physical methods to control and/or divert surface water flows and to limit the potential for erosion and migration of Site soils, via wind or water. A copy of the SWPPP will be submitted to the NYSDEC prior to the start of remedial construction. The erosion and sediment controls will be in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control.

4.1.6 Community Air Monitoring Plan (CAMP)

A copy of the CAMP for the Site is included as Appendix G. A plan indicating the proposed on-site air monitoring locations is included in Appendix G.

4.1.7 Contractors Site Operations Plan (SOP)

The Remediation Contractor will prepare a Contractors SOP prior to the start of construction. The Remediation Engineer, SESI, will review this SOP for completeness and ensure it includes the following items, at a minimum:

- Anticipated hours of work;
- Site security procedures;
- Traffic control measures; and
- Planned contingency actions.

SESI will also review all plans and submittals for this remedial project (including those listed above and contractor and sub-contractor document submittals) and confirm that they are in compliance with this RAWP. SESI, on behalf of our Client, SFC, LLC, will submit all applicable remedial documents to NYSDEC and NYSDOH in a timely manner and prior to the start of work.

4.1.8 Community Participation Plan

A certification of mailing will be sent by the Volunteer to the NYSDEC project manager following the distribution of all Fact Sheets and notices that includes: (1) certification that the Fact Sheets were mailed, (2) the date they were mailed; (3) a copy of the Fact Sheet, (4) a list of recipients (contact list); and (5) a statement that the repository was inspected on (specific date) and that it contained all of applicable project documents.

No changes will be made to the approved Fact Sheets authorized for release by NYSDEC without written consent of the NYSDEC. No other information, such as brochures and flyers, will be included with the Fact Sheet mailing.

The approved Community Participation Plan for this project is attached in Appendix H.

Document repositories have been established at the following locations and contain all applicable project documents:

Yonkers Public Library

Riverfront Branch

One Lincoln Center

Yonkers, NY 10701

Phone: (914) 337 - 1500

Hours: Monday – Thursday 9:00 AM – 8:00 PM

Friday 10:00 AM – 5:00 PM

Saturday 9:00 AM – 5:00 PM

Sunday 12:00 PM – 5:00 PM

NYSDEC Region 3 Office

21 South Putt Corners Rd.

Yonkers, NY 10701

New Paltz, NY 12561

(914) 337-1500

Monday-Friday 8:30-4:30

4.2 GENERAL REMEDIAL CONSTRUCTION INFORMATION

4.2.1 Project Organization

SFC is the BCP Volunteer and redeveloper of the Site. SESI is the environmental consultant for SFC. A table summarizing the various personnel associated with the project is included as Table 7. An organization chart is included in Table 7.

Resumes of key personnel involved in the Remedial Action are included in Appendix –I.

4.2.2 Remedial Engineer

The Remedial Engineer for this project will be Mr. Michael St. Pierre, P.E. The Remedial Engineer is a registered professional engineer licensed by the State of New York. The Remedial Engineer will have primary direct responsibility for implementation of the remedial program for the River Park Center Site (NYSDEC BCA Index No. A3-0572-1006; Site No. C360083). The Remedial Engineer will certify in the Final Engineering Report that the remedial activities were

observed by qualified environmental professionals under his supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved in full conformance with that Plan. Other Remedial Engineer certification requirements are listed later in this RAWP.

The Remedial Engineer will coordinate the work of other contractors and subcontractors involved in all aspects of remedial construction, including soil excavation, stockpiling, characterization, removal and disposal, air monitoring, emergency spill response services, import of backfill material, and management of waste transport and disposal. The Remedial Engineer will be responsible for all appropriate communication with NYSDEC and NYSDOH.

The Remedial Engineer will review all pre-remedial plans submitted by contractors for compliance with this Remedial Action Work Plan and will certify compliance in the Final Remediation Report.

The Remedial Engineer will provide the certifications listed in Section 10.1 in the Final Engineering Report.

4.2.3 Remedial Action Construction Schedule

A remedial action construction schedule is included as Table 8 to this plan. The schedule is developed based on elapsed time from receipt of NYSDEC approval. Once approval is received, and updated schedule showing actual dates will be provided to the NYSDEC as an addendum to this plan.

4.2.4 Work Hours

The hours for operation of remedial construction will conform to the City of Yonkers, Department of Buildings construction code requirements or according to specific variances issued by that agency. The NYSDEC will be notified by the Applicant of any variances issued by the Department of Buildings. NYSDEC reserves the right to deny alternate remedial construction hours.

4.2.5 Site Security

A description of the proposed site security measures will be included in the Site Operations Plan (see Section 4.1.7).

4.2.6 Traffic Control

A description of the proposed traffic control measures will be included in the Site Operations Plan (see Section 4.1.7).

4.2.7 Contingency Plan

The proposed contingency plan will be included as part of the Site Operations Plan (see Section 4.1.7).

4.2.8 Worker Training and Monitoring

Worker training and monitoring requirements will be outlined in the CQAP (see Section 4.1.3).

4.2.9 Agency Approvals

The Applicant has submitted a preliminary Draft Environmental Impact Statement for review. It will address all SEQRA requirements for this Site. All permits or government approvals required for remedial construction have been, or will be, obtained prior to the start of remedial construction.

The planned end use for the Site is in general conformance with the current zoning for the property. For those elements of the project, most notably the ballpark, not specifically contemplated in approved plans, amendments to the Urban Renewal Plan are being proposed subject to City of Yonkers, Department of Planning and City Council approval.

A complete list of all local, regional and national governmental permits, certificates or other approvals or authorizations required to perform the remedial and development work will be submitted separately. This list includes a citation of the law, statute or code to be complied with, the originating agency, and a contact name and phone number in that agency. This list will be updated in the Final Engineering Report.

4.2.10 NYSDEC BCP Signage

A project sign will be erected at the main entrance to the Site prior to the start of any remedial activities. The sign will indicate that the project is being performed under the New York State Brownfield Cleanup Program. The sign will meet the detailed specifications provided by the NYSDEC Project Manager.

4.2.11 Pre-Construction Meeting with NYSDEC

A pre-construction meeting will be conducted with the NYSDEC prior to the start of major construction activities.

4.2.12 Emergency Contact Information

An emergency contact sheet with names and phone numbers will be provided to the NYSDEC prior to the start of remedial construction. That document will define the specific project contacts for use by NYSDEC and NYSDOH in the case of a day or night emergency.

4.2.13 Remedial Action Costs

The total estimated cost of the Remedial Action is \$10,000,000. An itemized summary of estimated costs for all remedial activity is included as Table 10. This will be revised based on actual costs and submitted as an Appendix to the Final Engineering Report.

4.3 SITE PREPARATION

4.3.1 Mobilization

Mobilization tasks will include:

- Construction of temporary facilities and utilities;
- Set-up of construction equipment and facilities;
- Construction of fencing and barriers;
- Construction of erosion control measures; and
- Construction of decontamination and materials staging areas.

4.3.2 Erosion and Sedimentation Controls

Erosion and sediment control measures will be outlined in the SWPPP (see Section 4.1.5).

4.3.3 Stabilized Construction Entrance(s)

Traffic control, and measures to prevent cross-contamination of construction equipment, will be addressed in the Site Operations Plan (see Section 4.1.7).

4.3.4 Utility Marker and Easements Layout

SFC and its contractors are solely responsible for the identification of utilities that might be affected by work under the RAWP and implementation of all required, appropriate, or necessary health and safety measures during performance of work under this RAWP. SFC and its contractors are solely responsible for safe execution of all invasive and other work performed under this RAWP. SFC and its contractors will obtain all local, State or Federal permits or approvals pertinent to such work that may be required to perform work under this RAWP. Approval of this RAWP by NYSDEC does not constitute satisfaction of these requirements.

The presence of utilities and easements on the Site will be fully investigated by the Applicant and its contractors. Any conflicts between utilities or easements and the proposed construction will be fully addressed prior to construction. There will be no risk or impediment to the planned work under this RAWP posed by utilities or easements on the Site.

4.3.5 Sheet piling and Shoring

Appropriate management of structural stability of on-site or off-site structures during on-site activities include excavation will be the sole responsibility of the Applicant and its contractors. The Applicant and its contractors will be solely responsible for safe execution of all invasive and other work performed under this Plan. The Applicant and its contractors will obtain all local, State or Federal permits or approvals that will be required to perform work under this Plan. Further, the Applicant and its contractors will be solely responsible for the implementation of all required, appropriate, or necessary health and safety measures during performance of work under the approved Plan.

4.3.6 Equipment and Material Staging

Equipment and material staging areas are expected to be relocated throughout the site during remedial construction. A detailed description of these areas will be included in the Site Operations Plan (see Section 4.1.7).

4.3.7 Decontamination Area

The decontamination area construction and operational requirements are outlined in the HASP.

4.3.8 Site Fencing

A construction safety fence will be installed around the entire perimeter of the site. Access through gates will be provided at various points as required by the Applicant and its contractors. These gates will be locked during non-construction hours.

4.3.9 Demobilization

After completion of the remedial work, the Applicant and its contractors will:

- Restore all areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management area[s], and access area);
- Remove all temporary access areas (whether on-Site or off-Site) and restoration of disturbed access areas to pre-remediation conditions;
- Remove all sediment and erosion control measures and disposal of materials in accordance with acceptable rules and regulations;
- Decontaminate equipment; and
- Dispose of all general refuse.

4.4 REPORTING

All daily and monthly Reports will be included in the Final Engineering Report.

4.4.1 Daily Reports

Daily reports will be submitted to NYSDEC and NYSDOH Project Managers by the end of each day during active Site remediation work and will include:

- An update of progress made during the reporting day (sent via email in a format acceptable to the DEC);
- Locations of work and quantities of material imported and exported from the Site;
- References to alpha-numeric map for Site activities;
- A summary of any and all complaints with relevant details (names, phone numbers);
- A summary of CAMP finding, including excursions;
- An explanation of notable Site conditions.

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of emergencies (accident, spill), requests for changes to the RAWP or other sensitive or time critical information. However, such conditions must also be included in the daily reports. Emergency conditions and changes to the RAWP will be addressed directly to NYSDEC Project Manager via personal communication.

Daily Reports will include a description of daily activities keyed to an alpha-numeric map for the Site that identifies work areas. These reports will include a summary of air sampling results, odor and dust problems and corrective actions, and all complaints received from the public.

A Site map that shows a predefined alpha-numeric grid for use in identifying locations described in reports submitted to NYSDEC is shown on Sheet RA-2.

The NYSDEC assigned project number will appear on all reports.

4.4.2 Monthly Reports

Monthly reports will be submitted to NYSDEC and NYSDOH Project Managers within one week following the end of the month of the reporting period and will include:

- Activities relative to the Site during the previous reporting period and those anticipated for the next reporting period, including a quantitative presentation of work performed (i.e. tons of material exported and imported, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- An update of the remedial schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

4.4.3 Other Reporting

Photographs will be taken of all remedial activities and submitted to NYSDEC in digital (JPEG) format. Photos will illustrate all remedial program elements and will be of acceptable quality. Representative photos of the Site prior to any Remedial Actions will be provided. Representative photos will be provided of each contaminant source, source area and Site structures before, during and after remediation. Photos will be submitted to NYSDEC on CD or other acceptable electronic media and will be sent to NYSDEC's Project Manager (2 copies) and to NYSDOH's Project Manager (1 copy). CD's will have a label and a general file inventory structure that separates photos into directories and sub-directories according to logical Remedial Action components. A photo log keyed to photo file ID numbers will be prepared to provide explanation for all representative photos. For larger and longer projects, photos should be submitted on a monthly basis or another agreed upon time interval.

Job-site record keeping for all remedial work will be appropriately documented. These records will be maintained on-Site at all times during the project and be available for inspection by NYSDEC and NYSDOH staff.

4.4.4 Complaint Management Plan

A public information board will be constructed at the perimeter of the Site. This information board will contain the phone number of the Applicant where complaints may be directed. General information notices to the public will also be posted on this board for their benefit.

4.4.5 Deviations from the Remedial Action Work Plan

If there are any deviations from the RAWP, the following steps will be taken:

- Reasons for deviating from the approved RAWP will be identified and communicated directly to the NYSDEC Project Manager;
- All deviations will be communicated verbally and in writing (by letter or email) to the NYSDEC Project Manager;
- The deviations will be implemented based on verbal or written approval of the NYDEC Project Manger. All verbal approvals will be followed-up in writing.
- The effect of the deviations on the overall remedy will be described/addressed in the FER.

5.0 REMEDIAL ACTION: MATERIAL REMOVAL FROM SITE

Removal of all contaminated media (soil, water, structures, etc) under the Remedial Action will be implemented in accordance with the Site-specific Construction Quality Assurance Plan (CQAP) and the Quality Assurance Project Plan (QAPP). The CQAP will be submitted as part of the Remedial Design Document and will include, where appropriate, a description and identification (including a map) of: the location of remedial treatment units; the volume of each environmental medium to be remediated; the location, depth and concentration of all contaminants in excess of the remediation standard; sample locations, depths and parameters for all post-construction samples. A QAPP describing the proposed sampling and analytical methods, are included as Appendix F.

5.1 SOIL CLEANUP OBJECTIVES (SCOS)

The SCOs will be tailored to meet the Track 4 commercial use SCOs. The SCOs for the top one-foot (landscaped areas) of this Site will meet the stricter of the following SCO: Commercial;

Protection of Groundwater; or Protection of Environmental Resources, as listed in 6NYCRR Part 375-6 SCOs and are listed in Table 6, unless less strict criteria are agreed to by the NYSDEC.

Soil and materials management on-Site and off-Site will be conducted in accordance with the Soil Management Plan as described below.

Table 2 summarizes all soil samples that exceed the SCOs proposed for this Remedial Action.

UST closures will, at a minimum, conform to criteria defined in DER-10.

5.2 REMEDIAL PERFORMANCE EVALUATION (POST EXCAVATION END-POINT SAMPLING)

5.2.1 End-Point Sampling Frequency

Post-excavation soil and groundwater samples will be collected in accordance with Section 5.4 of DER-10, when dealing with relatively localized contamination (e.g., UST closure). However, when dealing with relatively large excavations, sidewall samples will be collected at a frequency of one sample every 150 linear feet of excavation sidewall. Bottom samples will be collected at a frequency of one every 5,000 square feet of excavation bottom area.

5.2.2 Methodology

Soil samples will be collected in accordance with the QAPP using disposable gloves/trowels or stainless steel spoons. Groundwater samples will be collected from open excavations either using disposable bailers or, where appropriate, directly into the sampling jars.

5.2.3 Reporting of Results

The samples will be submitted to a NYSDOH certified laboratory and the results will be reported in accordance with NYSDEC requirements for Category B data deliverables.

5.2.4 QA/QC

Collection of QA/QC samples to evaluate potential cross-contamination from sampling equipment and during shipment of samples and repeatability of laboratory analytical practices

will be in accordance with the QAPP included as Appendix F. Field blanks, trip blanks and duplicate samples associated with daily sampling activities will be collected as a part of the QA/QC practices.

5.2.5 Data Usability Summary Report (DUSR)

To ensure that the field sampling and laboratory analytical practices are acceptable, the data associated with all the samples will be validated by a third party (in accordance with requirements of DER-10). The validation approach and results will be presented in a DUSR to be included in the FER.

5.2.6 Reporting of End-Point Data in Final Engineering Report (FER)

The FER will include a table of end point data with highlights or a summary of exceedances of SCOs. A spider map showing all SCO exceedances will also be presented in the FER.

Chemical labs used for all end-point sample testing and contingency sampling will be NYSDOH ELAP certified.

End point sampling, including bottom and side-wall sampling, will be performed in accordance with DER-10 sample frequency requirements. Side-wall samples will be collected a minimum of every 150 linear feet. Bottom samples will be collected at a rate of one for every 5,000 square feet. The FER will provide a tabular and map summary of all end-point sample results and exceedances of SCOs.

5.3 ESTIMATED MATERIAL REMOVAL QUANTITIES

The estimated quantity of soil/fill to be removed from the Site is 25,000 cubic yards. The estimated quantity of soil to be imported on-site for backfill and cover soil is 7,500 cubic yards. The estimated quantity of soil/fill expected to be reused/relocated on Site is 150,000 cubic yards.

5.4 SOIL/MATERIALS MANAGEMENT PLAN

5.4.1 Soil Screening Methods

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 the remedy and during development phase, such as excavations for foundations and utility work, prior to issuance of the COC.

All primary contaminant sources (including but not limited to USTs and hotspots) identified during the Site Characterization, Remedial Investigation, and Remedial Action will be surveyed by a Surveyor licensed to practice in the State of New York. This information will be provided on maps in the FER. Soil excavated during the Site redevelopment, based on known information about on-Site contamination distribution and field screening results, will be managed as two waste streams in separate stockpiles, contaminated (exceeding Commercial Soil Cleanup Objectives) and uncontaminated soil.

Contaminated soil that is "grossly" contaminated will be disposed off-Site in accordance with the applicable SCGs. Contaminated and clean soil to be reused on-Site will be sampled at a frequency of 1 composite sample every 5,000 cubic yards. Each of the composite samples will be generated by combining five (5) grab samples. Subsequently, the samples will be analyzed for VOCs, SVOCs, PCBs, Pesticides and Metals (including hexavalent chromium).

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

5.4.2 Stockpile Methods

A Site-specific Soil Erosion and Sediment Control Plan will be submitted as a part of the Remedial Design Document (RDD). Stockpiles will be inspected at a minimum once each week and after every storm event without ½-inch of rain over 24 hours. 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.

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.

5.4.3 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 Applicant and its contractors are solely responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the Site will be investigated by the Applicant to verify that no risk or impediment to the planned work under this Remedial Action Work Plan 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 Remediation 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 (e.g., building foundations, bridge footings, roads).

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.

Each hotspot and structure to be remediated (USTs, vaults and associated piping, transformers, etc.) will be removed and stockpiled for sampling. End-point remedial performance sampling will be completed before excavations are filled for Site development proximal to the hotspot or structure.

Mechanical processing of historical fill and contaminated soil on-Site is prohibited; however, on-Site fill and soils may be reused if not visually or grossly contaminated.

All primary contaminant sources (including but not limited to USTs and hotspots) identified during the 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 FER.

5.4.4 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 will be included in the SOP and RDD All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes.

Proposed in-bound and out-bound truck routes to the Site will be the most appropriate route and will take 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; (f) overall safety in transport; and (g) community input.

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.

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.

5.4.5 Materials Disposal Off-Site

The disposal locations will be included in the RDD. Disposal locations established after the submission of the RDD will be reported to the NYSDEC Project Manager.

The total quantity of material expected to be disposed off-Site will be known when site redevelopment activities begin.

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 will not be 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 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 (including Site Characterization data); and (2) a letter from all receiving facilities stating it is in receipt of the correspondence (above) and is approved to accept the material. These documents will be included in the FER.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at 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 materials processing facility without permit modifications only upon prior notification of NYSDEC Region 3 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 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 FER will include an accounting of the destination of all material removed from the Site during this Remedial Action, including excavated soil, contaminated soil, historic fill, solid waste, and hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. This information will also be presented in a tabular form in the FER.

The 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 FER.

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.

5.4.6 Materials Reuse On-Site

Soil excavated during the site redevelopment, based on known information about on-site contamination distribution and field screening results, will be managed as two waste streams in separate stockpiles, contaminated (exceeding Commercial Soil Cleanup Objectives) and uncontaminated soil.

Contaminated soil that is “grossly” contaminated will be disposed off-Site in accordance with the applicable SCGs. [See definition of grossly contaminated soil, Part 375-1.2(u)]. Contaminated and clean soil to be reused on-site will be sampled at a frequency of 1 composite sample every 5,000 cubic yards. Each of the composite samples will be generated by combining five (5) grab samples. Subsequently, the samples will be analyzed for VOCs, SVOCs, PCBs, Pesticides and Metals (including hexavalent chromium).

A majority of the site is currently “capped” with buildings, parking lots and other impervious surfaces. Soil that will be utilized as the “capping” material in landscaped areas will meet the stricter of the following SCO: Commercial; Protection of Groundwater; or Protection of Environmental Resources, as listed in 6NYCRR Part 375-6 SCOs, unless less strict criteria are agreed to by the NYSDEC.

The detailed logistics of the soil handling (i.e., location and size of the soil staging areas) will be included in the RDD.

The Remedial Engineer will ensure that procedures defined for materials reuse in this RAWP are followed and that unacceptable material will not remain on-Site.

Acceptable demolition material proposed for reuse on-Site, if any, will be sampled for asbestos.

The RDD to be submitted may include, the use of concrete crushing or processing equipment that are self-contained and capable of providing misting for dust control.

Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused 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. This will be expressed in the final Site Management Plan.

5.4.7 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 regulations. Liquids discharged into the New York City sewer system will be addressed through approval by the associated utilities authority.

Dewatered fluids will not be recharged back to the land surface or subsurface of the Site. Dewatering fluids will be managed off-Site.

Discharge of water generated during remedial construction to surface waters, if needed, will be through a SPDES permit.

5.4.8 Demarcation

After the completion of soil removal and any other invasive remedial activities and prior to backfilling, 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, geotextile fabric 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 the 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 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 FER and the Site Management Plan.

5.4.9 Backfill from Off-Site Sources

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

Material from industrial sites, spill sites, other environmental remediation sites or other potentially contaminated sites will not be imported to the Site unless such materials are being received as approved BUD materials subject to NYSDEC approval. The proposed sampling frequency and testing is presented in Table #9.

The FER will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-Site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

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 listed in Table 6 of this report. Non-compliant soils will not be imported on-Site without prior approval by NYSDEC. Nothing in the approved Remedial Action Work Plan or its approval by NYSDEC should be construed as an approval for this purpose.

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 on-Site without prior approval

by NYSDEC. Nothing in this Remedial Action Work Plan should be construed as an approval for this purpose.

Solid waste will not be imported onto the Site.

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

5.4.10 Stormwater Pollution Prevention

A summary of the Stormwater Pollution Prevention Plan that conforms to the requirements of NYSDEC Division of Water guidelines and NYS regulations will be included in the RDD.

Barriers and hay bale checks will be installed and inspected once a 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. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the RDD shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or hay bales will be installed around the entire perimeter of the remedial construction area.

5.4.11 Contingency Plan

The following procedures will be implemented upon discovery of an unknown source of contamination or AOC that may require remediation (USTs, stained soil, drums, etc.).

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, surrounding soils, etc. Chemical analytical work will be implemented for full scan parameters (TAL metals, TCL volatiles and semi-volatiles, TCL pesticides, 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.

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.

5.4.12 Community Air Monitoring Plan (CAMP)

A copy of the CAMP for the Site is included as Appendix G.

5.4.13 Odor, Dust and Nuisance Control Plan

Odor, dust and nuisance control will be in accordance with the site specific Health and Safety Plan included as Appendix E.

The FER will include the following certification by the Remedial Engineer: "I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan."

5.4.13.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-Site. 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 significant 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 Applicant's Remediation Engineer, who is responsible for certifying the FER.

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) shrouding open

excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. 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.

5.4.13.2 Dust Control Plan

As required, dust suppression activities may include:

- 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 may 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.

5.4.13.3 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 City of Yonkers rodent and noise control standards.

6.0 RESIDUAL CONTAMINATION TO REMAIN ON-SITE

Residual contaminated soil, groundwater, and soil vapor will exist beneath the Site after the remedy is complete; therefore, Engineering and Institutional Controls (ECs and ICs) will be required to protect human health and the environment. These ECs and ICs are described herein. Long-term management of EC/ICs and of residual contamination will be executed under a Site specific Site Management Plan (SMP) that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the Site) will have three (3) primary EC systems. These are: (1) a composite capping system consisting of a soil capping system, asphalt covered roads, concrete covered sidewalks, and concrete building slabs, (2) a sub-slab vapor mitigation system, and (3) a groundwater monitoring system consisting of eight (8) wells.

The FER will report residual contamination on the Site in tabular and map form.

7.0 ENGINEERING CONTROLS: COMPOSITE CAPPING SYSTEM

Exposure to residual contaminated soils will be prevented by an engineered, composite capping system that will be built on the Site. This composite capping system will be comprised of asphalt pavement, concrete sidewalks, concrete building slabs, and one foot of clean fill/topsoil over a demarcation barrier in landscaped areas.

The cap that is required in all vegetated areas is one foot of clean soil underlain by a geotextile marker (geotextile fabric – Mirafi 140N or approved equal). All non-vegetated areas (buildings, roadways, parking lots, etc) will be covered by paving or concrete at least 6 inches in thickness.

A diagram showing the design detail for each cover type is shown on Sheet RA-2.

A map showing the aerial distribution and plan areas of each of the cover types to be built at the Site is included on Sheet RA-2.

A Subsurface Soil Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete.

Maintenance of this composite capping system will be described in the Site Management Plan in the FER.

8.0 ENGINEERING CONTROLS: SUB-SLAB VAPOR MITIGATION AND GROUNDWATER MONITORING

A soil vapor mitigation system is required for all of the enclosed building structures on-site and will be discussed in the RDD. In general, the system will consist of a continuous 10 mil polyethylene liner (or equal) beneath the required building areas on a geotextile fabric with 2 inches of sand above. Beneath the liner and fabric will be a 12-inch thick clean gravel vapor collection field with a network of 4-inch diameter perforated HDPE pipe vented to the exterior of the building and connected to a blower (if needed). Another layer of geotextile fabric will be placed beneath the gravel vapor collection field. In addition to the vapor collection system, a sub-slab drainage trench will be constructed to drain any water that is present below the slab. Plans, details and specifications for the soil vapor mitigation system will be included in RDD.

All as-built drawings, diagrams, calculations, and manufacturer documentation for treatment systems will be presented in the FER.

8.1 ENGINEERING CONTROL SYSTEMS

8.1.1 Criteria for Completion of Remediation/Termination of Remedial Systems

8.1.1.1 Composite Capping System

The composite capping system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals.

8.1.1.2 Sub-Slab Depressurization System (SSDS)

The SSDS system will not be discontinued without written approval by NYSDEC and NYSDOH. A proposal to discontinue the active SSDS may be submitted by the property owner based on confirmatory data that justifies such request. Systems will remain in place and operational until permission to discontinue use is granted in writing by NYSDEC and NYSDOH.

8.1.1.3 Groundwater 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. Proposed long-term groundwater monitoring wells (a total of eight [8] wells) are shown on Sheet RA-7.

9.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the Site will have residual contamination remaining in place. Engineering Controls for the residual contamination have been incorporated into the remedy to render the overall Site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination: an Environmental Easement and a Site Management Plan (SMP). These elements are described in this Section. A Site -specific Environmental Easement will be recorded with Westchester County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the Environmental Easement and the grantor's successors and assigns adhere to all Engineering and Institutional Controls (ECs/ICs) placed on this Site by this NYSDEC-approved remedy. ICs provide restrictions on Site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the Environmental Easement. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the Environmental Easement and grantor's successors and assigns.

9.1 ENVIRONMENTAL EASEMENT

An Environmental Easement, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination is left on-site after the Remedial Action is complete. As part of this remedy, an Environmental Easement approved by NYSDEC will be filed and recorded with the Westchester County Clerk. The Environmental Easement will be submitted as part of the FER.

The Environmental Easement renders the Site a Controlled Property. The Environmental Easement will be recorded with the Westchester County Clerk before the Certificate of Completion can be issued by NYSDEC. A series of ICs are required under this remedy to implement, maintain and monitor these ECs, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the Site to commercial use(s) only. These ICs are requirements or restrictions placed on the Site that are listed in, and required by, the Environmental Easement. ICs can, generally, be subdivided between controls that support ECs, and those that place general restrictions on Site usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

The ICs that support ECs are:

- Compliance with the Environmental Easement by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required;
- All ECs must be operated and maintained as specified in this SMP;
- A composite cover system consisting of asphalt pavements, concrete covered sidewalks, and concrete building slabs must be inspected, certified and maintained as required in the SMP;
- A soil vapor mitigation system consisting of a sub-slab depressurization system under all building structures must be inspected, certified, operated and maintained as required by the SMP;
- All ECs on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP;
- Groundwater, soil vapor, and other environmental or public health monitoring must be performed as defined in the SMP;
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP;
- On-Site environmental monitoring devices, including but not limited to groundwater monitor wells and soil vapor probes, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;

- ECs may not be discontinued without an amendment or extinguishment of the Environmental Easement.

Adherence to these ICs for the Site is mandated by the Environmental Easement and will be implemented under the SMP (discussed in the next section). The Controlled Property (Site) will also have a series of ICs in the form of Site restrictions and requirements. The Site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming on the Controlled Property are prohibited;
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose;
- 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 the SMP;
- The ground level of the Controlled Property may be used for commercial use only, provided the long-term ECs and ICs included in the SMP are employed;
- The ground level of the Controlled Property may not be used for a higher level of use, such as restricted residential use without an amendment or 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.

9.2 SITE MANAGEMENT PLAN

Site Management is the last phase of remediation and begins with the approval of the Final Engineering Report and issuance of the Certificate of Completion (COC) for the Remedial Action. The Site Management Plan is submitted as part of the FER but will be written in a manner that allows its use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the Environmental Easement and the Site Management Plan are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the Site following completion of the Remedial Action in accordance with the 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 any 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 will include 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. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 2002, and the guidelines provided by NYSDEC.

Site management activities, reporting, and EC/IC certification will be scheduled on a certification period basis. The certification period will be annually. The Site Management Plan will be based on a calendar year and will be due for submission to NYSDEC by March 1 of the year following the reporting period.

The Site Management Plan in the Final Remediation Report will include a monitoring plan for groundwater at the down-gradient Site perimeter to evaluate Site -wide performance of the remedy. Appropriately placed groundwater monitor wells will also be installed immediately down-gradient of all volatile organic carbon remediation areas for the purpose of evaluation of the effectiveness of the remedy that is implemented.

No exclusions for handling of residual contaminated soils will be provided in the Site Management Plan (SMP). All handling of residual contaminated material will be subject to provisions contained in the SMP.

10.0 FINAL ENGINEERING REPORT

A Final Engineering Report (FER) and Certificate of Completion (COC) will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides the documentation that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, certifications, manifests, bills of lading as well as the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the Site Management Plan and Environmental Easement. This determination will be made by NYSDEC in the context of the FER review.

The FER will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the Site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The FER will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

10.1 CERTIFICATIONS

The following certification will appear in front of the Executive Summary of the Final Engineering Report. The certification will be signed by the Remedial Michael St. Pierre who is a Professional Engineer registered in New York State. This certification will be appropriately signed and stamped. The certification will include the following statements:

I, Michael St. Pierre, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the River Park Center Site (NYSDEC BCA Index No. A3-0572-1006 Site No. C360083).

I certify that the Site description presented in this FER is identical to the Site descriptions presented in the Environmental Easement, the Site Management Plan, and the Brownfield Cleanup Agreement for River Park Center and related amendments.

I certify that the Remedial Action Work Plan dated November 13, 2007 and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan has been submitted by the Applicant for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of all contaminated soil, fill, water or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all Federal, State and local laws.

I certify that all import of soils from off-Site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that all invasive work during the remediation and all invasive development work were conducted in accordance with dust and odor suppression methodology and soil screening methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

11.0 SCHEDULE

A schedule of Remedial Actions is included as Table 8 and presents the work elements and estimated dates for performance of work and deliverables.

12.0 SCG'S FOR SITE CHARACTERIZATION AND REMEDIAL INVESTIGATION

The following standards and criteria typically will apply to Site Characterizations and Remedial Investigations conducted in New York State:

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands Maps and Classification
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 257 - Air Quality Standards
- 10 NYCRR Part 5 of the State Sanitary Code - Drinking Water Supplies (May 1998)
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response

- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Characterizations and Remedial Investigations conducted in New York State:

- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife (July 1987)
- Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh
- The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh
- Criteria for the Development of Health Advisories for Sportfish Consumption
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

SCGs for Remedy Selection

The following standards and criteria typically apply to the remedy selection process conducted in New York State:

- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources

The following guidance typically applies to the remedy selection process conducted in New York State:

- TAGM 4044 - Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills (March 1992)
- TAGM 4051 - Early Design Strategy (August 1993)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Freshwater Wetlands Regulations - Guidelines on Compensatory Mitigation (October 1993)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies:

- Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)

SCGs for Underground Storage Tank Closure

The following standards and criteria typically apply to UST closures conducted in New York State:

- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil (November 1998)
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

The following guidance typically applies to UST closures conducted in New York State:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- Spill Response Guidance Manual
- Permanent Closure of Petroleum Storage Tanks (July 1988)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations

- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

SCGs for Remedial Action

The following standards and criteria typically apply to Remedial Actions conducted in New York State:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program
- 10 NYCRR Part 67 – Lead
- 12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 361 - Siting of Industrial Hazardous Waste Facilities
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources
- 6 NYCRR Part 608 - Use and Protection of Waters

- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS ("SPDES Regulations")
- Technical Guidance for Screening Contaminated Sediments (January 1999)

The following guidance typically applies to Remedial Actions conducted in New York State:

- TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- State Coastal Management Policies
- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)

- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

SCGs for Site Management

The following standards and criteria typically apply to Site Management activities conducted in New York State:

- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Management activities conducted in New York State:

- Groundwater Monitoring Well Decommissioning Procedures (May 1995)
- The activity is a component of a program selected by a process complying with the public participation requirements of section 1.10, to the extent applicable.
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

TABLE IX
PROTOCOL FOR ACCEPTANCE/TESTING OF IMPORTED FILL
RIVER PARK BUSINESS CENTER
CITY OF YONKERS, NY
NYSDEC BCA # C360083
SESI PROJECT # 7190
NOVEMBER 12, 2007

Volume in cubic yards (cy)	Sampling Frequency - Clean Fill Source	Sampling Frequency - NYSDEC Licensed Recycling Facility Source	Analytical Parameters
1000 to 10,000	<ul style="list-style-type: none"> 1 grab sample collected every 250 cy. 2 grab samples composited into one sample. 1 composite sample will be analyzed every 500 cy. 	<ul style="list-style-type: none"> 1 grab sample collected every 1,000 cy. 2 grab samples composited into one sample. 1 composite sample will be analyzed every 2,000 cy. 	VOCs +10, BNAs +20, pesticides, PCBs, PP metals, barium, hexavalent chromium, cyanide and total phenols. In addition to the above parameters, recycled concrete, depending on its source, may be analyzed for TCLP, dioxins/furans and radionuclides.
Greater than 10,000	<ul style="list-style-type: none"> First 10,000 cy sampled and analyzed at the above detailed frequency. Volume exceeding 10,000 cy <ul style="list-style-type: none"> 1 grab sample collected every 500 cy. 5 grab samples composited into 1 sample. 1 composite sample analyzed every 2,500 cy. 	<ul style="list-style-type: none"> First 10,000 cy sampled and analyzed at the above detailed frequency. Volume exceeding 10,000 cy <ul style="list-style-type: none"> 1 grab sample collected every 1,000 cy. 5 grab samples composited into 1 sample. 1 composite sample analyzed every 5,000 cy. 	

Notes:

- (1) A copy of the application form (Procedures for Acceptance of Clean Fill Materials) must be completed and submitted by the owner of the fill source for all fill material (before the material is brought onto the site).
- (2) Submit a verification form certified by an independent evaluator, attesting that any clean fill brought to the site is in conformance with this protocol (before the material is brought onto the site). These verification forms will be kept on file for eventual submission to NYSDEC as a part of the Final Engineering Report.
- (3) No additional sampling is required if any analyte concentrations in the composite samples do not exceed the more stringent of NYSDEC Restricted Use Soil Cleanup Objectives for Commercial Use or Protection of Groundwater (e.g. sample dilution will not be considered to result in additional sampling/analyses). Soil utilized in the vicinity of the relocated Saw Mill River will comply with more stringent of NYSDEC Restricted Use Soil Cleanup Objectives for Commercial Use or Protection of Ecological Resources.

Table 8 - Draft Remedial Action Construction Schedule River Park Center City of Yonkers, Westchester County, New York

NYSDEC BCP No.: C360083

ID	Task Name	Duration	Year 1												Year 2					
			M-1	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17
1	Project Management	327 days																		
2	Site Inspection & QA/QC Activities	220 days																		
3	Reporting/Submittals	327 days																		
20	Post-Design A/E Support	240 days																		
21	Project Health and Safety Activities	220 days																		
22	Remedial Design	90 days																		
23	Final Engineering Design	60 days																		
24	Subcontractor Coordination	30 days																		
25	Project Plan Submittal	30 days																		
26	Site Work	241 days																		
27	Mobilization	20 days																		
28	Demolition of Existing Buildings	44 days																		
29	Additional Investigation Activities	44 days																		
30	Remedial Construction	199 days																		
31	UST Removal	30 days																		
32	Excavation & Site Cap (Stadium)	174 days																		
33	Excavation & Site Cap (New Main St. Tower)	89 days																		
34	Excavation & Site Cap (Elm St. Tower)	89 days																		
35	Post Excavation Sampling / Analysis	150 days																		
36	Material Handling & Transportation Off-Site	120 days																		
37	Saw Mill River Refurbishment	173 days																		
38	River Diversion	65 days																		
39	Demolition of Saw Mill River Cover	22 days																		
40	Nepperhan Underpinning	65 days																		
41	Relocation Construction	66 days																		

Project: River Park Center
Date: Tue 11/13/07

Task
Split
Progress



Milestone
Summary
Project Summary



External Tasks
External Milestone
Deadline



Table VII - Project Organization

Name	Company	Project Position	Address	Phone Number
Joseph Apicella	Struever Fidelco Cappelli LLC	Volunteer Contact	115 Stevens Ave Valhalla NY, 10595	(914) 769-6500
Peter Klein	Struever Fidelco Cappelli LLC	Volunteer Contact	115 Stevens Ave Valhalla NY, 10595	(914) 769-6500
Linda R. Shaw	Knauf Shaw, LLP	Attorney for Volunteer	1125 Crossroads Building 2 State Street Rochester NY, 14614	(585) 546-8430
Matthew Hubicki	NYSDEC	Project Manager	625 Broadway 11 th Floor Albany NY, 12233	(518) 402-9564
Michael Ryan	NYSDEC	Project Manager	625 Broadway 11 th Floor Albany NY, 12233	(518) 402-9564
Anthony Peretta	NYSDOH	Project Manager	547 River Street Room 300 Troy NY, 12180	(518) 402-7850
Michael St Pierre, P.E.	SESI Consulting Engineers, PC	Principal, Senior Project Engineer	12A Maple Ave Pine Brook NJ, 07058	(973) 808-9050 Ext. 246
Christopher F. Zwingle, P.E.	SESI Consulting Engineers, PC	Principal, Environmental Division Head	12A Maple Ave Pine Brook NJ, 07058	(973) 808-9050 Ext. 232
Dean Giovanetti, P.G.	SESI Consulting Engineers, PC	Project Manager	12A Maple Ave Pine Brook NJ, 07058	(973) 808-9050 Ext. 237

TABLE 6

(b) Restricted use soil cleanup objectives.

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Metals							
Arsenic	7440-38-2	16 ^f	16 ^f	16 ^f ^c	16 ^f	13 ^f	16 ^f
Barium	7440-39-3	350 ^f	400	400	10,000 ^d	433	820
Beryllium	7440-41-7	14	72	590	2,700	10	47
Cadmium	7440-43-9	2.5 ^f	4.3	9.3	60	4	7.5
Chromium, hexavalent ^h	18540-29-9	22	110	400	800	1 ^e	19
Chromium, trivalent ^h	16065-83-1	36	180	1,500	6,800	41	NS
Copper	7440-50-8	270	270	270	10,000 ^d	50	1,720
Total Cyanide ^h		27	27	27	10,000 ^d	NS	40
Lead	7439-92-1	400	400	1,000	3,900	63 ^f	450
Manganese	7439-96-5	2,000 ^f	2,000 ^f	10,000 ^d	10,000 ^d	1600 ^f	2,000 ^f
Total Mercury		0.81 ^j	0.81 ^j	2.8 ^j	5.7 ^j	0.18 ^f	0.73
Nickel	7440-02-0	140	310	310	10,000 ^d	30	130
Selenium	7782-49-2	36	180	1,500	6,800	3.9 ^f	4 ^f
Silver	7440-22-4	36	180	1,500	6,800	2	8.3
Zinc	7440-66-6	2200	10,000 ^d	10,000 ^d	10,000 ^d	109 ^f	2,480
PCBs/Pesticides							
2,4,5-TP Acid (Silvex)	93-72-1	58	100 ^a	500 ^b	1,000 ^c	NS	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 ^e	17
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 ^e	136
4,4'- DDD	72-54-8	2.6	13	92	180	0.0033 ^e	14
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04 ^g	0.02
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09
Chlordane (alpha)	5103-71-9	0.91	4.2	24	47	1.3	2.9

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential ^f	Restricted-Residential	Commercial	Industrial		
delta-BHC	319-86-8	100 ^a	100 ^a	500 ^b	1,000 ^c	0.04 ^g	0.25
Dibenzofuran	132-64-9	14	59	350	1,000 ^c	NS	210
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1
Endosulfan I	959-98-8	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	102
Endosulfan II	33213-65-9	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	102
Endosulfan sulfate	1031-07-8	4.8 ⁱ	24 ⁱ	200 ⁱ	920 ⁱ	NS	1,000 ^c
Endrin	72-20-8	2.2	11	89	410	0.014	0.06
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1
Polychlorinated biphenyls	1336-36-3	1	1	1	25	1	3.2
Semivolatiles							
Acenaphthene	83-32-9	100 ^a	100 ^a	500 ^b	1,000 ^c	20	98
Acenaphthylene	208-96-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	107
Anthracene	120-12-7	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Benz(a)anthracene	56-55-3	1 ^f	1 ^f	5.6	11	NS	1 ^f
Benzo(a)pyrene	50-32-8	1 ^f	1 ^f	1 ^f	1.1	2.6	22
Benzo(b)fluoranthene	205-99-2	1 ^f	1 ^f	5.6	11	NS	1.7
Benzo(g,h,i)perylene	191-24-2	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Benzo(k)fluoranthene	207-08-9	1	3.9	56	110	NS	1.7
Chrysene	218-01-9	1 ^f	3.9	56	110	NS	1 ^f
Dibenz(a,h)anthracene	53-70-3	0.33 ^c	0.33 ^c	0.56	1.1	NS	1,000 ^c
Fluoranthene	206-44-0	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Fluorene	86-73-7	100 ^a	100 ^a	500 ^b	1,000 ^c	30	386
Indeno(1,2,3-cd)pyrene	193-39-5	0.5 ^f	0.5 ^f	5.6	11	NS	8.2
m-Cresol	108-39-4	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^c
Naphthalene	91-20-3	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	12

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
o-Cresol	95-48-7	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
p-Cresol	106-44-5	34	100 ^a	500 ^b	1,000 ^c	NS	0.33 ^e
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8 ^e	0.8 ^e
Phenanthrene	85-01-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Phenol	108-95-2	100 ^a	100 ^a	500 ^b	1,000 ^c	30	0.33 ^e
Pyrene	129-00-0	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1,000 ^c
Volatiles							
1,1,1-Trichloroethane	71-55-6	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27
1,1-Dichloroethene	75-35-4	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.33
1,2-Dichlorobenzene	95-50-1	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02 ^f
cis-1,2-Dichloroethene	156-59-2	59	100 ^a	500 ^b	1,000 ^c	NS	0.25
trans-1,2-Dichloroethene	156-60-5	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1 ^e	0.1 ^e
Acetone	67-64-1	100 ^a	100 ^b	500 ^b	1,000 ^c	2.2	0.05
Benzene	71-43-2	2.9	4.8	44	89	70	0.06
Butylbenzene	104-51-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76
Chlorobenzene	108-90-7	100 ^a	100 ^a	500 ^b	1,000 ^c	40	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1
Hexachlorobenzene	118-74-1	0.33 ^e	1.2	6	12	NS	3.2
Methyl ethyl ketone	78-93-3	100 ^a	100 ^a	500 ^b	1,000 ^c	100 ^a	0.12

Table 375-6.8(b): Restricted Use Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water
		Residential	Restricted-Residential	Commercial	Industrial		
Methyl tert-butyl ether	1634-04-4	62	100 ^a	500 ^b	1,000 ^c	NS	0.93
Methylene chloride	75-09-2	51	100 ^a	500 ^b	1,000 ^c	12	0.05
n-Propylbenzene	103-65-1	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	3.9
sec-Butylbenzene	135-98-8	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	11
tert-Butylbenzene	98-06-6	100 ^a	100 ^a	500 ^b	1,000 ^c	NS	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3
Toluene	108-88-3	100 ^a	100 ^a	500 ^b	1,000 ^c	36	0.7
Trichloroethene	79-01-6	10	21	200	400	2	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6
1,3,5- Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02
Xylene (mixed)	1330-20-7	100 ^a	100 ^a	500 ^b	1,000 ^c	0.26	1.6

All soil cleanup objectives (SCOs) are in parts per million (ppm).

NS=Not specified. See Technical Support Document (TSD).

Footnotes

^a The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.

^b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

^c The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.

^d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.

^e For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

^f For constituents where the calculated SCO was lower than the rural soil background concentration as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 2 SCO value for this use of the site.

^g This SCO is derived from data on mixed isomers of BHC.

^h The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

ⁱ This SCO is for the sum of endosulfan I, endosulfan II, and endosulfan sulfate.

^j This SCO is the lower of the values for mercury (elemental) or mercury (inorganic salts). See TSD Table 5.6-1.

Table V - Stream Sediment
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	SED-1	SED-2	SED-3	SED-4	SED-5	SED-6	MW-8	MW-11	MW-15	MW-17	MW-28
Depth	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	5-10'	5-11'	18-20'	5-8'	10-12'
Laboratory ID #	J69868-6	J69868-4	J69868-2	J70462-2	J70462-4	J70462-3	J70289-4	J70289-6	J70550-1	J70289-8	J69752-4
Date Collected	8/24/2007	8/24/2007	8/24/2007	8/31/2007	8/31/2007	8/31/2007	8/29/2007	8/29/2007	8/4/2007	8/29/2007	8/22/2007
GC/MS Volatiles (ppb)											
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	0.125	0.0548	0.0172	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&B-Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	ND	ND	ND	ND	ND	ND	0.0032	ND	ND	0.00068	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
i-Butyl Alcohol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GC/MS Semi-volatiles (ppb)											
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND	0.158	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	0.610	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	1.56	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	0.0775	ND	ND
Anthracene	41	22.4	64	87.1	84.8	86.8	0.131	ND	3.95	ND	ND
Benz[a]pyrene	ND	ND	ND	ND	ND	ND	0.213	ND	ND	ND	ND
Benz[b]fluoranthene	114	119	295	308	427	127	0.0674	ND	5.11	ND	ND
Benz[c]fluoranthene	143	122	371	340	359	120	0.0460	ND	4.29	ND	ND
Benz[e]fluoranthene	82	103	248	111	128	58.8	0.0411	ND	4.23	ND	ND
Benz[k]fluoranthene	55.2	89.2	236	298	375	94.4	0.0266	ND	0.577	ND	ND
Di[2-Ethylhexyl]phthalate	205	180	574	403	159	58.9	0.0440	ND	1.11	ND	ND
Butyl benzyl phthalate	ND	ND	ND	ND	ND	ND	0.140	0.140	0.294	0.288	ND
Carbazole	ND	ND	268	90.5	41.1	34.9	ND	ND	1.27	ND	ND
Chrysene	114	119	312	371	432	137	0.0727	ND	4.75	ND	ND
Dibenz[a,h]anthracene	ND	ND	ND	ND	ND	ND	ND	ND	0.461	ND	ND
Dibenzofuran	ND	ND	ND	ND	ND	ND	ND	ND	1.07	ND	ND
Fluoranthene	251	192	750	751	1040	307	0.165	ND	13.8	0.0195	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	1.85	ND	ND
Indeno[1,2,3-cd]pyrene	72	86	229	123	155	57.7	0.0267	ND	1.14	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	0.794	ND	ND
Phenanthrene	153	54.2	319	405	405	297	0.116	ND	16.0	ND	ND
Pyrene	201	160	534	535	732	206	0.224	ND	10.4	0.0145	ND
POBs and Pesticides											
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ND	4.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	3.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ND	11.6	ND	ND	ND	3.9	ND	ND	ND	ND	ND
Aldrin	ND	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	2.9	3.9	ND	16.6	ND	5.2	ND	ND	ND	ND	ND
Dieldrin	ND	8.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	2.5	3.6	ND	18.5	ND	5	ND	ND	ND	ND	ND

NOTES:

BOLD denotes criteria exceedance

= estimated value

NS = No Standard

ND = Not Detected at concentrations that exceeded the laboratory reporting limit

[illegible]

BOLD denotes criteria exceedance

NS - No Standard

ND - Not Detected at concentrations that exceeded the laboratory L

Table V - Stream Sediment Analytical Data (Organics - Normalized for TOC)
 River Park Center
 City of Yorkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No.	Most Stringent Sediment Quality Criteria (ug/gOC)	SED-1 0-0.5' J69868-6	SED-2 0-0.5' J69868-4	SED-3 0-0.5' J69868-2	SED-4 0-0.5' J70462-2	SED-5 0-0.5' J70462-4	SED-6 0-0.5' J70462-3	MW-9 5-10' J70288-4	MW-11 5-11' J70289-6	MW-15 18-20' J70650-1
Depth										
Laboratory ID #										
Date Collected	NS	8/24/2007	8/24/2007	8/24/2007	8/31/2007	8/31/2007	8/31/2007	8/29/2007	8/29/2007	9/4/2007
Total Organic Carbon (ppm)	NS	5800	10000	14000	1400	6400	8240	270	270	270
GC/MS Volatiles (ug/gOC)	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	186	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NS	ND	ND	ND	ND	ND	ND	0.46	0.20	0.06
Acetone	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	24	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	92	ND	ND	ND	7	2	ND	ND	ND	ND
M,p-Xylenes	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylbenzene	NS	ND	ND	ND	ND	ND	ND	0.01	ND	ND
n-Butylbenzene	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-Butyl Alcohol	48	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	NS	ND	ND	ND	ND	ND	ND	ND	ND	0.59
GC/MS Semi-volatiles (ug/gOC)	NS	ND	ND	ND	ND	ND	ND	ND	ND	2.26
1,1-Biphenyl	34	ND	ND	ND	ND	ND	ND	ND	ND	5.78
2-Methylnaphthalene	140	ND	ND	ND	ND	ND	ND	ND	ND	0.29
Acenaphthene	NS	ND	ND	ND	ND	ND	ND	0.49	ND	14.63
Acenaphthylene	107	7	2	5	62	15	14	0.79	ND	ND
Anthracene	NS	ND	ND	ND	ND	67	20	0.25	ND	18.93
Benzofluorene	12	20	12	21	221	67	20	0.17	ND	15.89
Benzofluorene	1.3	19	12	22	235	66	19	0.15	ND	19.67
Benzofluorene	1.3	25	12	27	243	56	9	0.11	ND	3.62
Benzofluorene	1.3	14	10	18	79	20	15	0.16	ND	4.11
Benzofluorene	1.3	10	9	15	213	59	15	0.52	0.52	0.87
Benzofluorene	199.5	35	19	41	288	25	9	ND	ND	ND
bis(2-Ethylhexyl)phthalate	NS	NS	13	ND	ND	ND	ND	ND	ND	4.70
Butyl benzyl phthalate	NS	ND	ND	18	65	6	6	0.27	ND	17.59
Carbazole	1.3	20	12	22	265	68	22	ND	ND	1.78
Chrysene	NS	ND	ND	ND	ND	ND	ND	ND	ND	3.96
Dibenzofluorene	NS	ND	ND	ND	ND	163	49	0.57	ND	51.11
Dibenzofluorene	1020	43	19	50	565	ND	ND	0.10	ND	8.89
Fluoranthene	8	ND	ND	ND	ND	24	9	0.10	ND	4.22
Fluorene	1.3	12	9	16	88	ND	ND	ND	ND	2.94
Indeno(1,2,3-cd)pyrene	30	ND	ND	ND	ND	ND	ND	ND	ND	59.26
Naphthalene	120	28	5	23	280	63	48	0.43	ND	38.62
Phenanthrene	961	35	16	38	383	114	33	0.83	ND	ND
Pyrene	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs (ug/gOC)	0.0008	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetol-1248	NS	ND	0.41	ND	ND	ND	ND	ND	ND	ND
PCB-1248	0.01	ND	0.37	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	0.01	ND	1.16	ND	2.64	ND	ND	ND	ND	ND
4,4'-DDT	0.01	ND	0.29	ND	ND	ND	ND	ND	ND	ND
Aldrin	0.001	0.50	0.38	ND	11.86	ND	0.83	ND	ND	ND
Alkyl-Chloride	0.001	ND	0.88	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.001	0.43	0.86	ND	13.25	ND	0.80	ND	ND	ND
gamma-Chloride	0.001	0.43	0.86	ND	13.25	ND	0.80	ND	ND	ND

NOTES:

BOLD denotes criteria exceedance

= estimated value

NS - No Standard

ND - Not Detected at concentrations that exceeded the laboratory reporting limit

- sample was not collected at this location, value shown is average of other two samples collected from the same site

SESI Consulting Engineers' Project No. 7190

[illegible]

BOLD denotes criteria exceedance

NS - No Standard

ND - Not Detected at concentrations that exceeded the laboratory reporting limits
* - sample was not collected at this location, value shown is average of other five samples collected from

Prepared by SESI Consulting Engineers, P.C.
Date Prepared: December 2007

Date Prepared: December 2007
Table E: Sediment.xls

Table V - Stream Sediment Analysis
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No.	Depth	Laboratory ID #	Most Stringent Sediment Quality Criteria (ug/gOC)	S.B-6 23-25'	S.B-6 28'-30'
Date Collected			NS	11/28/2007	11/28/2007
Total Organic Carbon (ppm)			NS	290	280
GCMS Volatiles (ug/gOC)			NS	ND	ND
2-Butanone			186	ND	0.009
1,2,4-Trimethylbenzene			NS	ND	0.139
Acetone			0.6	ND	0.026
Benzene			NS	ND	ND
Carbon disulfide			24	ND	0.005
Ethylbenzene			92	ND	0.008
M&P-Xylenes			NS	ND	ND
Methyl Acetate			NS	0.06	0.043
Methylene chloride			NS	ND	0.019
n-Butylbenzene			0.8	ND	ND
Tetrachloroethane			NS	ND	ND
t-Butyl Alcohol			49	ND	0.020
Toluene					
GCMS Semi-volatiles (ug/gOC)			NS	ND	ND
1,1'-Biphenyl			34	ND	ND
2-Methylnaphthalene			140	ND	ND
Acenaphthene			NS	ND	ND
Acenaphthylene			107	ND	ND
Anthracene			NS	ND	ND
Benzidene			12	ND	ND
Benzo(a)anthracene			13	ND	ND
Benzof(b)pyrene			1.3	ND	ND
Benzof(c)fluoranthene			1.3	ND	ND
Benzof(k)fluoranthene			1.3	ND	0.7
Bis(2-Ethylhexyl)phthalate			199.5	2.3	ND
Butyl benzyl phthalate			NS	ND	ND
Cabazole			NS	ND	ND
Chrysene			1.3	ND	ND
Dibenzof(a,h)anthracene			NS	ND	ND
Dibenzofuran			NS	ND	ND
Fluoranthene			1020	ND	ND
Fluorene			8	ND	ND
Indeno(1,2,3-cd)pyrene			1.3	ND	ND
Naphthalene			30	ND	ND
Phenanthrene			120	ND	ND
Pyrene			961	ND	ND
PCBs (ug/gOC)			0.0008	ND	ND
Aroclor-1248					
Pesticides (ug/gOC)			0.01	ND	ND
4,4'-DDD			0.01	ND	ND
4,4'-DDE			0.01	ND	ND
4,4'-DDT			0.1	ND	ND
Aldrin			0.001	ND	ND
Dieldrin			0.001	ND	ND
gamma-Chlordane			0.001	ND	ND

NOTES:

BOLD denotes criteria exceedance

j = estimated value

NS - No Standard

MD - Not Detected at concentrations that exceeded the laboratory reporting limits

A - sample was not collected at this location. Values different from zero = 0.

Table V - Stream Sediment Analytical Results (Metals)
River Park Center
City of Yonkers, Westchester County, New York
SES Consulting Engineers Project No. 7190

Sample No.	Sediment Criteria	SED-1	SED-2	SED-3	SED-4	SED-5	SED-6	MW-9	MW-11	MW-15	MW-17	MW-28
Depth	Lowest Effect Level (ppm)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	5-10	5-10	18-20	5-8	10-12
Laboratory ID #	Severe Effect Level (ppm)	J6968-6	J6968-4	J6968-2	J7046-2	J7048-4	J7048-3	J7028-4	J7028-6	J7050-1	J7028-8	J6978-4
Date Collected		8/24/2007	8/24/2007	8/24/2007	8/31/2007	8/31/2007	8/31/2007	8/29/2007	8/29/2007	9/4/2007	8/29/2007	8/22/2007
Metals Analysis (ppm)												
Aluminum	NS	4020	3850	6400	5430	6290	3750	8230	16800	3180	8700	14500
Antimony	2	ND	4.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	6	3.6	ND	8.1	8.6	7.2	4.1	136	ND	7.3	2.6	ND
Barium	NS	56.9	29.8	224	45.6	54.4	34.5	47.9	65.4	46.8	40.1	47.8
Beryllium	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	0.6	4.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	NS	14400	8390	15100	10600	13500	9820	29500	2590	22200	2550	861
Chromium	26	15.1	15.8	26.6	29.8	22.7	17.9	24.1	82.2	12.1	29.2	22.3
Cobalt	NS	ND	ND	6.7	7.4	7.0	ND	7.0	10.7	ND	12.5	8.0
Copper	16	45.7	46.3	52.9	101	79.0	49.4	27.6	13.0	75.8	21.9	24.7
Iron	2%	18100	17030	41700	44000	39200	23400	13500	12500	12000	10500	15500
Lead	31	98.2	291	497	87.1	179	647	47.9	5.9	35.7	16.9	5.4
Magnesium	NS	9160	5370	9870	6590	7120	5250	3310	8870	8870	2070	3370
Manganese	46	1100	145	252	346	313	200	354	88.7	66.0	148	115
Mercury	0.15	1.3	60.6	2.1	0.28	0.28	0.28	109	0.053	1.4	2.7	ND
Nickel	16	50	11.7	21.3	53.3	30.1	14.9	20.2	24.8	14.9	21.7	23.7
Potassium	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	1	2.2	ND	ND	ND	ND	197	ND	ND	ND	ND	ND
Sodium	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Titanium	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	21.3	33.0	24.2	68.4	29.3	18.6	18.9	43.9	14.4	21.6	26.3
Zinc	120	194	118	407	155	289	131	50.3	36.4	28.2	47.3	38.4

Table V - Stream Sediment Analytical Results (Metals)
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	Sediment Criteria		MM-38	MM-38	SB-1	SB-1	SB-1	SB-2	SB-2	SB-2	SB-3	SB-3	SB-3
Depth	Lowest Effect Level	Severe Effect Level	4-6'	8-10'	10-12'	15-17'	20-22'	9.5-10'	15-17'	20-22'	11-13'	16-18'	21-23'
Laboratory ID #			AC34471-006	AC34471-009	AC34599-008	AC34599-009	AC34599-010	AC34532-010	AC34532-011	AC34532-012	AC34532-006	AC34532-007	AC34532-008
Date Collected			11/27/2007	11/27/2007	11/30/2007	11/30/2007	11/30/2007	11/26/2007	11/29/2007	11/29/2007	11/29/2007	11/29/2007	11/29/2007
Metals Analysis (ppm)													
Aluminum	NS	NS	3600	3100	7200	4600	5700	12000	9700	11000	8200	9800	4800
Antimony	2	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	6	53	4.1	11	ND	ND	ND	3.4	ND	ND	ND	ND	ND
Barium	NS	NS	86	22	36	25	41	51	130	64	42	47	41
Beryllium	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	0.6	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	NS	NS	14000	1800	2600	6300	3800	1700	6600	12000	2700	4800	2500
Chromium	26	110	19	21	43	20	23	50	28	23	24	37	14
Cobalt	NS	NS	8.1	41	6.2	5.4	7.4	9.9	16	6.2	11	8.8	3.8
Copper	16	110	55	120	16	38	36	20	54	34	28	36	22
Iron	2%	4%	28000	130000	8700	9700	12000	21000	19000	10000	14000	15000	6400
Lead	31	110	130	31	ND	ND	ND	7	ND	ND	ND	ND	ND
Magnesium	NS	NS	8600	ND	3400	4100	4300	4200	12000	5300	3000	4700	1800
Manganese	46	1100	300	1800	70	120	250	400	1600	720	310	260	520
Mercury	0.15	1.3	0.88	0.28	ND	ND	ND	ND	ND	ND	ND	0.12	ND
Nickel	16	50	14	54	15	21	25	21	36	17	17	27	10
Potassium	NS	NS	750	ND	ND	560	640	1200	930	810	650	1000	590
Selenium	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	1	2.2	ND	ND	ND	ND	ND	ND	ND	ND	1.8	ND	ND
Sodium	NS	NS	450	400	470	360	470	ND	950	1400	500	880	520
Thallium	NS	NS	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	NS	28	30	28	21	30	40	28	27	35	34	13
Zinc	120	270	83	75	17	15	19	36	26	16	22	22	ND

Table V - Stream Sediment Analytical Results (Metals)
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	Sediment Criteria	SB-4	SB-4	SB-4	SB-5	SB-5	SB-6	SB-6	SB-6
Depth	Lowest Effect Level	14-16	19-21	24-26	18-20	23-25	18-20	23-25	28-30
Laboratory ID #	Severe Effect Level	AC04599-005	AC04599-006	AC04599-007	AC04599-002	AC04599-003	AC04513-002	AC04513-003	AC04513-004
Date Collected	(ppm)	11/29/2007	11/29/2007	11/29/2007	11/30/2007	11/30/2007	11/28/2007	11/28/2007	11/28/2007
Metals Analysis (ppm)									
Aluminum	NS	4100	3700	9600	4000	18000	3500	5100	6900
Antimony	2	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	6	2.4	ND	ND	ND	ND	ND	ND	ND
Barium	NS	24	28	67	25	75	34	31	64
Beryllium	NS	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	0.6	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	NS	2200	6900	12000	2000	2700	1200	2700	2400
Chromium	26	63	7.7	28	10	46	12	18	68
Cobalt	NS	5.8	3.6	7.8	4.2	14	2.9	5.2	24
Copper	16	20	14	31	25	35	12	23	36
Iron	2%	15000	8400	16000	7500	33000	8200	8900	20000
Lead	31	ND	ND	ND	ND	6.3	ND	ND	ND
Magnesium	NS	2600	3600	6900	2300	9600	2600	3200	4100
Manganese	46	230	220	380	190	500	210	230	260
Mercury	0.15	0.12	ND	ND	ND	ND	ND	ND	ND
Nickel	16	17	10	20	12	19	8.7	15	79
Potassium	NS	ND	600	1760	ND	11000	1400	580	3000
Selenium	NS	ND	ND	ND	ND	ND	ND	ND	ND
Silver	1	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	NS	ND	ND	630	300	390	ND	460	520
Titanium	NS	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	NS	18	12	28	16	50	17	20	25
Zinc	120	20	16	32	16	32	18	16	28

Legend

194 concentration exceeding the applicable Lowest Effect Level

407 concentration exceeding the applicable Severe Effect Level

Table V - Surface Water Analytical Results
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	Laboratory ID #	Date Collected	Ambient Water Quality Standard, Water Class C, Type A (C), Fresh Water Fish Propagation	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6
				J69868-5 8/24/2007	J69868-3 8/24/2007	J69868-1 8/24/2007	J69868-8 8/24/2007	J69868-7 8/24/2007	J69868-10 8/24/2007
GC/MS Volatiles (ppb)									
cis-1,2-Dichloroethane			NS	1.4	1.3	1.3	1.0	0.75 J	0.94 J
GC/MS Semi-volatiles (ppb)									
bis(2-Ethylhexyl)phthalate			0.6	2.2	1.8 J	3.0	1.5 J	1.6 J	ND
Metals Analysis (ppb)									
Aluminum			100	<200	<200	282	<200	<200	<200
Calcium			NS	44400	44300	44300	45400	41500	45200
Iron			300	248	320	854	314	390	247
Lead			**	<3.0	<3.0	10.4	<3.0	3.8	<3.0
Magnesium			NS	14500	14400	14500	14800	13500	14700
Manganese			NS	28.0	49.0	179	33.4	65.4	25.2
Mercury			0.77*	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Sodium			NS	53900	53800	53800	55200	50600	55200

Notes:

* = dissolved form

** = dissolved form, also standard = (1.46203-(ln (hardness) (0.145712))) exp (1.273 (ln (hardness)))-4.297)

Bold denotes above standard

ND: Not Detected

J: estimated value

Table IV - Soil Vapor Analytical Results Summary Table
River Falls Center
City of Yonkers, Westchester County, New York

Sample No.	Air Guideline Values	SV-1	SV-2	SV-3	SV-8	SV-9
Laboratory ID. #		JT2090-1	JT2090-2	JT2090-3	JT2090-4	JT2090-5
Date Collected		9/20/2007	9/20/2007	9/20/2007	9/20/2007	9/20/2007
Units	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)
1,2,4-Trimethylbenzene		ND	ND	ND	187	26
1,3,5-Trimethylbenzene		ND	ND	ND	222	16
4-Ethyltoluene		ND	ND	ND	87.0	5.4 J
Acetone		43.5	54.2	65.6	40.9	34.4
Benzene		ND	26	ND	ND	ND
Carbon disulfide		17	28	161	ND	7.2
Chloroform		ND	ND	14	ND	ND
Cyclohexane		ND	6.5	ND	ND	ND
Dichlorodifluoromethane		ND	ND	19	ND	ND
Ethanol		7.9	15	11	18	12
Ethylbenzene		ND	ND	ND	16	ND
Isopropyl Alcohol		10	347	996 E	207	8.6
m,p-Xylene		ND	ND	ND	31	8.7
Methyl ethyl ketone		ND	12	ND	ND	ND
Methyl Isobutyl Ketone		7.8	46.3	13	9.8	23
Methylene chloride	60	8.3	8.0	6.6	8.3	ND
o-Xylene		ND	ND	ND	59.1	6.5 J
Propylene		ND	7.4	ND	ND	ND
Tertiary Butyl Alcohol		ND	11	43.0	13	ND
Tetrachloroethylene (PCE)	100	65	286	21	ND	ND
Toluene		ND	27	26	15	9.8
Trichlorofluoromethane		ND	11	15	ND	ND
Xylenes (total)		ND	ND	ND	89.9	15

Notes:

BOLD denotes concentration above standard

ND: Not Detected

J: estimated value

Table 3C - Analytical Results for Deep Groundwater Wells

River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY Water TASH Criteria (ug/L)	NY TOGS Water Criteria (ug/L)	HW-32	HW-33	HW-34	HW-35	HW-36	HW-37	HW-38
Labatory ID. #			AC34591-001	AC34591-002	AC34512-003	AC34512-001	AC34591-003	JT835-1	AC34591-004
Date Collected			12/26/07	12/26/07	11/28/07	11/28/07	12/26/07	12/26/07	12/26/07
Volatile Organics			Result	Result	Result	Result	Result	Results	Result
1,2,4-Trichlorobenzene	NA	NA	ND	ND	12	1	ND	ND	ND
1,3,5-Trichlorobenzene	NA	NA	ND	ND	3.5	ND	ND	ND	ND
Benzene	0.7	1	ND	ND	ND	18	ND	ND	ND
Chloroform	7	7	ND	ND	ND	ND	2.2	ND	ND
Chlorobenzene	NA	5	ND	ND	ND	12	ND	ND	2
1,2-Dichlorobenzene	5	5	ND	ND	1.2	ND	ND	ND	ND
1,4-Dichlorobenzene	5	5	ND	ND	3.1	1.5	ND	ND	ND
Methyl-tert-butyl ether	5	5	ND	ND	3.7	ND	ND	ND	ND
Methylene chloride	5	5	ND	ND	ND	ND	ND	ND	ND
Methyl-ethyl ether	NA	10	480	ND	ND	ND	ND	ND	ND
O-Xylene	5	5	ND	ND	3.4	ND	ND	ND	ND
p-Xylene	5	5	2.1	1.5	1	13	18	2.6	40
Tetrahydrofuran	5	5	ND	ND	2.4	4.4	ND	0.33	ND
Toluene	5	5	ND	ND	ND	5.1	ND	ND	ND
Trichloroethene	5	5	ND	ND	ND	ND	6.2	ND	1.8
Base Neutral Organics									
2,4-Dimethylphenol	NA	50	ND	ND	ND	21	ND	ND	ND
2-Methylphenol	50	NA	ND	ND	ND	19	ND	ND	ND
2-Methylphenol	5	NA	ND	ND	ND	24	ND	ND	ND
3,4-Methylphenol	50	NA	ND	ND	ND	29	ND	ND	ND
Acetophenone	20	20	ND	ND	ND	22	ND	ND	ND
Acetophenone	20	NA	ND	ND	ND	18	ND	ND	ND
Acetophenone	50	50	ND	ND	ND	11	ND	ND	ND
Acetophenone	NA	NA	ND	ND	ND	51	ND	ND	ND
Camphor	5	5	ND	ND	ND	18	ND	ND	ND
Diethylstilbenzene	50	50	ND	ND	ND	3.8	ND	ND	ND
Fluorene	50	50	ND	ND	ND	23	ND	ND	ND
Fluorene	10	10	ND	1.2	2.3	77	ND	ND	ND
Naphthalene	50	50	ND	ND	ND	36	ND	ND	ND
Phenanthrene	50	50	ND	ND	ND	2.4	ND	ND	ND
Pyrene	50	50	ND	ND	ND	ND	ND	ND	ND
Metals									
Aluminum	NA	NA	ND	230	520	400	ND	776	240
Arsenic	NA	25	ND	ND	4.9	ND	ND	ND	ND
Barium	NA	1000	75	300	28	110	82	ND	180
Cadmium	NA	NA	11000	16000	18000	8400	8800	8140	14000
Cobalt	NA	NA	ND	11	29	ND	ND	ND	ND
Copper	NA	200	ND	ND	35	ND	ND	ND	ND
Iron	NA	300	ND	1100	21000	6800	460	922	890
Lead	NA	25	ND	ND	13	ND	ND	ND	ND
Manganese	NA	35,000	5600	6700	6700	3500	3600	2840	5100
Manganese	NA	300	380	480	3300	530	390	882	1500
Nickel	NA	100	ND	21	69	17	ND	ND	ND
Potassium	NA	NA	12000	28000	21000	8200	5500	10600	20000
Selenium	NA	10	ND	ND	ND	ND	ND	12.2	ND
Sodium	NA	20000	130000	440000	410000	84000	58000	443000	200000
Zinc	NA	2000	ND	ND	82	33	ND	ND	ND
Other Parameters									
Conductivity	NA	200	ND	ND	ND	ND	ND	NA	0.017

Table IIIB - Additional Analytical Results for Monitoring in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-1 Unfiltered J71831-1 9/18/2007	MW-1 Unfiltered J76156-1 11/8/2007	MW-1 Filtered J76156-1F 11/8/2007	MW-2 Unfiltered J71592-1 9/15/2007	MW-2 Unfiltered J76008-1 11/7/2007	MW-2 Filtered J76008-1F 11/7/2007
Aluminum	NA	NA	7429-90-5	397000	283000	ND	99200	43500	ND
Antimony	NA	3	7440-36-0	<12	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	97.6	78	ND	41.6	16	ND
Barium	NA	1,000	7440-39-3	3900	2500	ND	1100	546	231
Beryllium	NA	3	7440-41-7	5.2	14	ND	3.2	ND	ND
Cadmium	NA	5	7440-43-9	<8.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	113000	76500	49900	84200	87800	92300
Chromium	NA	50	7440-47-3	621	444	ND	165	73.4	ND
Cobalt	NA	NA	7440-48-4	265	216	ND	93.1	ND	ND
Copper	NA	200	7440-50-8	1320	982	ND	366	154	ND
Iron	NA	300	7439-89-6	555000	394000	ND	147000	67000	ND
Lead	NA	25	7439-92-1	712	564	ND	123	38.8	ND
Magnesium	NA	35,000	7439-95-4		116000	12200	66800	45800	36600
Manganese	NA	300	7439-96-5	15600	12000	32.7	2430	1090	272
Mercury	NA	0.7	7439-97-6	1.4	ND	ND	1.3	0.79	ND
Nickel	NA	100	7440-02-0	781	632	ND	261	104	ND
Potassium	NA	NA	9777440	84100	55100	ND	32000	ND	11100
Selenium	NA	10	7782-49-2	<20	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<20	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	333000	215000	240000	272000	271000	313000
Thallium	NA	0.5	7440-28-0	<20	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	881	616	ND	237	ND	ND
Zinc	NA	2,000	7440-66-6	1370	1010	23.8	380	165	ND

BOLD denotes criteria exceedence
ND: Not Detected
J: Estimated value

Table IIIB - Additional Analytical Results for MW-3 in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-3 Unfiltered J71831-11 9/17/2007	MW-3 Unfiltered J76433-1 11/10/2007	MW-3 Filtered J76433-1F 11/10/2007	MW-4 Unfiltered J71831-12 9/17/2007	MW-4 Unfiltered J76433-2 11/10/2007	MW-4 Filtered J76433-2F 11/10/2007
Laboratory ID #									
Date Collected									
Aluminum	NA	NA	7429-90-5	4510	10100	255	86000	169000	456
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<12	ND	ND
Arsenic	NA	25	7440-38-2	<3.0	ND	ND	18.0	37.2	6.7
Barium	NA	1,000	7440-39-3	<200	255	ND	850	1330	339
Beryllium	NA	3	7440-41-7	<1.0	1.9	2.7	<2.0	ND	1.4
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<8.0	ND	ND
Calcium	NA	NA	7440-70-2	122000	108000	127000	307000	325000	255000
Chromium	NA	50	7440-47-3	13.2	27.8	ND	155	343	ND
Cobalt	NA	NA	7440-48-4	<50	ND	ND	<100	113	ND
Copper	NA	200	7440-50-8	<25	26	ND	318	555	ND
Iron	NA	300	7439-89-6	6620	16100	ND	113000	224000	24400
Lead	NA	25	7439-92-1	<3.0	5.5	ND	53.2	89.6	ND
Magnesium	NA	35,000	7439-95-4	49000	46600	60300	188000	216000	158000
Manganese	NA	300	7439-96-5	12200	12200	13600	8970	11000	7440
Mercury	NA	0.7	7439-97-6	<0.20	ND	ND	0.73	1	ND
Nickel	NA	100	7440-02-0	<40	ND	ND	145	318	ND
Potassium	NA	NA	9777440	11500	13000	11300	46600	58000	33600
Selenium	NA	10	7782-49-2	<10	ND	ND	<20	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<20	ND	ND
Sodium	NA	20,000	7440-23-5	65400	86900	78400	142000	149000	156000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<20	ND	ND
Vanadium	NA	NA	7440-62-2	<50	ND	ND	181	400	ND
Zinc	NA	2,000	7440-66-6	<20	42.6	ND	221	434	ND

BOLD denotes criteria exceedence
 ND: Not Detected
 J: Estimated value

Table IIIB - Additional Analytical Results for Monitoring in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-5 Unfiltered J71831-13 9/17/2007	MW-5 Unfiltered J76433-3 14/10/2007	MW-5 Filtered J76433-3F 11/10/2007	MW-6 Unfiltered J71831-4 9/18/2007	MW-6 Unfiltered J76156-2 11/8/2007	MW-6 Filtered J76156-2F 11/8/2007
Laboratory ID #									
Date Collected									
Aluminum	NA	NA	7429-90-5	57200	13800	551	105000	35100	ND
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<12	ND	ND
Arsenic	NA	25	7440-38-2	10.2	9.5	8.8	29.6	16.2	13
Barium	NA	1,000	7440-39-3	2640	3340	3350	844	433	265
Beryllium	NA	3	7440-41-7	<1.0	ND	ND	<2.0	ND	ND
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<8.0	ND	ND
Calcium	NA	NA	7440-70-2	366000	293000	318000	169000	136000	131000
Chromium	NA	50	7440-47-3	116	26.1	ND	217	71.2	ND
Cobalt	NA	NA	7440-48-4	<50	ND	ND	<100	ND	ND
Copper	NA	200	7440-50-8	250	52.5	ND	403	131	ND
Iron	NA	300	7439-89-6	69000	26500	15100	170000	74200	38500
Lead	NA	25	7439-92-1	70.1	16.5	ND	136	49.2	ND
Magnesium	NA	35,000	7439-95-4	249000	196000	232000	149000	108000	107000
Manganese	NA	300	7439-96-5	2860	1620	1550	3490	2310	1970
Mercury	NA	0.7	7439-97-6	<0.40	ND	ND	<0.80	0.4	ND
Nickel	NA	100	7440-02-0	97.0	ND	ND	192	ND	ND
Potassium	NA	NA	9777440	69800	51400	58400	37800	24100	21800
Selenium	NA	10	7782-49-2	<10	ND	ND	<20	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<20	ND	ND
Sodium	NA	20,000	7440-23-5	682000	689000	762000	132000	147000	163000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<20	ND	ND
Vanadium	NA	NA	7440-62-2	130	ND	ND	230	ND	ND
Zinc	NA	2,000	7440-66-6	221	61.9	ND	397	137	ND

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated Value

Table IIIB - Additional Analytical Results for M-100 Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MMW-8 Unfiltered J71831-5 9/18/2007	MMW-8 Unfiltered J76156-3 11/8/2007	MMW-8 Filtered J76156-3F 11/8/2007	MMW-9 Unfiltered J71489-1 9/14/2007	MMW-9 Unfiltered J76156-4 11/8/2007	MMW-9 Filtered J76156-4F 11/8/2007
Laboratory ID #									
Date Collected									
Aluminum	NA	NA	7429-90-5	264000	162000	ND	6960	7020	ND
Antimony	NA	3	7440-36-0	<12	21.3	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	136	81.7	ND	41.2	33.2	17.3
Berium	NA	1,000	7440-39-3	3410	1880	ND	<200	ND	ND
Beryllium	NA	3	7440-41-7	3.8	8.7	ND	<1.0	ND	ND
Cadmium	NA	5	7440-43-9	8.4	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	125000	106000	84600	83300	93200	87600
Chromium	NA	50	7440-47-3	7960	4820	ND	19.7	19	ND
Cobalt	NA	NA	7440-48-4	200	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	1820	1140	ND	43.3	34	ND
Iron	NA	300	7439-89-6	366000	214000	ND	7340	8360	605
Lead	NA	25	7439-92-1	2800	1670	ND	38.6	88.3	ND
Magnesium	NA	35,000	7439-95-4	122000	81400	29400	19300	24700	28100
Manganese	NA	300	7439-96-5	3300	1920	175	252	431	421
Mercury	NA	0.7	7439-97-6	194	78.2	ND	12.9	16.9	ND
Nickel	NA	100	7440-02-0	593	381	ND	<40	ND	ND
Potassium	NA	NA	9777440	32700	ND	ND	15600	17200	18000
Selenium	NA	10	7782-49-2	<20	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<20	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	88100	99000	112000	87200	75200	85800
Thallium	NA	0.5	7440-28-0	<20	ND	ND	<5.0	ND	ND
Vanadium	NA	NA	7440-62-2	728	411	ND	<50	ND	ND
Zinc	NA	2,000	7440-66-6	5150	3040	ND	66.6	104	22.4

BOLD denotes criteria exceedence
ND: Not Detected
J: Estimated value

**Table IIIB - Additional Analytical Results for Metropolitan River Park Center
Shallow Filtered Groundwater Samples
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190**

Sample No. Laboratory ID # Date Collected	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-10 Unfiltered J71489-2 9/14/2007	MW-10 Unfiltered J76433-4 11/10/2007	MW-10 Filtered J76433-4F 11/10/2007	MW-11 Unfiltered J71489-3 9/14/2007	MW-11 Unfiltered J76156-5 11/8/2007	MW-11 Filtered J76156-5F 11/8/2007
Aluminum	NA	NA	7429-90-5	10000	49400	ND	39500	19100	ND
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	<3.0	15.7	ND	15.4	15.8	3.4
Barium	NA	1,000	7440-39-3	<200	456	ND	214	ND	ND
Beryllium	NA	3	7440-41-7	<1.0	ND	ND	<1.0	ND	ND
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	70200	71900	66700	93100	98900	69300
Chromium	NA	50	7440-47-3	25.5	183	ND	120	56.4	ND
Cobalt	NA	NA	7440-48-4	<50	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	38.7	168	ND	110	62.6	ND
Iron	NA	300	7439-89-6	9370	60500	ND	36400	22400	348
Lead	NA	25	7439-92-1	33.2	189	ND	183	106	ND
Magnesium	NA	35,000	7439-95-4	23700	34900	23400	16300	14200	13400
Manganese	NA	300	7439-96-5	348	1690	38	428	592	214
Mercury	NA	0.7	7439-97-6	12.2	10	ND	43.2	28.6	ND
Nickel	NA	100	7440-02-0	<40	112	ND	55.9	ND	ND
Potassium	NA	NA	9777440	<10000	11600	ND	19500	16900	18700
Selenium	NA	10	7782-49-2	<10	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	78900	154000	105000	65700	58000	68900
Thallium	NA	0.5	7440-28-0	<5.0	ND	ND	<5.0	ND	ND
Vanadium	NA	NA	7440-62-2	<50	119	ND	90.2	56.7	ND
Zinc	NA	2,000	7440-66-6	49.2	269	ND	199	109	ND

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table IIIB - Additional Analytical Results for MW-14 in Shallow Filtered Groundwater Samples
River Palisades Inter
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-12 Unfiltered J71831-6 9/18/2007	MW-12 Unfiltered J76433-5 11/10/2007	MW-12 Filtered J76433-5F 11/10/2007	MW-14 Unfiltered J71831-7 9/18/2007	MW-14 Unfiltered J76433-6 11/10/2007	MW-14 Filtered J76433-6F 11/10/2007
Laboratory ID #									
Date Collected									
Aluminum	NA	NA	7429-90-5	30600	30400	ND	30100	29900	ND
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	8.9	8	ND	9.2	10	ND
Barium	NA	1,000	7440-39-3	330	201	ND	318	336	ND
Beryllium	NA	3	7440-41-7	<1.0	ND	ND	<1.0	1	ND
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	77300	69500	70900	52800	47900	44700
Chromium	NA	50	7440-47-3	95.1	153	ND	61.4	74.8	ND
Cobalt	NA	NA	7440-48-4	<50	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	115	78.5	ND	118	123	ND
Iron	NA	300	7439-89-6	36700	30200	ND	39500	43400	ND
Lead	NA	25	7439-92-1	152	108	ND	24.9	34.4	ND
Magnesium	NA	35,000	7439-95-4	34600	27000	27400	28500	26000	18300
Manganese	NA	300	7439-96-5	1120	602	ND	1130	1200	ND
Mercury	NA	0.7	7439-97-6	0.76	0.77	ND	<0.40	ND	ND
Nickel	NA	100	7440-02-0	62.1	54.8	ND	66.6	78.7	ND
Potassium	NA	NA	9777440	<10000	ND	ND	11500	11100	ND
Selenium	NA	10	7782-49-2	<10	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	128000	98500	177000	172000	198000	213000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	68.6	73.5	ND	63.5	70.6	ND
Zinc	NA	2,000	7440-66-6	130	152	20.2	97.8	89	36

BOLO denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table IIIB - Additional Analytical Results for MW-15 in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-15 Unfiltered J71592-2 9/15/2007	MW-15 Unfiltered J76433-7 11/10/2007	MW-15 Filtered J76433-7F 11/10/2007	MW-16 Unfiltered J71831-14 9/17/2007	MW-16 Unfiltered J76156-6 11/8/2007	MW-16 Filtered J76156-6F 11/8/2007
Laboratory ID #									
Date Collected									
Aluminum	NA	NA	7429-90-5	85000	60900	ND	33600	54400	ND
Antimony	NA	3	7440-36-0	<12	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	21.1	30.4	ND	11.0	20.4	ND
Barium	NA	1,000	7440-39-3	618	459	ND	780	985	ND
Beryllium	NA	3	7440-41-7	3.7	ND	ND	<1.0	2.6	ND
Cadmium	NA	5	7440-43-9	<8.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	155000	118000	78500	90500	96000	97900
Chromium	NA	50	7440-47-3	194	144	ND	50.9	87.4	ND
Cobalt	NA	NA	7440-48-4	<100	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	452	281	ND	234	280	ND
Iron	NA	300	7439-89-6	125000	88700	ND	39800	62400	ND
Lead	NA	25	7439-92-1	326	212	ND	18.5	30.4	ND
Magnesium	NA	35,000	7439-95-4	73700	55900	30600	40600	46400	39800
Manganese	NA	300	7439-96-5	1970	1440	55	12200	15600	419
Mercury	NA	0.7	7439-97-6	17.3	9.8	ND	<0.40	ND	ND
Nickel	NA	100	7440-02-0	159	128	ND	164	250	ND
Potassium	NA	NA	9177440	43300	25800	ND	13700	ND	ND
Selenium	NA	10	7782-49-2	<20	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<20	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	155000	174000	164000	110000	110000	107000
Thallium	NA	0.5	7440-28-0	<20	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	160	116	ND	71.9	107	ND
Zinc	NA	2,000	7440-66-6	385	270	ND	89.8	147	209

BOLD denotes criteria exceedance
ND: Not Detected
J: Estimated value

Table IIIB - Additional Analytical Results for Monitoring in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Laboratory ID # Date Collected	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-17 Unfiltered J71592-3 9/15/2007	MW-17 Unfiltered J76433-8 11/10/2007	MW-17 Filtered J76433-8F 11/10/2007	MW-18 Unfiltered J71831-2 9/18/2007	MW-18 Unfiltered J76156-7 11/8/2007	MW-18 Filtered J76156-7F 11/8/2007
Aluminum	NA	NA	7429-90-5	14300	38500	ND	21500	39900	ND
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	11.2	35.6	ND	4.3	5.7	ND
Barium	NA	1,000	7440-39-3	236	457	ND	249	322	ND
Beryllium	NA	3	7440-41-7	<1.0	ND	ND	<1.0	1.2	ND
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	100000	79300	75800	107000	110000	112000
Chromium	NA	50	7440-47-3	37.5	104	ND	49.6	97.4	ND
Cobalt	NA	NA	7440-48-4	<50	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	115	240	ND	66.6	121	ND
Iron	NA	300	7439-89-6	21200	52700	ND	19500	33500	3950
Lead	NA	25	7439-92-1	188	428	ND	31.7	74.3	ND
Magnesium	NA	35,000	7439-95-4	31000	33100	26800	26000	29400	24900
Manganese	NA	300	7439-96-5	1260	2880	109	1400	1070	706
Mercury	NA	0.7	7439-97-6	50.2	84.8	ND	1.9	4.2	ND
Nickel	NA	100	7440-02-0	<40	109	ND	<40	53.9	ND
Potassium	NA	NA	9777440	<10000	ND	ND	13200	12800	13400
Selenium	NA	10	7782-49-2	<10	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	69400	57900	66700	285000	296000	352000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	56.6	141	ND	<50	56.6	ND
Zinc	NA	2,000	7440-66-6	244	529	ND	51.8	112	22.8

BOLD denotes criteria exceedence
ND: Not Detected
J: Estimated value

Table IIIB - Additional Analytical Results for MW-19 in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Laboratory ID # Date Collected	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-19 Unfiltered J71831-3 9/18/2007	MW-19 Unfiltered J76156-8 11/8/2007	MW-19 Filtered J76156-8F 11/8/2007	MW-20 Unfiltered J71592-4 9/15/2007	MW-20 Unfiltered J76008-2 11/7/2007	MW-20 Filtered J76008-2F 11/7/2007
Aluminum	NA	NA	7429-90-5	88900	59900	ND	79200	48900	ND
Antimony	NA	3	7440-36-0	<12	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	55.8	58.6	ND	11.0	10	ND
Barium	NA	1,000	7440-39-3	1100	742	ND	1080	841	604
Beryllium	NA	3	7440-41-7	<2.0	2.4	ND	2.3	ND	ND
Cadmium	NA	5	7440-43-9	<8.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	89300	92400	87000	196000	174000	177000
Chromium	NA	50	7440-47-3	512	383	ND	156	93.4	ND
Cobalt	NA	NA	7440-48-4	<100	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	3720	2550	ND	248	178	ND
Iron	NA	300	7439-89-6	100000	77900	ND	77600	47900	8180
Lead	NA	25	7439-92-1	1110	767	ND	132	59.6	ND
Magnesium	NA	35,000	7439-95-4	35600	30700	20400	43400	34500	27200
Manganese	NA	300	7439-96-5	803	513	51.3	2580	2060	1870
Mercury	NA	0.7	7439-97-6	356	422	ND	12.2	4.7	ND
Nickel	NA	100	7440-02-0	158	111	ND	182	119	ND
Potassium	NA	NA	9177440	<20000	ND	ND	39900	24700	23500
Selenium	NA	10	7782-49-2	<20	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<20	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	146000	220000	253000	652000	528000	606000
Thallium	NA	0.5	7440-28-0	<20	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	175	111	ND	143	ND	ND
Zinc	NA	2,000	7440-66-6	1440	990	40.4	213	161	ND

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table IIIB - Additional Analytical Results for MW-21 in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Laboratory ID # Date Collected	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-21 Unfiltered J71592-5 9/15/2007	MW-21 Unfiltered J76008-3 11/7/2007	MW-21 Filtered J76008-3F 11/7/2007	MW-22 Unfiltered J71592-6 9/15/2007	MW-22 Unfiltered J76008-4 11/7/2007	MW-22 Filtered J76008-4F 11/7/2007
Aluminum	NA	NA	7429-90-5	29300	9230	ND	72200	88700	ND
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	<8.0	ND	ND	24.2	30.3	ND
Barium	NA	1,000	7440-39-3	268	ND	ND	1160	1030	ND
Beryllium	NA	3	7440-41-7	<1.0	ND	ND	2.7	3.7	ND
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	139000	111000	123000	88600	77600	74600
Chromium	NA	50	7440-47-3	35.1	13.1	ND	121	143	ND
Cobalt	NA	NA	7440-48-4	<50	ND	ND	80.3	ND	ND
Copper	NA	200	7440-50-8	94.0	28.9	ND	287	267	ND
Iron	NA	300	7439-89-6	21800	6360	ND	99200	109000	ND
Lead	NA	25	7439-92-1	9.0	ND	ND	77.0	81	ND
Magnesium	NA	35,000	7439-95-4	38200	29400	31200	50900	44400	25500
Manganese	NA	300	7439-96-5	245	68.7	ND	14200	13300	69.6
Mercury	NA	0.7	7439-97-6	<0.40	ND	ND	0.56	0.63	ND
Nickel	NA	100	7440-02-0	<40	ND	ND	280	292	ND
Potassium	NA	NA	91771440	22700	13400	14600	15500	ND	ND
Selenium	NA	10	7782-49-2	10.9	17.4	18.7	<10	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	403000	305000	348000	79700	111000	115000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	<50	ND	ND	203	214	ND
Zinc	NA	2,000	7440-66-6	47.2	ND	ND	247	275	20.8

BOLD denotes criteria exceedance
ND: Not Detected
J: Estimated value

Table IIIB - Additional Analytical Results for MW-23 in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Laboratory ID # Date Collected	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-23 Unfiltered J71592-7 9/15/2007	MW-23 Unfiltered J76008-5 11/7/2007	MW-23 Filtered J76008-5F 11/7/2007	MW-24 Unfiltered J71592-8 9/15/2007	MW-24 Unfiltered J76008-6 11/7/2007	MW-24 Filtered J76008-6F 11/7/2007
Aluminum	NA	NA	7429-90-5	1030	5500	ND	13200	30100	ND
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	<8.0	ND	ND	<8.0	7.8	ND
Barium	NA	1,000	7440-39-3	<200	ND	ND	<200	ND	ND
Beryllium	NA	3	7440-41-7	<1.0	ND	ND	<1.0	ND	ND
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	100000	87400	94000	99600	95400	99300
Chromium	NA	50	7440-47-3	<10	20	ND	25.8	59.2	ND
Cobalt	NA	NA	7440-48-4	<50	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	<25	29.7	ND	59.8	103	ND
Iron	NA	300	7439-89-6	1550	8090	ND	17100	36900	ND
Lead	NA	25	7439-92-1	<3.0	ND	ND	63.6	85.8	ND
Magnesium	NA	35,000	7439-95-4	40100	36600	37700	32400	34000	27200
Manganese	NA	300	7439-96-5	32.2	203	ND	1180	1650	368
Mercury	NA	0.7	7439-97-6	<0.20	ND	ND	1.8	ND	ND
Nickel	NA	100	7440-02-0	<40	ND	ND	<40	ND	ND
Potassium	NA	NA	9777440	<10000	ND	ND	22200	ND	18200
Selenium	NA	10	7782-49-2	<10	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	122000	116000	100000	226000	218000	244000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	<50	ND	ND	<50	ND	ND
Zinc	NA	2,000	7440-66-6	<20	26.8	22.4	72.5	127	21.8

BOLD denotes criteria exceedence
 ND: Not Detected
 J: Estimated value

Table IIIB - Additional Analytical Results for Monitoring in Shallow Filtered Groundwater Samples
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-25 Unfiltered J71592-9 9/15/2007	MW-25 Unfiltered J76008-7 11/7/2007	MW-25 Filtered J76008-7F 11/7/2007	MW-28 Unfiltered J71592-10 9/15/2007	MW-28 Unfiltered J76008-8 11/7/2007	MW-28 Filtered J76008-8F 11/7/2007
Laboratory ID #									
Date Collected									
Aluminum	NA	NA	7429-90-5	23000	238000	ND	28400	28100	ND
Antimony	NA	3	7440-36-0	<6.0	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	<8.0	125	ND	<8.0	7.4	ND
Barium	NA	1,000	7440-39-3	797	5740	217	290	237	ND
Beryllium	NA	3	7440-41-7	<1.0	10.3	ND	<1.0	1.2	ND
Cadmium	NA	5	7440-43-9	<4.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	94000	114000	86600	139000	102000	111000
Chromium	NA	50	7440-47-3	33.2	335	ND	55.1	53.9	ND
Cobalt	NA	NA	7440-48-4	<50	262	ND	<50	ND	ND
Copper	NA	200	7440-50-8	107	835	ND	86.5	75.1	ND
Iron	NA	300	7439-89-6	28300	288000	ND	38900	35900	ND
Lead	NA	25	7439-92-1	20.6	172	ND	28.5	23.4	ND
Magnesium	NA	35,000	7439-95-4	35600	84300	27700	61700	47900	47000
Manganese	NA	300	7439-96-5	566	5400	ND	4710	2720	2250
Mercury	NA	0.7	7439-97-6	<0.40	2.4	ND	<0.40	ND	ND
Nickel	NA	100	7440-02-0	62.2	624	ND	50.7	47.6	ND
Potassium	NA	NA	9777-440	16800	39900	11300	20800	11100	ND
Selenium	NA	10	7782-49-2	<10	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<10	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	179000	170000	173000	383000	239000	263000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<10	ND	ND
Vanadium	NA	NA	7440-62-2	62.6	604	ND	59.7	55.6	ND
Zinc	NA	2,000	7440-66-6	68.3	561	20.8	90.1	85.4	23.4

BOLD denotes criteria exceedence
 ND: Not Detected
 J: Estimated value

Table IIIB - Additional Analytical Results for MW-29 in Shallow Filtered Groundwater Samples
River Park Inter
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	CASRN#	MW-29 Unfiltered J71489-4 9/14/2007	MW-29 Unfiltered J76156-9 11/8/2007	MW-29 Filtered J76156-9F 11/8/2007	MW-30 Unfiltered J71489-5 9/14/2007	MW-30 Unfiltered J76008-9 11/7/2007	MW-30 Filtered J76008-9F 11/7/2007
Laboratory ID#									
Date Collected									
Aluminum	NA	NA	7429-90-5	129000	45000	ND	12500	23600	ND
Antimony	NA	3	7440-36-0	<12	ND	ND	<6.0	ND	ND
Arsenic	NA	25	7440-38-2	31.0	10.4	ND	<3.0	5.2	ND
Barium	NA	1,000	7440-39-3	1380	536	ND	268	344	ND
Beryllium	NA	3	7440-41-7	<2.0	2	ND	<1.0	ND	ND
Cadmium	NA	5	7440-43-9	<8.0	ND	ND	<4.0	ND	ND
Calcium	NA	NA	7440-70-2	28900	14000	7740	107000	83900	86500
Chromium	NA	50	7440-47-3	261	105	ND	42.0	84.4	ND
Cobalt	NA	NA	7440-48-4	<100	ND	ND	<50	ND	ND
Copper	NA	200	7440-50-8	332	156	ND	49.1	62.7	ND
Iron	NA	300	7439-89-6	147000	50900	ND	13500	26500	121
Lead	NA	25	7439-92-1	878	370	ND	29.4	61.6	ND
Magnesium	NA	35,000	7439-95-4	34400	13900	ND	30500	27000	22200
Manganese	NA	300	7439-96-5	3110	3290	ND	634	850	503
Mercury	NA	0.7	7439-97-6	2.6	ND	ND	0.31	0.54	ND
Nickel	NA	100	7440-02-0	176	85.4	ND	<40	65	ND
Potassium	NA	NA	9717-440	<20000	ND	ND	14400	12800	11100
Selenium	NA	10	7782-49-2	<20	ND	ND	<10	ND	ND
Silver	NA	50	7440-22-4	<20	ND	ND	<10	ND	ND
Sodium	NA	20,000	7440-23-5	<20000	ND	ND	126000	106000	119000
Thallium	NA	0.5	7440-28-0	<10	ND	ND	<5.0	ND	ND
Vanadium	NA	NA	7440-62-2	252	ND	ND	<50	60.4	ND
Zinc	NA	2,000	7440-66-6	795	383	21.6	60.1	101	21.2

BOLD denotes criteria exceedence
ND: Not Detected
J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
 River Center
 City of Yonkers, New York
 NYSDEC BCP # 360083

Sample No.	NY TACM Criteria	NY TOGS Criteria (ug/L)	MW-1 J71831-1 9/18/2007	MW-2 J71592-1 9/15/2007	MW-3 J71831-11 9/17/2007	MW-4 J71831-12 9/17/2007	MW-5 J71831-13 9/17/2007	MW-6 J71831-4 9/18/2007	MW-8 J71831-5 9/18/2007	MW-9 J71489-1 9/14/2007
GC/MS Volatiles (ppb)										
1,1,1-Trichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	NA	0.04	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromomethane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	4.7	3	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	0.6	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5	3	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	3	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	50	50	ND	ND	5.7 J	ND	ND	ND	ND	ND
2-Hexanone	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	NA	ND	ND	67.3	321	156	ND	ND	11.2
Benzene	0.7	1	ND	ND	353	2840	2220	12900	ND	ND
Bromodichloromethane	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	50	60	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	50	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	7	ND	1.0	ND	ND	ND	ND	ND	ND
Chloromethane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethane	NA	5	ND	ND	ND	ND	ND	ND	0.42 J	3.2
cis-1,3-Dichloropropene	NA	0.4	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	NA	NA	ND	ND	19.8	140	114	170 J	ND	ND
Dibromochloromethane	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	5	ND	ND	35.4	2400	17.3	3330	ND	ND
Freon 113	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NA	5	ND	ND	5.9	100	35.7	133 J	ND	ND
m,p-Xylene	5	5	ND	ND	17.0	5310	24.4	10100	ND	ND
Methyl Acetate	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	NA	10	5.0	ND	23.3	155	108	9690	ND	1.2

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-1 J71831-1 9/18/2007	MW-2 J71592-1 9/15/2007	MW-3 J71831-11 9/17/2007	MW-4 J71831-12 9/17/2007	MW-5 J71831-13 9/17/2007	MW-6 J71831-4 9/18/2007	MW-8 J71831-5 9/18/2007	MW-9 J71489-1 9/14/2007
Laboratory ID #										
Date Collected										
Methylcyclohexane	NA	NA	ND	ND	6.5 J	67.3 J	37.0 J	86.5 J	ND	ND
Methylene chloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	5	ND	ND	33.6	1400	3.0 J	4100	ND	ND
Styrene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	5	1.3	ND	ND	ND	ND	ND	5.3	2.1
Toluene	5	5	ND	ND	51.7	1200	26.6	9300	0.22 J	ND
trans-1,2-Dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NA	0.4	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	5	ND	ND	ND	ND	ND	ND	5.2	2.9
Trichlorofluoromethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	2	2	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	5	5	ND	ND	50.7	6410	27.4	14200	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppb)			6.3	1	669.9	20043.3	2769.4	64009.5	11.14	20.6
GC/MS Semi-volatiles (ppb)										
1,1-Biphenyl	NA	NA	ND	ND	ND	1.7 J	ND	5.3	ND	ND
2,4,5-Trichlorophenol	1	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	1	1	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	NA	50	ND	ND	ND	135	ND	52.4	ND	ND
2,4-Dinitrophenol	5	10	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	NA	10	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	50	NA	ND	ND	ND	123	ND	276	ND	ND
2-Methylphenol	5	NA	ND	ND	ND	15.4	ND	28.5	ND	ND
2-Nitroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
3,4-Methylphenol	50	NA	ND	ND	ND	24.2	ND	38.0	ND	ND
3,3'-Dichlorobenzidine	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	20	ND	ND	ND	1.1 J	ND	2.3	ND	ND

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-1 J71831-1 9/18/2007	MW-2 J71592-1 9/15/2007	MW-3 J71831-11 9/17/2007	MW-4 J71831-12 9/17/2007	MW-5 J71831-13 9/17/2007	MW-6 J71831-4 9/18/2007	MW-8 J71831-5 9/18/2007	MW-9 J71489-1 9/14/2007
Laboratory ID #										
Date Collected										
Acenaphthylene	20	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NA	NA	ND	ND	6.0	ND	ND	ND	ND	ND
Anthracene	50	50	ND	ND	ND	0.60 J	ND	2.1	0.62 J	ND
Atrazine	NA	7.5	ND	ND	ND	ND	ND	ND	ND	ND
Benzaldehyde	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzofuran	0.002	NA	ND	ND	ND	ND	ND	2.3	1.5 J	ND
Benzofuran	0.002 (ND)	ND	ND	ND	ND	ND	ND	1.7 J	1.4 J	ND
Benzofuran	0.002	0.002	ND	ND	ND	ND	ND	1.6 J	1.2 J	ND
Benzofuran	5	NA	ND	ND	ND	ND	ND	1.1 J	1.0 J	ND
Benzofuran	0.002	0.002	ND	ND	ND	ND	ND	1.6 J	1.2 J	ND
bis(2-Chloroethoxy)methane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	50	5	ND	ND	ND	ND	1.1 J	1.5 J	ND	10.8
Butyl benzyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Caprolactam	NA	NA	ND	ND	ND	102	79.4	ND	ND	77.7
Carbazole	NA	NA	ND	ND	ND	2.1	ND	3.4	ND	ND
Chrysene	0.002	0.002	ND	ND	ND	0.31 J	ND	2.3	1.5 J	ND
Dibenzofuran	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	5	NA	ND	ND	ND	0.68 J	ND	2.1 J	ND	ND
Diethyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	50	50	ND	ND	ND	0.86 J	0.59 J	6.3	3.3	0.68 J
Fluorene	50	50	ND	ND	ND	1.2 J	ND	4.3	ND	ND
Hexachlorobenzene	0.35	0.04	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	NA	0.5	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.002	0.002	ND	ND	ND	ND	ND	0.61 J	0.93 J	ND
Isophorone	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	10	ND	ND	9.6	537	0.65 J	682	0.69 J	ND
Nitrobenzene	5	0.4	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1	1	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	50	50	ND	ND	ND	2.6	ND	12.7	2.1	0.81 J
Phenol	1	1	ND	ND	1.9 J	24.9 J	2.7 J	ND	ND	1.0 J
Pyrene	50	50	ND	ND	ND	0.65 J	0.55 J	5.3	2.6	0.56 J
TOTAL TARGETED GC/MS Semi-volatiles (ppb)			0	0	17.5	973.3	84.99	1133.71	18.04	91.55

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedences Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-1 J71831-1 9/18/2007	MW-2 J71592-1 9/15/2007	MW-3 J71831-11 9/17/2007	MW-4 J71831-12 9/17/2007	MW-5 J71831-13 9/17/2007	MW-6 J71831-4 9/18/2007	MW-8 J71831-5 9/18/2007	MW-9 J71489-1 9/14/2007
Pesticides and PCBs (ppb)										
4,4-DDD	ND (<0.01)	0.3	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDE	ND (<0.01)	0.2	ND	ND	ND	ND	ND	ND	ND	ND
4,4-DDT	ND (<0.01)	0.2	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	ND (<0.01)	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	NA	0.05	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND (<0.01)	0.004	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ND (<0.01)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	NA	0.05	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ND (<0.01)	0.04	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ND (<0.01)	0.03	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	35	35	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	NA	0.06	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC Semi-volatiles (ppb)			0	0	0	0	0	0	0	0

BOLD denotes criteria exceedence
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-1 J71831-1 9/18/2007	MW-2 J71592-1 9/15/2007	MW-3 J71831-11 9/17/2007	MW-4 J71831-12 9/17/2007	MW-5 J71831-13 9/17/2007	MW-6 J71831-4 9/18/2007	MW-8 J71831-5 9/18/2007	MW-9 J71489-1 9/14/2007
Metals Analysis (ppb)										
Aluminum	NA	NA	397000	99200	4510	86000	57200	105000	264000	6960
Antimony	NA	3	<12	<6.0	<6.0	<12	<6.0	<12	<12	<6.0
Arsenic	NA	25	97.6	41.6	<3.0	18.0	10.2	29.6	136	41.2
Barium	NA	1,000	3900	1100	<200	850	2640	844	3410	<200
Beryllium	NA	3	5.2	3.2	<1.0	<2.0	<1.0	<2.0	3.8	<1.0
Cadmium	NA	5	<8.0	<4.0	<4.0	<8.0	<4.0	<8.0	8.4	<4.0
Calcium	NA	NA	113000	84200	122000	307000	366000	169000	125000	83300
Chromium	NA	50	621	165	13.2	155	116	217	7960	19.7
Cobalt	NA	NA	265	93.1	<50	<100	<50	<100	200	<50
Copper	NA	200	1320	366	<25	318	250	403	1820	43.3
Iron	NA	300	555000	147000	6620	113000	69000	170000	366000	7340
Lead	NA	25	712	123	<3.0	53.2	70.1	136	2800	38.6
Magnesium	NA	35,000	187000	66800	49000	188000	249000	149000	122000	19300
Manganese	NA	300	15600	2430	12200	8970	2860	3490	3300	252
Mercury	NA	0.7	1.4	1.3	<0.20	0.73	<0.40	<0.80	194	12.9
Nickel	NA	100	781	261	<40	145	97.0	192	593	<40
Potassium	NA	NA	84100	32000	11500	46600	69800	37800	32700	15600
Selenium	NA	10	<20	<10	<10	<20	<10	<20	<20	<10
Silver	NA	50	<20	<10	<10	<20	<10	<20	<20	<10
Sodium	NA	20,000	333000	272000	65400	142000	682000	132000	88100	97200
Thallium	NA	0.5	<20	<10	<10	<20	<10	<20	<20	<5.0
Vanadium	NA	NA	881	237	<50	181	130	230	728	<50
Zinc	NA	2,000	1370	380	<20	221	221	397	5150	66.6
General Chemistry (ppm)										
Cyanide		200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.074	<0.010

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
Riverfront Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-10 J71489-2 9/14/2007	MW-11 J71489-3 9/14/2007	MW-12 J71831-6 9/18/2007	MW-14 J71831-7 9/18/2007	MW-15 J71592-2 9/15/2007	MW-16 J71831-14 9/17/2007	MW-17 J71592-3 9/15/2007	MW-18 J71831-2 9/18/2007
GC/MS Volatiles (ppb)										
1,1,1-Trichloroethane	5	5	ND	ND	0.43 J	1.3	ND	0.46 J	ND	ND
1,1,2,2-Tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	NA	0.04	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	4.7	3	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	0.6	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5	3	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	3	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	50	50	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	NA	ND	17.5	ND	ND	ND	ND	ND	ND
Benzene	0.7	1	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Bromoforn	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	50	60	ND	ND	ND	ND	0.68 J	ND	ND	ND
Carbon tetrachloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	50	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	7	3.6	ND	10.9	3.2	ND	0.75 J	ND	ND
Chloromethane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	NA	5	0.88 J	0.64 J	ND	ND	1.1	18.0	5.3	ND
cis-1,3-Dichloropropene	NA	0.4	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Freon 113	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	NA	10	ND	ND	ND	ND	ND	0.24 J	ND	ND

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-10 JT1489-2 9/14/2007	MW-11 JT1489-3 9/14/2007	MW-12 JT1831-6 9/18/2007	MW-14 JT1831-7 9/18/2007	MW-15 JT1592-2 9/15/2007	MW-16 JT1831-14 9/17/2007	MW-17 JT1592-3 9/15/2007	MW-18 JT1831-2 9/18/2007
Laboratory ID #										
Date Collected										
Methylcyclohexane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	5	9.2	ND	2.5	0.38	17.9	23.5	3.3	ND
Toluene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NA	0.4	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	5	5.5	ND	ND	ND	3.2	6.8	0.88	ND
Trichlorofluoromethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	2	2	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	5	5	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppb)			19.18	18.14	13.83	4.88	22.88	49.75	9.48	0
GC/MS Semi-volatiles (ppb)										
1,1'-Biphenyl	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	1	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	1	1	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	5	10	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	NA	10	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
3,4-Methylphenol	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methyl phenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	20	ND	0.78	ND	ND	ND	ND	ND	ND

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-10 J71489-2 9/14/2007	MW-11 J71489-3 9/14/2007	MW-12 J71831-6 9/18/2007	MW-14 J71831-7 9/18/2007	MW-15 J71592-2 9/15/2007	MW-16 J71831-14 9/17/2007	MW-17 J71592-3 9/15/2007	MW-18 J71831-2 9/18/2007
Laboratory ID #										
Date Collected										
Acenaphthylene	20	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	50	50	ND	0.59 J	ND	ND	ND	ND	ND	ND
Atrazine	NA	7.5	ND	ND	ND	ND	ND	ND	ND	ND
Benzaldehyde	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzof(a)anthracene	0.002	NA	ND	0.62 J	ND	ND	ND	ND	1.1 J	0.40 J
Benzof(a)pyrene	0.002 (ND)	ND	ND	ND	ND	ND	ND	ND	1.2 J	ND
Benzof(b)fluoranthene	0.002	0.002	ND	ND	ND	ND	ND	ND	0.93 J	0.66 J
Benzof(g,h,i)perylene	5	NA	ND	ND	ND	ND	ND	ND	0.99 J	ND
Benzof(k)fluoranthene	0.002	0.002	ND	ND	ND	ND	ND	ND	1.3 J	ND
bis(2-Chloroethoxy)methane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	50	5	ND	2.1 J	ND	ND	ND	ND	10.2	1.6 J
Butyl benzyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Caprolactam	NA	NA	7.6	206	208	35.0	ND	31.1	ND	ND
Carbazole	NA	NA	ND	1.0 J	ND	ND	ND	ND	ND	ND
Chrysene	0.002	0.002	ND	0.47 J	ND	ND	ND	ND	1.3 J	0.36 J
Dibenzof(a,h)anthracene	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	5	NA	ND	0.67 J	ND	ND	ND	ND	ND	ND
Diethyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	50	50	0.65 J	1.3 J	ND	ND	1.1 J	ND	3.0	0.58 J
Fluorene	50	50	ND	1.0 J	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.35	0.04	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NA	0.5	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.002	0.002	ND	ND	ND	ND	ND	ND	0.98 J	ND
Isophorone	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	10	ND	0.47 J	ND	ND	ND	ND	ND	ND
Nitrobenzene	5	0.4	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1	1	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	50	50	ND	1.8 J	ND	ND	0.79 J	ND	1.3 J	0.46 J
Phenol	1	1	ND	ND	ND	ND	0.92 J	ND	2.0 J	ND
Pyrene	50	50	0.56 J	0.89 J	ND	ND	ND	ND	2.0 J	0.48 J
TOTAL TARGETED GC/MS Semi-volatiles (ppb)			8.81	217.69	20.8	35	2.81	31.1	24.3	4.54

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-10 J71489-2 9/14/2007	MW-11 J71489-3 9/14/2007	MW-12 J71831-6 9/18/2007	MW-14 J71831-7 9/18/2007	MW-15 J71592-2 9/15/2007	MW-16 J71831-14 9/17/2007	MW-17 J71592-3 9/15/2007	MW-18 J71831-2 9/18/2007
Pesticides and PCBs (ppb)										
4,4'-DDD	ND (<0.01)	0.3	ND	ND	ND	ND	ND	ND	NA	ND
4,4'-DDE	ND (<0.01)	0.2	ND	ND	ND	ND	ND	ND	NA	ND
4,4'-DDT	ND (<0.01)	0.2	ND	ND	ND	ND	ND	ND	NA	ND
Aldrin	ND (<0.01)	ND	ND	ND	ND	ND	ND	ND	NA	ND
alpha-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	NA	ND
alpha-Chlordane	NA	0.05	ND	ND	ND	ND	ND	ND	NA	ND
Aroclor 1016	0.1	0.09	ND	ND	ND	ND	ND	ND	NA	ND
Aroclor 1221	0.1	0.09	ND	ND	ND	ND	ND	ND	NA	ND
Aroclor 1232	0.1	0.09	ND	ND	ND	ND	ND	ND	NA	ND
Aroclor 1242	0.1	0.09	ND	ND	ND	ND	ND	ND	NA	ND
Aroclor 1254	0.1	0.09	ND	1.3	ND	ND	ND	ND	NA	ND
Aroclor 1260	0.1	0.09	ND	ND	ND	ND	ND	ND	NA	ND
beta-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	NA	ND
delta-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	NA	ND
Dieldrin	ND (<0.01)	0.004	ND	ND	ND	ND	ND	ND	NA	ND
Endosulfan sulfate	0.1	NA	ND	ND	ND	ND	ND	ND	NA	ND
Endosulfan-I	0.1	NA	ND	ND	ND	ND	ND	ND	NA	ND
Endosulfan-II	0.1	NA	ND	ND	ND	ND	ND	ND	NA	ND
Endrin	ND (<0.01)	ND	ND	ND	ND	ND	ND	ND	NA	ND
Endrin aldehyde	NA	5	ND	ND	ND	ND	ND	ND	NA	ND
Endrin ketone	NA	5	ND	ND	ND	ND	ND	ND	NA	ND
gamma-BHC (Lindane)	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	NA	ND
gamma-Chlordane	NA	0.05	ND	ND	ND	ND	ND	ND	NA	ND
Heptachlor	ND (<0.01)	0.04	ND	ND	ND	ND	ND	ND	NA	ND
Heptachlor epoxide	ND (<0.01)	0.03	ND	ND	ND	ND	ND	ND	NA	ND
Methoxychlor	35	35	ND	ND	ND	ND	ND	ND	NA	ND
Toxaphene	NA	0.06	ND	ND	ND	ND	ND	ND	NA	ND
TOTAL TARGETED GC Semi-volatiles (ppb)			0	1.3	0	0	0	0	0	0

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-10 J71489-2 9/14/2007	MW-11 J71489-3 9/14/2007	MW-12 J71831-6 9/18/2007	MW-14 J71831-7 9/18/2007	MW-15 J71592-2 9/15/2007	MW-16 J71831-14 9/17/2007	MW-17 J71592-3 9/15/2007	MW-18 J71831-2 9/18/2007
Laboratory ID #										
Date Collected										
Metals Analysis (ppb)										
Aluminum	NA	NA	10000	39500	30600	30100	85000	33600	14300	21500
Antimony	NA	3	<6.0	<6.0	<6.0	<6.0	<12	<6.0	<6.0	<6.0
Arsenic	NA	25	<3.0	15.4	8.9	9.2	21.1	11.0	11.2	4.3
Barium	NA	1,000	<200	214	330	318	618	780	236	249
Beryllium	NA	3	<1.0	<1.0	<1.0	<1.0	3.7	<1.0	<1.0	<1.0
Cadmium	NA	5	<4.0	<4.0	<4.0	<4.0	<8.0	<4.0	<4.0	<4.0
Calcium	NA	NA	70200	93100	77300	52800	155000	90500	100000	107000
Chromium	NA	50	25.5	120	95.1	61.4	194	50.9	37.5	49.6
Cobalt	NA	NA	<50	<50	<50	<50	<100	<50	<50	<50
Copper	NA	200	38.7	110	115	118	452	234	115	66.6
Iron	NA	300	9370	36400	36700	39500	125000	39800	21200	19500
Lead	NA	25	33.2	183	152	24.9	326	18.5	188	31.7
Magnesium	NA	35,000	23700	16300	34600	28500	73700	40600	31000	26000
Manganese	NA	300	348	428	1120	1130	1970	12200	1260	1400
Mercury	NA	0.7	12.2	43.2	0.76	<0.40	17.3	<0.40	50.2	1.9
Nickel	NA	100	<40	55.9	62.1	66.6	159	164	<40	<40
Potassium	NA	NA	<10000	19500	<10000	11500	43300	13700	<10000	13200
Selenium	NA	10	<10	<10	<10	<10	<20	<10	<10	<10
Silver	NA	50	<10	<10	<10	<10	<20	<10	<10	<10
Sodium	NA	20,000	78900	55700	128000	172000	156000	110000	69400	285000
Thallium	NA	0.5	<5.0	<5.0	<10	<10	<20	<10	<10	<10
Vanadium	NA	NA	<50	90.2	68.6	63.5	160	71.9	56.6	<50
Zinc	NA	2,000	49.2	199	130	97.8	385	89.8	244	51.8
General Chemistry (ppm)										
Cyanide		200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011

BOLD denotes criteria exceedance.

ND: Not Detected

J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-19 J71631-3 9/18/2007	MW-20 J71592-4 9/15/2007	MW-21 J71592-5 9/15/2007	MW-22 J71592-6 9/15/2007	MW-23 J71592-7 9/15/2007	MW-24 J71592-8 9/15/2007	MW-25 J71592-9 9/15/2007	MW-28 J71592-10 9/15/2007
GC/MS Volatiles (ppb)										
1,1,1-Trichloroethane	5	5	ND	ND	21.9	ND	ND	ND	1.1	ND
1,1,2,2-Tetrachloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	NA	0.04	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromochloroethane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	4.7	3	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	0.6	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5	3	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	3	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	50	50	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.7	1	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	50	60	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	50	5	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	7	0.36 J	ND	ND	0.63 J	2.3	ND	0.50 J	ND
Chloromethane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	NA	5	ND	ND	0.63 J	2.8	4.2	1.3	7.5	0.71 J
cis-1,3-Dichloropropene	NA	0.4	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Fluor 113	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	NA	5	ND	0.80 J	ND	ND	ND	ND	ND	ND
m,p-Xylene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert Butyl Ether	NA	10	ND	ND	ND	ND	ND	ND	ND	ND

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-19 J71831-3 9/18/2007	MW-20 J71592-4 9/15/2007	MW-21 J71592-5 9/15/2007	MW-22 J71592-6 9/15/2007	MW-23 J71592-7 9/15/2007	MW-24 J71592-8 9/15/2007	MW-25 J71592-9 9/15/2007	MW-28 J71592-10 9/15/2007
Laboratory ID #										
Date Collected										
Methylcyclohexane	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	5	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	5	0.41 J	ND	1.1	18.0	23.9	3.7	17.1	7.7
Toluene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	NA	0.4	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	5	ND	ND	32.2	2.7	3.5	1.2	8.8	1.0
Trichlorofluoromethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	2	2	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	5	5	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppb)			0.77	0.8	55.83	24.13	33.9	6.2	35	9.41
GC/MS Semi-volatiles (ppb)										
1,1'-Biphenyl	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	1	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	1	1	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	5	10	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	5	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	NA	10	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorophenol	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
3&4-Methylphenol	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloro-3-methylphenol	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	5	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	5	5	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20	20	ND	2.3	ND	ND	ND	ND	ND	ND

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table

River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-19 J71831-3 9/7/8/2007	MW-20 J71592-4 9/15/2007	MW-21 J71592-5 9/15/2007	MW-22 J71592-6 9/15/2007	MW-23 J71592-7 9/15/2007	MW-24 J71592-8 9/15/2007	MW-25 J71592-9 9/15/2007	MW-28 J71592-10 9/15/2007
Laboratory ID #										
Date Collected										
Acenaphthylene	20	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acetophenone	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Atrazine	NA	7.5	ND	ND	ND	ND	ND	ND	ND	ND
Benzaldehyde	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzol(a)anthracene	0.002	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzol(a)pyrene	0.002 (ND)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzol(b)fluoranthene	0.002	0.002	ND	ND	ND	ND	ND	ND	ND	ND
Benzol(g,h,i)perylene	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzok(i)fluoranthene	0.002	0.002	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl)ether	NA	1	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	50	5	ND	ND	ND	ND	ND	1.3 J	ND	ND
Butyl benzyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Caprolactam	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.002	0.002	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	50	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	5	NA	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	50	50	ND	0.58 J	ND	ND	ND	0.62 J	ND	ND
Fluorene	50	50	ND	2.7	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.35	0.04	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	NA	0.5	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.002	0.002	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	50	50	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	10	10	ND	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	5	0.4	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitroso-di-n-propylamine	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	NA	50	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1	1	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	50	50	ND	1.7 J	ND	ND	ND	ND	ND	ND
Phenol	1	1	ND	0.80 J	ND	ND	ND	0.64 J	ND	ND
Pyrene	50	50	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC/MS Semi-volatiles (ppb)			0	8.08 J	0	0	0	2.56	0	0

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River 1 Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-19 J71831-3 9/18/2007	MW-20 J71592-4 9/15/2007	MW-21 J71592-5 9/15/2007	MW-22 J71592-6 9/15/2007	MW-23 J71592-7 9/15/2007	MW-24 J71592-8 9/15/2007	MW-25 J71592-9 9/15/2007	MW-28 J71592-10 9/15/2007
Laboratory ID #										
Date Collected										
Pesticides and PCBs (ppb)										
4,4'-DDD	ND (<0.01)	0.3	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND (<0.01)	0.2	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ND (<0.01)	0.2	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	ND (<0.01)	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	NA	0.05	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	0.1	0.09	ND	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND (<0.01)	0.004	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-I	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan-II	0.1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ND (<0.01)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	NA	5	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (lindane)	ND (<0.05)	NA	ND	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	NA	0.05	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ND (<0.01)	0.04	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ND (<0.01)	0.03	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	35	35	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	NA	0.06	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC Semi-volatiles (ppb)			0	0	0	0	0	0	0	0

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-19 J71831-3 9/18/2007	MW-20 J71592-4 9/15/2007	MW-21 J71592-5 9/15/2007	MW-22 J71592-6 9/15/2007	MW-23 J71592-7 9/15/2007	MW-24 J71592-8 9/15/2007	MW-25 J71592-9 9/15/2007	MW-28 J71592-10 9/15/2007
Laboratory ID #										
Date Collected										
Metals Analysis (ppb)										
Aluminum	NA	NA	88900	79200	29300	72200	1030	13200	23000	28400
Antimony	NA	3	<12	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Arsenic	NA	25	55.8	11.0	<8.0	24.2	<8.0	<8.0	<8.0	<8.0
Barium	NA	1,000	1100	1080	268	1160	<200	<200	797	290
Beryllium	NA	3	<2.0	2.3	<1.0	2.7	<1.0	<1.0	<1.0	<1.0
Cadmium	NA	5	<8.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Calcium	NA	NA	89300	196000	139000	88600	100000	99600	94000	139000
Chromium	NA	50	512	156	35.1	121	<10	25.8	33.2	55.1
Cobalt	NA	NA	<100	<50	<50	80.3	<50	<50	<50	<50
Copper	NA	200	3720	248	94.0	287	<25	59.8	107	86.5
Iron	NA	300	100000	77600	21800	99200	1550	17100	28300	38900
Lead	NA	25	1110	132	9.0	77.0	<3.0	63.6	20.6	28.5
Magnesium	NA	35,000	35600	43400	38200	50900	40100	32400	35600	61700
Manganese	NA	300	803	2580	245	14200	32.2	1180	566	4710
Mercury	NA	0.7	356	12.2	<0.40	0.56	<0.20	1.8	<0.40	<0.40
Nickel	NA	100	158	182	<40	280	<40	<40	62.2	50.7
Potassium	NA	NA	<20000	39900	22700	15500	<10000	22200	16800	20800
Selenium	NA	10	<20	<10	10.9	<10	<10	<10	<10	<10
Silver	NA	50	<20	<10	<10	<10	<10	<10	<10	<10
Sodium	NA	20,000	146000	652000	403000	79700	122000	226000	179000	383000
Thallium	NA	0.5	<20	<10	<10	<10	<10	<10	<10	<10
Vanadium	NA	NA	175	143	<50	203	<50	<50	62.6	59.7
Zinc	NA	2,000	1440	213	47.2	247	<20	72.5	68.3	90.1
General Chemistry (ppm)										
Cyanide		200	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River 1 Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-29 J71489-4 9/14/2007	MW-30 J71489-5 9/14/2007
Laboratory ID #				
Date Collected				
GC/MS Volatiles (ppb)				
1,1,1-Trichloroethane	5	5	ND	ND
1,1,2,2-Tetrachloroethane	5	5	ND	ND
1,1,2-Trichloroethane	NA	1	ND	ND
1,1-Dichloroethane	5	5	ND	ND
1,1-Dichloroethene	5	5	ND	ND
1,2,4-Trichlorobenzene	5	5	ND	ND
1,2-Dibromo-3-chloropropane	NA	0.04	ND	ND
1,2-Dibromoethane	NA	NA	ND	ND
1,2-Dichlorobenzene	4.7	3	ND	ND
1,2-Dichloroethane	5	0.6	ND	ND
1,2-Dichloropropane	NA	1	ND	ND
1,3-Dichlorobenzene	5	3	ND	ND
1,4-Dichlorobenzene	5	3	ND	ND
2-Butanone (MEK)	50	50	ND	ND
2-Hexanone	NA	50	ND	ND
4-Methyl-2-pentanone(MIBK)	50	NA	ND	ND
Acetone	50	NA	ND	ND
Benzene	0.7	1	ND	ND
Bromodichloromethane	NA	50	2.5	ND
Bromoform	NA	50	ND	ND
Bromomethane	NA	5	ND	ND
Carbon disulfide	50	60	ND	ND
Carbon tetrachloride	5	5	ND	ND
Chlorobenzene	5	5	ND	ND
Chloroethane	50	5	ND	ND
Chloroform	7	7	29.4	ND
Chloromethane	NA	NA	ND	ND
cis-1,2-Dichloroethene	NA	5	ND	ND
cis-1,3-Dichloropropene	NA	0.4	ND	ND
Cyclohexane	NA	NA	ND	ND
Dibromochloromethane	50	50	ND	ND
Dichlorodifluoromethane	NA	5	ND	ND
Ethylbenzene	5	5	ND	ND
Freon 113	5	5	ND	ND
Isopropylbenzene	NA	5	ND	ND
m,p-Xylene	5	5	ND	ND
Methyl Acetate	NA	NA	ND	ND
Methyl Tert Butyl Ether	NA	10	ND	ND

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-29 J71489-4 9/14/2007	MW-30 J71489-5 9/14/2007
Laboratory ID #				
Date Collected				
Methylcyclohexane	NA	NA	ND	ND
Methylene chloride	5	5	ND	ND
o-Xylene	NA	5	ND	ND
Styrene	NA	5	ND	ND
Tetrachloroethene	5	5	ND	ND
Toluene	5	5	ND	ND
Trans-1,2-Dichloroethene	5	5	ND	ND
Trans-1,3-Dichloropropene	NA	0.4	ND	ND
Trichloroethene	5	5	ND	ND
Trichlorofluoromethane	NA	5	ND	ND
Vinyl chloride	2	2	ND	ND
Xylene (total)	5	5	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppb)			31.9	0
GC/MS Semi-volatiles (ppb)				
1,1'-Biphenyl	NA	NA	ND	ND
2,4,5-Trichlorophenol	1	NA	ND	ND
2,4,6-Trichlorophenol	NA	NA	ND	ND
2,4-Dichlorophenol	1	1	ND	ND
2,4-Dimethylphenol	NA	50	ND	ND
2,4-Dinitrophenol	5	10	ND	ND
2,4-Dinitrotoluene	NA	5	ND	ND
2,6-Dinitrotoluene	5	5	ND	ND
2-Chloronaphthalene	NA	10	ND	ND
2-Chlorophenol	50	NA	ND	ND
2-Methylnaphthalene	50	NA	ND	ND
2-Methylphenol	5	NA	ND	ND
2-Nitroaniline	5	5	ND	ND
2-Nitrophenol	5	NA	ND	ND
3,4-Methylphenol	50	NA	ND	ND
3,3'-Dichlorobenzidine	NA	5	ND	ND
3-Nitroaniline	5	5	ND	ND
4,6-Dinitro-o-cresol	NA	NA	ND	ND
4-Bromophenyl phenyl ether	NA	NA	ND	ND
4-Chloro-3-methyl phenol	5	NA	ND	ND
4-Chloroaniline	5	5	ND	ND
4-Chlorophenyl phenyl ether	NA	NA	ND	ND
4-Nitroaniline	NA	5	ND	ND
4-Nitrophenol	5	NA	ND	ND
Acenaphthene	20	20	ND	ND

BOLD denotes criteria exceedance

ND: Not Detected

J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River J Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-29 J71489-4 9/14/2007	MW-30 J71489-5 9/14/2007
Laboratory ID #				
Date Collected				
Acenaphthylene	20	NA	ND	ND
Acetophenone	NA	NA	ND	ND
Anthracene	50	50	ND	ND
Atrazine	NA	7.5	ND	ND
Benzaldehyde	NA	NA	ND	ND
Benzofuran	0.002	NA	ND	ND
Benzofuran	0.002 (ND)	ND	ND	ND
Benzofuran	0.002	0.002	ND	ND
Benzofuran	5	NA	ND	ND
Benzofuran	0.002	0.002	ND	ND
Benzofuran	0.002	0.002	ND	ND
Benzofuran	NA	5	ND	ND
Benzofuran	NA	1	ND	ND
Benzofuran	NA	NA	ND	ND
Benzofuran	50	5	ND	1.6 J
Benzofuran	50	50	ND	ND
Benzofuran	NA	NA	5.3	22.9
Benzofuran	NA	NA	ND	ND
Benzofuran	0.002	0.002	ND	ND
Benzofuran	50	NA	ND	ND
Benzofuran	5	NA	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	0.35	0.04	ND	ND
Benzofuran	NA	0.5	ND	ND
Benzofuran	NA	5	ND	ND
Benzofuran	NA	5	ND	ND
Benzofuran	0.002	0.002	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	10	10	ND	ND
Benzofuran	5	0.4	ND	ND
Benzofuran	NA	NA	ND	ND
Benzofuran	NA	50	ND	ND
Benzofuran	1	1	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	1	1	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	50	50	ND	ND
Benzofuran	5.3	24.5		

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River 1 Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY TOGS Criteria (ug/L)	MW-29 J71489-4 9/14/2007	MW-30 J71489-5 9/14/2007
Laboratory ID #				
Date Collected				
Pesticides and PCBs (ppb)				
4,4'-DDD	ND (<0.01)	0.3	ND	ND
4,4'-DDE	ND (<0.01)	0.2	ND	ND
4,4'-DDT	ND (<0.01)	0.2	ND	ND
Aldrin	ND (<0.01)	ND	ND	ND
alpha-BHC	ND (<0.05)	NA	ND	ND
alpha-Chlordane	NA	0.05	ND	ND
Aroclor 1016	0.1	0.09	ND	ND
Aroclor 1221	0.1	0.09	ND	ND
Aroclor 1232	0.1	0.09	ND	ND
Aroclor 1242	0.1	0.09	ND	ND
Aroclor 1248	0.1	0.09	ND	ND
Aroclor 1254	0.1	0.09	ND	ND
Aroclor 1260	0.1	0.09	ND	ND
beta-BHC	ND (<0.05)	NA	ND	ND
delta-BHC	ND (<0.05)	NA	ND	ND
Dieldrin	ND (<0.01)	0.004	ND	ND
Endosulfan sulfate	0.1	NA	ND	ND
Endosulfan-I	0.1	NA	ND	ND
Endosulfan-II	0.1	NA	ND	ND
Endrin	ND (<0.01)	ND	ND	ND
Endrin aldehyde	NA	5	ND	ND
Endrin ketone	NA	5	ND	ND
gamma-BHC (Lindane)	ND (<0.05)	NA	ND	ND
gamma-Chlordane	NA	0.05	ND	ND
Heptachlor	ND (<0.01)	0.04	ND	ND
Heptachlor epoxide	ND (<0.01)	0.03	ND	ND
Methoxychlor	35	35	ND	ND
Toxaphene	NA	0.06	ND	ND
TOTAL TARGETED GC Semi-volatiles (ppb)			0	0

BOLD denotes criteria exceedance.
ND: Not Detected
J: Estimated value

Table III - Groundwater Analytical Results Summary and Exceedances Table
River Center
City of Yonkers, New York
NYSDEC BCP # 360083

Sample No.	NY TAGM Criteria	NY IOGS Criteria (ug/L)	MW-29 J71489-4 9/14/2007	MW-30 J71489-5 9/14/2007
Laboratory ID #				
Date Collected				
Metals Analysis (ppb)				
Aluminum	NA	NA	129000	12500
Antimony	NA	3	<12	<6.0
Arsenic	NA	25	31.0	<3.0
Barium	NA	1,000	1380	268
Beryllium	NA	3	<2.0	<1.0
Cadmium	NA	5	<8.0	<4.0
Calcium	NA	NA	28900	107000
Chromium	NA	50	261	42.0
Cobalt	NA	NA	<100	<50
Copper	NA	200	332	49.1
Iron	NA	300	147000	13500
Lead	NA	25	878	29.4
Magnesium	NA	35,000	34400	30500
Manganese	NA	300	3110	634
Mercury	NA	0.7	2.6	0.31
Nickel	NA	100	176	<40
Potassium	NA	NA	<20000	14400
Selenium	NA	10	<20	<10
Silver	NA	50	<20	<10
Sodium	NA	20,000	<20000	126000
Thallium	NA	0.5	<10	<5.0
Vanadium	NA	NA	252	<50
Zinc	NA	2,000	795	60.1
General Chemistry (ppm)				
Cyanide		200	<0.010	<0.010

BOLD denotes criteria exceedance
 ND: Not Detected
 J: Estimated value

Table 2 B - Additional Soil Sample Analytical Results

River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Lab ID - # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	MM-32/S-17-3 AC3447-1-07 11/27/2007	MM-32/S-20/22 AC3447-1-03 11/27/2007	MM-33/S-01-3 AC3446-2-01 11/8/2007	MM-33/S-2/5-7 AC3446-2-02 11/28/2007	MM-34/S-2/5-7 AC3442-1-01 11/8/2007	MM-34/S-1/1-3 AC3420-1-02 11/8/2007	MM-35/S-1/1-3 AC3446-2-03 11/28/2007
Volatile Organics									
1,2,4-Triethylbenzene	3.6	180	ND	ND	0.0078	ND	ND	0.0012	ND
1,3,5-Triethylbenzene	8.4	190	ND	ND	ND	ND	ND	0.0018	ND
2-Butene	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	0.05	500	0.021	ND	ND	ND	ND	0.027	ND
Acetone	0.05	44	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1	390	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.28	500	ND	ND	ND	ND	ND	ND	ND
M&P-Xylenes	0.05	500	0.0074	0.044	0.018	0.012	0.022	0.027	0.035
Methylene chloride	0.93	500	ND	0.21	ND	ND	ND	ND	ND
Methyl-tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	12	500	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3.9	500	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11	500	ND	ND	ND	ND	ND	ND	ND
t-Butyl Alcohol	1.3	150	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	0.7	500	ND	ND	ND	ND	ND	ND	ND
Toluene	0.47	200	ND	ND	ND	ND	ND	0.0022	ND
Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Base Neutral Organics									
Acenaphthene	20	500	0.049	ND	0.43	ND	ND	ND	ND
Acenaphthylene	100	500	ND	ND	0.37	ND	ND	ND	0.075
Anthracene	100	500	0.14	ND	1.2	ND	ND	ND	0.11
Benz[a]anthracene	1	5.6	0.6	ND	8.3	ND	ND	ND	0.57
Benz[b]fluoranthene	1	1	0.78	ND	6.8	ND	ND	ND	0.58
Benz[k]fluoranthene	1	5.6	0.96	ND	7.9	ND	ND	ND	0.79
Benz[a]h[pyrene]	100	500	0.8	ND	4.9	ND	ND	ND	0.4
Benz[k]fluoranthene	0.8	86	0.27	ND	2.7	ND	ND	ND	0.23
bis(2-Ethylhexyl)phthalate	0.31	ND	0.098	J	0.15	0.25	J	ND	0.39
Butylbenzophenone	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	0.06	ND	0.51	ND	ND	ND	0.052
Chrysene	1	56	0.67	ND	6.2	ND	ND	ND	0.67
Dibenz[a,h]anthracene	0.33	0.56	0.17	ND	1.1	ND	ND	ND	0.12
Dibenz[a,h]anthracene	7	350	J	ND	ND	ND	ND	ND	J
Fluoranthene	100	500	0.92	ND	5.9	ND	ND	ND	1.1
Fluorene	30	500	0.043	J	0.28	ND	ND	ND	ND
Indeno[1,2,3-cd]pyrene	0.5	5.6	0.61	ND	4.1	ND	ND	ND	0.32
Naphthalene	12	500	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100	500	0.82	ND	5.8	ND	ND	ND	0.56
Phenol	0.38	500	1	ND	12	ND	ND	ND	ND
Pyrene	100	500	1	ND	ND	ND	ND	ND	1
Metals									
Mercury	0.16	2.8	0.62	ND	5.5	3.5	ND	ND	11
Aluminum	ND	ND	4200	3500	4800	8500	8500	13000	3700
Antimony	ND	ND	ND	ND	2.7	2.5	ND	ND	ND
Arsenic	13	16	4.5	3.7	8	2.9	ND	2.6	7.3
Barium	350	400	100	30	210	42	25	46	59
Cadmium	2.5	8.3	ND	ND	ND	ND	ND	ND	ND

Table 2 B - Additional Soil Sample Analytical Results
 River Park Center
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No	Unrestricted Use Criteria	Commercial Use Criteria	MW-32S-1/11-3 AC34471-007 11/27/2007	MW-32S-2/20-22 AC34471-013 11/27/2007	MW-33S-1/11-3 AC34482-001 11/28/2007	MW-33S-2/19-7 AC34482-002 11/28/2007	MW-34S-2/19-7 AC34201-001 11/28/2007	MW-34S-1/11-3 AC34201-002 11/28/2007	MW-35S-1/11-3 AC34482-003 11/28/2007
Lab ID #									
Date Collected									
Calcium		400	1300	1700	1800	4800	ND	1800	3600
Chromium	1		12	13	17	16	20	17	15
Cobalt			5	4.8	5	4.7	5.2	6.8	4.7
Copper	50	270	71	23	150	28	10	13	35
Iron		2000	2000	11000	15000	14000	14000	17000	9900
Lead	63	1000	490	22	830	29	ND	38	120
Magnesium			3300	2900	3300	4800	2400	2900	1300
Manganese	1500	10,000	210	220	200	280	190	140	100
Nickel	30	310	10	19	13	10	12	11	14
Potassium			ND	770	730	620	ND	ND	780
Silver	2	1,300	ND	ND	ND	ND	ND	ND	ND
Sodium			760	330	420	ND	ND	440	1000
Vanadium			21	14	23	19	18	21	15
Zinc	109	10,000	200	30	270	32	23	29	87
PCBS									
Aroclor-1248	0.1	1	ND	ND	ND	ND	ND	ND	ND
Aroclor-1254	0.1	1	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	0.1	1	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	0.036	3	ND	ND	ND	ND	ND	ND	ND
Chlordane	0.064	24	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	14	ND	ND	ND	ND	ND	ND	ND
P,P'-DDE	0.0033	62	ND	ND	ND	ND	ND	ND	ND
P,P'-DDT	0.0033	47	ND	ND	0.017	ND	ND	ND	ND
Other Parameters									
Cyanide	27	27	0.33	ND	0.4	ND	ND	ND	0.55

Footnotes
 NY Soil Criteria in PPM unless otherwise noted
 NY Water criteria in U/L (P/P) unless otherwise noted
 *NEW YORK (TAGM) -- as per Department of Environmental Conservation.
 Values are based upon TAGM 4046 dated 1/24/94. Gasoline and Fuel Oil recommended soil cleanup objectives may be different based upon the 12/2000 memo. PCBs 10ppm for surface, 10ppm for subsurface. Total VOC <10ppm. See regulation for soil organic content guidance. <10ppm.
 Total Semi-VOC <500ppm. Individual Semi-VOC compound concentration listed or MDL.
 Background levels for Lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 PPM.
 Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 PPM.
 *GCC -- Based upon NYSDEC 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives, December 14, 2008. Unrestricted Use
 *TOGS -- Based upon June 1998 Division of Water Technical & Operational Guidance Series (1.1). Ambient Water Quality Standards & Guidance
 Values and Groundwater Effluent Limitations: GA Limits
 For Be, When Hardness is less than or equal to 75 PPM, 1,100 u/L. When hardness is greater than 75 ppm.
 *Disclaimer: Regulatory values are based upon information published by the New York DEC.
 HC-V assumes no legal responsibility for the accuracy of the regulatory values or subsequent updates of values.

Table 2 B - Additional Soil Sample Analytical Results
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	Unrestricted Use Criteria	Commercial Use Criteria	MM-35/S-25-7	MM-36/S-10-2	MM-37/S-11-3	MM-37/S-20-22	MM-37/S-347-46	MM-38/1-3/S-1	MM-38/4-6/S-2	MM-38/6-10/S-3
Lab ID #			AC3447-004	AC3462-013	AC3462-010	AC34678-001	AC34678-002	AC3447-1008	AC34471-006	AC34471-008
Date Collected			11/29/2007	11/29/2007	11/29/2007	12/4/2007	12/4/2007	11/27/2007	11/27/2007	11/27/2007
Volatile Organics										
1,2,4-Triethylbenzene	3.6	190	ND	ND	ND	0.0037	ND	ND	ND	ND
1,3,5-Triethylbenzene	8.4	190	ND	ND	ND	0.0018	ND	ND	ND	ND
2-Butanone			ND	ND	ND	ND	ND	ND	ND	0.023
4-Isopropyltoluene	0.05	500	ND	ND	ND	ND	0.019	ND	ND	0.091
Acetone	0.06	44	ND	ND	ND	ND	J	ND	ND	0.0028
Benzene			ND	ND	ND	ND	ND	ND	ND	0.0025
Carbon disulfide	1	380	ND	ND	ND	ND	ND	ND	ND	J
Ethylbenzene	0.26	500	ND	ND	ND	ND	ND	ND	ND	ND
M-xylene	0.05	500	0.0033	B	0.0061	B	0.0033	J	0.011	B
Methyl chloride	0.83	500	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-ethyl ether	12	500	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	3.9	500	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	11	500	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene			ND	ND	ND	ND	ND	ND	ND	ND
t-Butyl Alcohol			ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	1.3	150	ND	0.0083	ND	0.002	J	ND	ND	0.012
Toluene	0.7	500	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane	0.47	200	ND	0.0042	J	ND	ND	ND	ND	0.0016
Base Neutral Organics										
Acenaphthene	20	500	3.4	J	0.085	J	ND	ND	0.053	J
Acenaphthylene	100	500	0.91	J	ND	0.077	J	ND	0.052	J
Anthracene	100	500	8.5	0.069	J	0.21	J	ND	0.13	J
Benz[a]anthracene	1	5.6	12	0.5	J	0.82	J	ND	0.47	J
Benz[a]pyrene	1	5.6	0.9	0.6	J	0.81	J	ND	0.41	J
Benzofluoranthene	1	5.6	10	0.83	J	1	J	ND	0.46	J
Benzofluoranthene	100	500	4.4	0.82	J	0.6	0.33	J	0.31	J
Benzofluoranthene	0.8	56	3.5	0.34	J	0.29	J	ND	0.19	J
benz[e]fluoranthene			0.54	J	0.97	J	0.046	J	ND	ND
benz[k]fluoranthene			ND	ND	0.13	J	ND	ND	ND	ND
benz[ghi]perylene			2.3	J	0.08	J	0.045	J	0.089	J
Carbazole	1	56	11	0.56	J	0.27	J	ND	0.47	J
Chrysene	0.33	0.56	2.2	ND	0.14	J	0.051	J	0.08	J
Dibenz[a,h]anthracene	7	350	J	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	100	500	26	0.94	J	1.4	0.54	ND	0.041	J
Fluorene	30	500	4.4	ND	0.093	J	ND	ND	0.063	J
Indeno[1,2,3-cd]pyrene	0.5	5.6	3.6	0.49	J	0.51	J	ND	0.24	J
Indeno[1,2,3-cd]pyrene	12	800	1.2	J	0.042	J	ND	ND	ND	ND
Naphthalene	100	500	25	0.47	J	0.8	0.37	J	0.63	J
Phenanthrene	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	0.33	500	ND	0.59	J	1.6	0.59	J	0.042	J
Pirene	100	500	22	0.9	J				0.59	J
Metals										
Mercury	0.16	2.8	1.9	3.8	0.57	1.8	ND	ND	0.58	0.28
Aluminum			5500	6900	4900	6300	18000	4500	3500	3100
Antimony			ND	5.9	6.8	ND	ND	ND	ND	ND
Arsenic	13	16	3.9	5.9	3.6	5.2	ND	ND	4.1	11
Barium	350	400	40	78	110	37	43	85	85	22
Cadmium	2.5	8.3	ND	ND	1.4	ND	ND	ND	ND	ND

Table 2 B - Additional Soil Sample Analytical Results
 River Park Center
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	MM-35/S-2/E-7 AC34482-004 11/23/2007	MM-36/S-10-2 AC34532-013 11/29/2007	MM-37/S-11-3 AC34489-010 11/28/2007	MM-37/S-2/20-22 AC34676-001 12/4/2007	MM-37/S-34/7-18 AC34678-002 12/4/2007	MM-38/1-S/S-1 AC34471-008 11/27/2007	MM-38/4-S/S-2 AC34471-008 11/27/2007	MM-38/6-10/S-3 AC34471-009 11/27/2007
Calcium	1	400	11000	28000	14000	7100	13000	11000	14000	18000
Chromium			17	17	17	23	55	14	19	21
Cobalt			4.2	3.9	3.9	5.4	11	5.7	8.1	4.1
Copper	50	270	28	63	31	82	56	18	55	120
Iron			1200	14000	12000	11000	12000	9900	28000	30000
Lead	63	1,000	82	170	380	100	ND	43	130	31
Magnesium			3100	6200	3900	4700	6000	7900	8600	ND
Manganese	1600	10,000	270	180	180	210	200	150	300	1600
Nickel	30	310	15	17	12	14	19	12	14	54
Potassium			740	730	870	ND	1300	1800	750	ND
Silver	2	1,500	ND	ND	ND	9.7	5	ND	ND	ND
Sodium			650	650	ND	550	2700	310	450	400
Vanadium			16	35	15	22	43	17	28	30
Zinc	109	10,000	50	240	180	67	18	38	83	75
PCBS										
Aroclor-1248	0.1	1	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1254	0.1	1	ND	1.2	ND	0.13	ND	ND	ND	ND
Aroclor-1260	0.1	1	ND	ND	0.16	ND	ND	ND	ND	ND
Beis-BHC	0.036	3	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	0.004	24	ND	ND	0.051	ND	ND	ND	ND	ND
Dieldrin	0.005	14	ND	ND	ND	ND	ND	ND	ND	ND
P,P'-DDE	0.0033	62	ND	0.054	0.0069	ND	ND	ND	ND	ND
P,P'-DDT	0.0033	47	ND	ND	0.013	ND	ND	ND	ND	ND
Other Parameters										
Cyanide	27	27	0.38	0.63	ND	0.36	ND	ND	0.54	0.6

Footnotes
 NY Soil Criteria in PPM, unless otherwise noted
 NY Water criteria in u/L (PPB) unless otherwise noted
 *NEW YORK (TAGM) - as per Department of Environmental Conservation
 Values are based upon TAGM 4046 dated 1/24/94. Gasoline and Fuel
 the 12/20/00 memo. PCBs 1.0ppm for surface, 10ppm for subsurface
 Total SemiVOCs <500ppm, Individual SemiVOC Compound-Me concentration
 Background levels for Lead vary widely. Average levels in undeveloped
 Average background levels in metropolitan or suburban areas or near
 *SCC - Based upon NYSDEC 6 NYCRR Subpart 375.6 Remedial Program
 *TOGS - Based upon June 1998 Division of Water Technical & Operatic
 Values and Groundwater Effluent Limitations: GA Limits
 For Be, When Herdies is less than or equal to 75 PPM, 1,100 u/L
 *Disclaimer: Regulatory values are based upon information published by
 HC-V assumes no legal responsibility for the accuracy of the regulatory

Table 2 B - Additional Soil Sample Analytical Results
 River Park Center
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	MM-38/S-470-32 AC2431-001 11/28/2007	SB-1/S-710-12 AC3459-006 11/28/2007	SB-1/S-215-17 AC3459-009 11/28/2007	SB-1/S-3/20-22 AC3459-010 11/28/2007	SB-2/S-10-2 AC3453-009 11/28/2007	SB-2/S-215-10 AC3453-010 11/28/2007	SB-2/S-515-17 AC3453-011 11/28/2007	SB-2/S-470-22 AC3453-012 11/28/2007
Volatile Organics										
1,2,4-trimethylbenzene	3.6	180	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-trimethylbenzene	8.4	150	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone			ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene			ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.06	500	ND	0.045	0.048	0.042	ND	0.02	0.023	0.023
Benzene	0.03	44	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide			0.0018	J	ND	ND	ND	ND	ND	0.0015
Ethylbenzene	1	380	ND	0.0013	ND	ND	ND	ND	ND	J
M-Xylenes	0.26	500	ND	ND	ND	ND	ND	ND	ND	ND
Methylchloride	0.06	500	0.014	B	0.013	B	0.017	0.015	B	B
Methyl-tert-butyl ether	0.53	500	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	12	500	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3.9	500	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11	500	ND	ND	ND	ND	ND	ND	ND	ND
t-Butyl Alcohol			ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	1.3	150	ND	ND	ND	ND	ND	ND	ND	0.0011
Toluene	0.7	500	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	0.47	200	ND	ND	ND	ND	ND	ND	ND	ND
Base Neutral Organics										
Acenaphthene	20	500	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Benzofluoranthene	1	5.6	ND	ND	ND	ND	0.3	ND	ND	ND
Benzofluorene	1	1	ND	ND	ND	ND	0.34	ND	ND	ND
Benzofluoranthene	1	5.6	ND	ND	ND	ND	0.46	J	ND	ND
Benzofluorene	100	500	ND	ND	ND	ND	0.28	J	ND	ND
Benzofluoranthene	0.8	5.6	ND	ND	ND	ND	0.16	J	ND	ND
bis(2-Ethylhexyl)phthalate			ND	0.42	J	0.13	J	ND	ND	ND
Butylbenzophenone			ND	ND	ND	ND	ND	ND	ND	ND
Carbazole			ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1	5.6	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofluoranthene	0.33	380	ND	ND	ND	ND	0.35	J	ND	ND
Dibenzofuran	7	500	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100	500	ND	ND	ND	ND	0.67	J	ND	ND
Fluorene	30	500	ND	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)Pyrene	0.5	5.6	ND	ND	ND	ND	0.22	J	ND	ND
Naphthalene	12	500	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100	500	ND	ND	ND	ND	0.43	J	ND	ND
Phenol	0.33	500	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100	500	ND	ND	ND	ND	0.58	J	ND	ND
Metals										
Mercury	0.18	2.8	ND	ND	ND	ND	1.4	ND	ND	ND
Aluminum			23000	7200	4600	5700	4500	12000	9700	11000
Antimony			ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	13	16	ND	ND	ND	ND	ND	3.4	ND	ND
Barium	350	400	300	36	25	41	28	51	130	64
Cadmium	2.5	8.3	ND	ND	ND	ND	ND	ND	ND	ND

Table 2 B - Additional Soil Sample Analytical Results
 River Park Center
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No.	Unrestricted Use	Commercial Use	SP-1/S-4/0-32	SP-1/S-7/0-12	SP-1/S-2/15-17	SP-1/S-3/20-22	SP-2/S-7/0-32	SP-2/S-2/15-10	SP-2/S-3/15-17	SP-2/S-4/20-22
Lab ID #	Criteria	Criteria	AC3453-001	AC3458-002	AC3459-003	AC3459-010	AC3453-009	AC3453-010	AC3453-011	AC3453-012
Date Collected			11/28/2007	11/30/2007	11/30/2007	11/30/2007	11/28/2007	11/28/2007	11/29/2007	11/29/2007
Calcium	1	400	7300	2800	6300	3800	6200	1700	6500	12000
Chromium			130	43	20	23	11	80	28	23
Cobalt			19	6.2	5.4	7.4	4.4	9.9	16	6.2
Copper	50	270	28	16	38	36	30	20	54	34
Iron			41000	8700	9700	12000	9700	21000	18000	10000
Lead	63	1,000	41	ND	ND	ND	18	7	ND	ND
Magnesium			27000	3400	4100	4300	36000	4200	12000	5300
Manganese	1600	10,000	280	70	120	250	140	400	1600	720
Nickel	30	310	42	15	21	25	11	21	38	17
Potassium			4600	ND	590	640	600	1200	950	810
Silver	2	1,500	ND	ND	ND	ND	ND	ND	ND	ND
Sodium			560	470	380	470	300	ND	550	1400
Vanadium			110	28	21	30	43	40	28	27
Zinc	109	10,000	62	17	15	19	32	36	28	16
PCBS										
Aroclor-1248	0.1	1	ND				ND			ND
Aroclor-1254	0.1	1	ND				0.089			ND
Aroclor-1260	0.1	1	ND				ND			ND
BaP-B[a]P	0.036	3	ND				ND			ND
Chlordane	0.094	24	ND				0.052			ND
Dieldrin	0.005	1.4	ND				ND			ND
P,P'-DDE	0.0033	62	ND				0.0072			ND
P,P'-DDT	0.0033	47	ND				ND			ND
Other Parameters										
Cyanide	27	27	ND				ND			ND

Footnotes
 NY Soil Criteria in PPM unless otherwise noted
 NY Water criteria in ug/L (PPB) unless otherwise noted
 *NEW YORK (TAGM) - as per Department of Environmental Conservation
 Values are based upon TAGM 4046 dated 1/24/94. Gasoline and Fuel
 the 12/20/00 memo. PCBs 1.0ppm for surface, 10ppm for subsurface
 Total SemiVo<-500ppm, Individual SemiVo Compounds=concent
 Background levels for Lead very widely. Average levels in undevelop
 Average background levels in metropolitan or suburban areas or near
 *SCC - Based upon NYSDEC 6 NYCRR Subpart 375-6 Remedial Progr
 *TODS - Based upon June 1998 Division of Water Technical & Operati
 Values and Groundwater Effluent limitations: GA Limits
 For Re. When Hardness is less than or equal to 75 PPM, 1,100 ug/L
 *Disclaimer: Regulatory values are based upon information published by
 HC.V assumes no legal responsibility for the accuracy of the regulatio

Table 2 B - Additional Soil Sample Analytical Results

River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	SB-3/S-1/1-15 ¹ AC34532-005 11/29/2007	SB-3/S-2/1-13 ¹ AC34532-005 11/29/2007	SB-3/S-3/18-18 ¹ AC34532-007 11/29/2007	SB-3/S-4/21-23 ¹ AC34533-008 11/29/2007	SB-4/S-1/0-2 AC34533-004 11/29/2007	SB-4/S-2/14-16 ¹ AC34538-005 11/29/2007	SB-4/S-3/19-21 AC34539-006 11/29/2007	SB-4/S-4/24-28 AC34539-007 11/29/2007
Volatile Organics										
1,2,4-Trimethylbenzene	3.6	150	ND	ND	ND	ND	ND	ND	ND	ND
3,5-Trimethylbenzene	8.4	150	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	0.05	500	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	0.06	44	0.031	0.021	0.022	0.02	0.019	0.023	0.022	0.018
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1	350	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.26	500	ND	ND	ND	ND	ND	ND	ND	ND
M&P-Xylenes	0.05	500	0.02	0.02	0.018	B	0.033	0.014	0.013	B
Methylene chloride	0.93	500	ND	ND	ND	ND	ND	ND	ND	ND
Methyl- <i>t</i> -butyl ether	12	500	ND	ND	ND	ND	ND	ND	ND	ND
<i>n</i> -Butylbenzene	3.9	500	ND	ND	ND	ND	ND	ND	ND	ND
<i>n</i> -Propylbenzene	11	500	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
<i>t</i> -Butyl Alcohol	1.3	150	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	0.7	500	0.002	0.0019	0.0022	0.002	ND	ND	ND	ND
Toluene	0.47	200	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene										
Base Neutral Organics										
Acenaphthene	20	500	0.041	J	ND	ND	0.3	J	ND	ND
Acenaphthylene	100	500	ND	ND	ND	ND	0.18	J	ND	ND
Anthracene	100	500	0.054	J	0.036	J	0.86	J	ND	ND
Benzo[a]Anthracene	1	5.6	0.22	J	0.036	J	3.4	ND	ND	ND
Benzo[b]Pyrene	1	1	0.2	J	0.052	J	4.5	ND	ND	ND
Benzo[k]Fluoranthene	5.6	500	0.23	J	0.06	J	2.2	ND	ND	ND
Benzo[a,h]Perylene	100	500	0.14	J	ND	ND	1.6	ND	ND	ND
Benzo[a]Fluoranthene	0.8	56	0.077	J	ND	ND	3.5	ND	ND	ND
benz[2-Ethylhexyl]phthalate			0.046	J	ND	ND	0.37	J	ND	ND
Butylbenzophenone			ND	ND	ND	ND	0.37	J	ND	ND
Carbazole			ND	ND	ND	ND	0.37	J	ND	ND
Chrysene	1	56	0.22	J	0.056	J	3.5	ND	ND	ND
Dibenz[a,h]Anthracene	0.33	0.56	ND	ND	ND	ND	0.37	J	ND	ND
Dibenzofuran	7	350	ND	ND	ND	ND	0.37	J	ND	ND
Fluoranthene	100	500	0.55	J	0.17	J	7.2	ND	ND	ND
Indeno[1,2,3-cd]pyrene	30	500	0.1	J	ND	ND	1.8	ND	ND	ND
Naphthalene	0.5	5.6	ND	ND	ND	ND	4.4	ND	ND	ND
Phenanthrene	12	500	ND	ND	ND	ND	0.14	ND	ND	ND
Pyrene	100	500	0.4	J	0.16	J	4.4	ND	ND	ND
Pteridine	0.33	500	ND	ND	ND	ND	6.6	ND	ND	ND
Pyrene	100	500	0.44	J	0.13	J	6.6	ND	ND	ND
Metals										
Mercury	0.18	2.8	0.3	ND	0.12	ND	42	0.12	ND	ND
Aluminum			2500	8200	9600	4500	6100	4100	3700	9600
Antimony			ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	73	16	ND	ND	ND	ND	12	2.4	ND	ND
Berillium	350	400	22	42	47	41	180	24	28	67
Cadmium	2.5	8.3	ND	ND	ND	ND	ND	ND	ND	ND

Table 2 B - Additional Soil Sample Analytical Results
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	SB-3/S-1/11-13 AC34532-005 11/29/2007	SB-4/S-2/11-13 AC34532-006 11/29/2007	SB-3/S-3/16-18 AC34532-007 11/29/2007	SB-3/S-1/2-1-24 AC34532-008 11/29/2007	SB-4/S-1/0-2 AC34539-004 11/29/2007	SB-4/S-2/14-16 AC34539-005 11/29/2007	SB-4/S-3/19-21 AC34539-006 11/29/2007	SB-4/S-4/24-26 AC34539-007 11/29/2007
Calcium	1	400	15000	2700	4800	2500	11000	2200	6000	12000
Chromium	ND	ND	ND	24	31	14	17	63	77	29
Cobalt	4.7	11	8.8	26	36	22	52	5.8	3.6	7.8
Copper	50	270	28	14000	15000	6400	11000	20	14	31
Iron	63	1000	9600	ND	ND	ND	140	15000	8400	18000
Lead	ND	6.2	2800	8000	4700	1800	1700	ND	ND	ND
Magnesium	1600	10,000	73	310	260	620	130	290	220	390
Manganese	30	310	790	17	27	10	12	17	10	20
Nickel	ND	ND	ND	1.8	ND	ND	ND	ND	ND	ND
Potassium	2	1,500	ND	500	880	620	450	ND	ND	ND
Silver	ND	ND	56	35	34	13	17	18	12	28
Sodium	109	10,000	34	22	22	ND	110	20	16	32
Zinc	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBS										
Aroclor-1248	0.1	1	1.2	ND	0.18	ND	ND	ND	ND	ND
Aroclor-1254	0.1	1	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	0.1	1	0.11	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	0.036	3	0.023	ND	ND	ND	ND	ND	ND	ND
Chlordane	0.094	24	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	1.4	0.017	ND	ND	ND	ND	ND	ND	ND
P,P'-DDE	0.0083	62	0.037	ND	ND	ND	ND	ND	ND	ND
P,P'-DDT	0.0083	47	ND	ND	ND	ND	0.0075	ND	ND	ND
Other Parameters										
Cyanide	27	27	0.3	ND	ND	ND	0.59	ND	ND	ND

Footnotes
 NY Soil Criteria in PPM unless otherwise noted
 NY Water criteria in ug/L (PPB) unless otherwise noted
 *NEW YORK (TAGM) -- as per Department of Environmental Conservation
 Values are based upon TAGM 4046 dated 1/24/94. Gasoline and Fuel
 the 12/20/00 memo. PCBs 1.0ppm for surface, 10ppm for subsurface
 Total Semivolatile <500ppm, Individual Semivolatile Compound <10ppm
 Background levels for Lead vary widely. Average levels in undeveloped
 Average background levels in metropolitan or suburban areas or near
 *SCC -- Based upon NYSDDEC 6 NYCRR Subpart 375-6 Remedial Program
 *TCOS -- Based upon June 1986 Division of Water Technical & Operatic
 Values and Groundwater Effluent limitations: GA Limits
 For Be, When Hardness is less than or equal to 75 PPM, 1,100 ug/L
 Disclaimer: Regulatory values are based upon information published by
 HC-V assumes no legal responsibility for the accuracy of the regulatory

Table 2 B - Additional Soil Sample Analytical Results
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	SB-S/S-1/1-S AC3459-01 11/29/2007	SB-S/S-2/1B-20 AC3459-02 11/30/2007	SB-S/S-3/2-25 AC3459-03 11/30/2007	SB-S/S-1/1-S AC3471-014 11/27/2007	SB-S/S-2/1B-20 AC34613-02 11/29/2007	SB-S/S-3/2-25 AC34613-03 11/29/2007	SB-S/S-4/2B-20 AC34613-04 11/29/2007	SB-7/S-1/1-S AC3459-01 12/3/2007
Volatile Organics										
1,2,4-Trimehybenzene	3.6	190	ND	ND	ND	ND	ND	ND	0.0021	ND
1,3,5-Trimehybenzene	8.4	180	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone			ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	0.05	500	ND	ND	ND	0.017	ND	ND	0.038	ND
Acetone	0.06	44	ND	ND	ND	ND	0.0073	ND	ND	ND
Benzene			ND	ND	ND	ND	0.0031	J	ND	ND
Carbon disulfide	1	390	ND	ND	ND	ND	ND	ND	0.0015	ND
Ethylbenzene	0.28	500	ND	ND	ND	ND	ND	ND	0.0023	ND
M-xylene	0.06	500	0.0072	0.01	0.013	0.015	0.012	B	0.012	0.014
Methylbenzyl chloride	0.53	500	ND	ND	ND	ND	ND	ND	ND	B
Methyl-ethyl ether	12	500	ND	ND	ND	ND	ND	0.01	ND	ND
n-Butylbenzene	3.9	500	ND	ND	ND	ND	ND	ND	0.024	ND
n-Propylbenzene	11	500	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene			ND	ND	ND	ND	ND	ND	ND	ND
t-Butyl Alcohol			ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	1.3	150	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.7	500	ND	ND	ND	ND	ND	ND	0.0057	0.0015
Trichloroethene	0.47	200	ND	ND	ND	ND	ND	ND	ND	ND
Base Neutral Organics										
Acenaphthene	20	500	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100	500	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100	500	ND	ND	ND	ND	ND	ND	ND	0.067
Benz[a]anthracene	1	5.6	0.062	ND	ND	0.14	ND	ND	ND	0.43
Benz[b]pyrene	1	1	0.068	ND	ND	0.15	J	ND	ND	0.4
Benz[b]fluoranthene	1	5.6	0.077	ND	ND	0.2	J	ND	ND	0.55
Benz[a,h]perylene	100	500	0.048	J	ND	0.12	J	ND	ND	0.26
Benz[k]fluoranthene	0.8	55	ND	ND	ND	0.06	J	ND	ND	0.23
bis[2-Ethylhexyl]phthalate			0.16	J	ND	0.39	ND	0.88	0.19	J
Butylbenzophthalate			ND	ND	ND	ND	ND	ND	ND	ND
Carbazole			ND	ND	ND	ND	ND	ND	ND	0.065
Chrysene	1	55	0.053	J	ND	0.15	J	ND	ND	0.49
Dibenz[a,h]anthracene	0.33	0.56	ND	ND	ND	ND	ND	ND	ND	0.039
Dibenzofuran	7	380	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100	500	0.078	J	ND	0.24	J	ND	ND	0.9
Fluorene	30	500	ND	ND	ND	ND	ND	ND	ND	ND
Indeno[1,2,3-cd]pyrene	0.5	5.6	0.043	J	ND	0.067	J	ND	ND	0.21
Naphthalene	12	500	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100	500	0.04	J	ND	0.12	J	ND	ND	0.58
Phenol	0.33	500	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100	500	0.1	J	ND	0.21	J	ND	ND	0.53
Metals										
Mercury	0.18	2.8	0.2	ND	ND	ND	ND	ND	ND	1.1
Aluminum			6700	4000	15000	5300	3500	5700	6500	1700
Antimony			ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	13	16	2.7	ND	ND	ND	ND	ND	ND	8.7
Barium	350	400	52	25	75	38	34	31	64	110
Cadmium	2.5	9.3	ND	ND	ND	ND	ND	ND	ND	0.9

Table 2 B - Additional Soil Sample Analytical Results
 River Park Center
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	SB-6/S-1/1-3 AC34599-001 11/29/2007	SB-6/S-2/16-20 AC34599-002 11/20/2007	SB-6/S-3/23-25 AC34599-003 11/20/2007	SB-6/S-4/1-3 AC34477-014 11/27/2007	SB-6/S-5/16-20 AC34513-002 11/29/2007	SB-6/S-6/23-25 AC34513-003 11/29/2007	SB-6/S-7/16-30 AC34513-004 11/29/2007	SB-7/S-1/1-3 AC34599-011 12/8/2007
Calcium			11000	2000	2700	3600	1200	2700	2400	4100
Chromium	1	400	16	10	46	14	12	18	68	6.8
Cobalt			5.4	4.2	14	4.8	2.9	5.2	24	3.8
Copper	50	270	17	25	35	16	12	23	36	56
Iron			12000	7500	38000	11000	8200	8900	20000	23000
Lead	63	1,000	35	ND	6.3	10	ND	ND	ND	160
Magnesium	1600	10,000	6800	2900	9800	3600	2800	3200	4100	630
Manganese			340	190	500	240	210	230	290	55
Nickel	30	310	11	12	16	10	8.7	15	19	6.5
Potassium			1100	ND	11000	990	1400	580	3000	ND
Silver	2	1,500	ND	ND	ND	ND	ND	ND	ND	ND
Sodium			610	300	390	ND	ND	460	520	400
Vanadium			21	16	50	18	17	20	25	ND
Zinc	109	10,000	100	16	32	31	16	16	28	140
PCBS										
Aroclor-1248	0.1	1	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1254	0.1	1	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	0.1	1	ND	ND	ND	ND	ND	ND	ND	0.081
Beta-BHC	0.036	3	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	0.094	24	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	1.4	ND	ND	ND	ND	ND	ND	ND	ND
P,P'-DDE	0.0033	62	ND	ND	ND	ND	ND	ND	ND	ND
P,P'-DDT	0.0033	47	ND	ND	ND	ND	ND	ND	ND	ND
Other Parameters										
Cyanide	27	27	ND	ND	ND	ND	ND	ND	ND	0.49

Footnotes
 NY Soil Criteria in PPW unless otherwise noted
 NY Water criteria in ug/L (PPB) unless otherwise noted
 *NEW YORK (TAGM) -- as per Department of Environmental Conservation
 Values are based upon TAGM 4046 dated 1/24/94. Gasoline and Fuel
 the 1/2/2000 memo. PCB's 1.0ppm for surface, 10ppm for subsurface.
 Total Semivolatile <500ppm, Individual Semivolatile Compound-specific
 Background levels for Lead vary widely. Average levels in undeveloped
 Average background levels in metropolitan or suburban areas or near
 *SGC -- Based upon NYSDDEC 6 NYCRR Subpart 375-6 Remedial Prog
 *TOGS -- Based upon June 1998 Division of Water Technical & Operatic
 Values and Groundwater Effluent limitations: GA Limits
 For Pb, When Hardness is less than or equal to 75 PPW, 1,100 ug/L
 *Disclaimer: Regulatory values are based upon information published by
 HC-V assumes no legal responsibility for the accuracy of the regulation

Table 2 B - Additional Soil Sample Analytical Results

River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	SB-7/S-26-1 AC3462-012 12/3/2007	SB-7/S-3/10-12 AC3465-013 12/3/2007	SB-7/S-4/15-17 AC3469-014 12/3/2007	SB-8/S-1/1-3 AC3462-007 11/28/2007	SB-8/S-2/5-7 AC3462-008 11/28/2007	SB-8/S-3/10-12 AC3462-003 11/28/2007	SB-8/S-4/18-17 AC3447-010 11/27/2007	SB-8/S-1/1-3 AC3462-001 11/28/2007
Volatile Organics										
1,2,4-Trimehylbenzene	3.8	190	ND	0.056	ND	ND	ND	ND	ND	ND
1,3,5-Trimehylbenzene	8.4	190	ND	0.016	ND	ND	ND	ND	ND	ND
2-Butanol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropylbenzene	0.05	500	0.018	0.028	0.025	ND	ND	0.018	0.024	0.021
Acetone	0.06	44	ND	0.0016	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	1	380	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.26	500	ND	0.0014	ND	ND	ND	ND	ND	ND
M-xylene	0.05	500	0.0052	0.0038	0.0078	0.014	0.016	0.0079	0.011	0.021
Methylbenzene	0.53	500	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-ethyl ether	12	500	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	3.9	500	ND	0.0042	ND	ND	ND	ND	ND	ND
n-Propylbenzene	11	500	ND	0.0023	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-Butyl Alcohol	1.3	150	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	0.7	500	ND	0.0013	ND	ND	ND	ND	ND	ND
Toluene	0.47	200	ND	ND	0.0019	ND	ND	ND	ND	0.0018
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Base Neutral Organics										
Acenaphthene	20	500	0.098	ND	ND	2.2	ND	ND	ND	0.072
Acenaphthylene	100	500	0.13	ND	ND	0.18	ND	ND	ND	ND
Anthracene	100	500	0.16	ND	ND	4.7	ND	ND	ND	0.21
Benz[a]anthracene	1	5.6	0.86	0.11	ND	9.2	ND	0.083	ND	0.8
Benz[a]pyrene	1	1	0.99	0.081	ND	6.6	ND	0.075	ND	0.76
Benz[b]fluoranthene	1	5.6	1.3	0.08	ND	9	ND	0.064	ND	0.83
Benz[c]h. l. Perylene	100	500	0.78	0.037	ND	4.2	ND	0.075	ND	0.51
Benz[k]fluoranthene	0.8	56	0.4	0.05	ND	2.6	ND	ND	ND	0.26
bis[2-Ethylhexyl]phthalate	ND	ND	0.05	ND	ND	0.49	ND	0.11	ND	ND
Butylbenzylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	1	59	0.097	ND	ND	2.3	ND	ND	ND	0.074
Dibenz[a,h]anthracene	0.33	0.58	0.36	0.11	ND	8.7	ND	0.064	ND	0.14
Dibenz[a,h]anthracene	7	390	0.18	ND	ND	1.8	ND	ND	ND	0.16
Dibenzofuran	100	500	1.7	0.24	ND	19	ND	0.11	ND	1.5
Fluoranthene	30	500	0.072	ND	ND	2.2	ND	0.045	ND	0.63
Indeno[1,2,3-cd]pyrene	0.5	5.6	0.62	0.04	ND	3.8	ND	ND	ND	0.44
Naphthalene	12	500	0.072	ND	ND	1.1	ND	ND	ND	ND
Phenanthrene	100	500	1.1	0.18	ND	19	ND	0.064	ND	0.95
Phenanthrene	0.33	500	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	100	500	1.9	0.2	ND	15	ND	0.12	ND	1.7
Metals										
Mercury	0.18	2.8	8.4	ND	ND	1.5	ND	0.14	ND	50
Aluminum	ND	ND	8600	12000	13000	4700	12000	6600	4600	7000
Antimony	13	16	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	350	400	12	45	ND	2.8	2.7	3	ND	5.5
Barium	2.5	8.3	120	82	82	35	40	26	20	72
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 2 B - Additional Soil Sample Analytical Results
 River Park Center
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No.	Unrestricted Use Criteria	Commercial Use Criteria	SB-7/S-2/5-7 AC34458-012 12/8/2007	SB-7/S-3/10-12 AC34459-013 12/8/2007	SB-7/S-4/15-17 AC34460-014 12/8/2007	SB-8/S-1/1-3 AC34462-007 11/28/2007	SB-8/S-2/6-7 AC34462-008 11/28/2007	SB-8/S-3/10-12 AC34463-009 11/28/2007	SB-8/S-4/15-17 AC34471-010 11/27/2007	SB-9/S-1/1-3 AC34632-001 11/29/2007
Lab ID #										
Date Collected										
Calcium	1	400	2400	5000	4000	11000	1900	4800	2400	4800
Chromium	1	25	24	25	33	8.3	24	14	13	23
Cobalt	6.2	11	6.2	11	15	ND	5.8	6.2	4.6	6.5
Copper	50	270	37	42	69	18	12	67	31	38
Iron	63	1,000	16000	16000	28000	7300	13000	22000	8600	16000
Lead	1600	10,000	180	ND	ND	36	14	18	8.1	88
Magnesium	2800	4700	2800	4700	7800	2300	1900	2700	2700	5100
Manganese	1600	10,000	170	170	480	110	140	160	65	680
Nickel	30	310	15	23	48	ND	14	14	13	20
Potassium	2	1,500	600	1600	2400	ND	ND	ND	1400	710
Silver	2	1,500	ND	4.2	2.8	ND	ND	ND	ND	ND
Sodium	670	1300	870	1300	1000	950	2300	680	700	1000
Vanadium	24	28	24	28	45	ND	22	33	17	25
Zinc	108	10,000	85	33	47	300	52	36	18	120
PCBS										
Aroclor-1248	0.1	1	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1254	0.1	1	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	0.1	1	0.34	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	0.036	3	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	0.034	24	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	1.4	ND	ND	ND	ND	ND	ND	ND	ND
P-P'DDE	0.0033	62	ND	ND	ND	ND	ND	ND	ND	ND
P-P-DDT	0.0033	47	ND	ND	ND	ND	ND	ND	ND	ND
Other Parameters										
Cyanide	27	27	0.51	ND	ND	ND	ND	ND	ND	ND

Footnotes
 NY Soil Criteria in PPM unless otherwise noted
 NY water criteria in ug/L (PPB) unless otherwise noted
 *NEW YORK (TAGM) - as per Department of Environmental Conservation
 Values are based upon TAGM 4046 dated 1/24/94. Gasoline and Fuel
 the 12/2000 memo. PCB's 1.0ppm for surface, 10ppm for subsurface
 Total SemiVo>500ppm, Individual SemiVo Compound=1% concentration
 Background levels for Lead vary widely. Average levels in underlying
 Average background levels in metropolitan or suburban areas or near
 *SCC - Based upon NYSDDEC 8 NYCRR Subpart 37.5-6 Remedial Prog
 *TOGS - Based upon June 1998 Division of Water Technical & Operati
 Values and Groundwater Effluent limitations: GA Limits
 For Ba, When Hardness is less than or equal to 75 PPM, 1,100 ug/L v
 *Disclaimer: Regulatory values are based upon information published by
 HC-V assumes no legal responsibility for the accuracy of the regulatio

Table 2 B - Additional Soil Sample Analytical Results

River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Sample No.	Unrestricted Use Criteria	Commercial Use Criteria	SP-9/S-2/5-7 ACM4532-002 11/28/2007	SP-9/S-3/10-12" ACM4532-003 11/28/2007	SP-9/S-4/15-17" ACM4532-004 11/28/2007
Lab ID: #					
Date Collected					
Volatile Organics					
1,2,4-Trimethylbenzene	3.8	190	0.0032	ND	ND
1,3,5-Trimethylbenzene	8.4	160	ND	ND	ND
2-Butanone			ND	ND	ND
4-Isopropyltoluene			ND	ND	ND
Acetone	0.05	500	ND	ND	ND
Benzene	0.06	44	ND	ND	ND
Carbon disulfide			ND	ND	ND
Ethylbenzene	1	360	ND	ND	ND
M,p-Xylenes	0.28	500	ND	ND	ND
Methylene chloride	0.05	500	0.047	B	0.015
Methyl- <i>t</i> -butyl ether	0.53	500	ND	ND	B
n-Butylbenzene	12	500	ND	ND	ND
n-Propylbenzene	3.9	500	ND	ND	ND
sec-Butylbenzene	11	500	ND	ND	ND
<i>t</i> -Butyl Alcohol			ND	ND	ND
Tetrahydrofuran	1.3	180	ND	ND	ND
Toluene	0.7	500	ND	ND	ND
Trichloroethene	0.47	200	ND	ND	ND
Base Neutral Organics					
Acenaphthene	20	500	0.14	J	ND
Acenaphthylene	100	500	0.055	J	ND
Anthracene	100	500	0.38	0.067	J
Benzo[a]Anthracene	1	5.6	1.1	0.24	J
Benzo[a]Pyrene	1	1	0.97	0.26	J
Benzo[b]fluoranthene	1	5.6	1.2	0.29	J
Benzo[k]fluoranthene	100	500	0.66	0.18	J
Benzo[e]pyrene	0.8	56	0.46	0.086	J
bis[2-Ethylhexyl]phthalate			ND	ND	ND
Butylbenzophthalate			ND	ND	ND
Camphol			ND	ND	ND
Chrysene	1	56	0.14	J	ND
Dibenz[a,h]Anthracene	0.33	0.66	0.2	0.24	J
Dibenzofuran	7	350	ND	ND	ND
Fluoranthene	100	500	2.1	0.52	ND
Fluorene	30	500	0.14	J	ND
Indeno[1,2,3-cd]pyrene	0.5	5.6	0.54	0.13	J
Naphthalene	12	500	0.067	J	ND
Phenanthrene	100	500	1.8	0.37	J
Phenol	0.33	500	ND	ND	ND
Pyrene	100	500	2.3	0.54	ND
Metals					
Mercury	0.18	2.8	270	54	ND
Aluminum			2000	5800	11000
Antimony			ND	ND	ND
Arsenic	13	16	4.7	6	ND
Barium	350	400	39	58	62
Cadmium	2.5	9.3	ND	ND	ND

Table 2 B - Additional Soil Sample Analytical Results
 River Park Center
 City of Yonkers, Westchester County, New York
 SESI Consulting Engineers Project No. 7190

Sample No. Lab ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	SB-9/S-2/6-77 AC24632-002 11/28/2007	SB-9/S-2/10-12* AC24632-003 11/28/2007	SB-9/S-4/15-17* AC24632-004 11/28/2007
Calcium	1	400	4700	4500	2400
Chromium			10	31	23
Cobalt			3.2	6.1	11
Copper	50	270	26	130	36
Iron	63	1,000	6600	12000	26000
Lead			99	130	ND
Magnesium	1600	10,000	2800	4700	4400
Manganese			67	100	380
Nickel	30	310	8.7	20	30
Potassium			ND	ND	1300
Silver	2	1,500	ND	ND	ND
Sodium			350	ND	350
Vanadium	ND	ND	ND	18	31
Zinc	109	10,000	38	110	38
PCBS					
Aroclor-1248	0.1	1	ND	ND	ND
Aroclor-1254	0.1	1	ND	ND	ND
Aroclor-1260	0.1	1	ND	ND	ND
BaP, BbF	0.003	3	ND	ND	ND
Chlordane	0.094	24	ND	ND	ND
Dieldrin	0.005	1.4	ND	ND	ND
P,P'-DDE	0.0033	62	ND	ND	ND
P,P'-DDT	0.0033	17	ND	ND	ND
Other Parameters					
Cyanide	27	27	0.47	0.38	ND

Footnotes
 NY Soil Criteria in PPM, unless otherwise noted
 NY Water criteria in u/L (PPB) unless otherwise noted
 *NEW YORK (TAGM) -- as per Department of Environmental Conservation
 Values are based upon TAGM 4046 dated 1/24/94. Gasoline and Fuel
 the 12/2000 memo. PCBs 1.0ppm for surface, 10ppm for subsurface
 Total SemiVo<500ppm, Individual SemiVo Compound=Max
 Background levels for Lead vary widely. Average levels in undeveloped
 Average background levels in metropolitan or suburban areas or near
 *SCC - Based upon NYSDEC 6 NYCRR Subpart 375-6 Remedial Prog.
 *TCOS - Based upon June 1988 Division of Water Technical & Operator
 Values and Groundwater Effluent Limitations, GA Limits
 For Be, When Hardness is less than or equal to 75 PPM, 1,100 u/L v
 *Disclaimer: Regulatory values are based upon information published by
 HCN assumes no legal responsibility for the accuracy of the regulation

Table II - Soil Analytical Results Summary and Exceedances Table

River Center
City of York, New York
NYSDEC BCP # 360083
SESI Consulting Engineers Project # 7190

Sample No. Depth ft Laboratory ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	MW-20-1 12-15 J68922-5 8/14/2007	MW-23-1 10-12 J68922-4 8/14/2007	MW-B-1 12-14 J68922-1 8/13/2007	MW-8-2 14-16 J68922-2 8/13/2007	MW-16-10-12 10-12 J69159-2 8/15/2007	MW-16-8-10 8-10 J69159-1 8/15/2007	MW-18-8-10 8-10 J69159-3 8/15/2007	MW-19-10-12 10-12 J69159-5 8/15/2007
GC/MS Volatiles (ppm)										
Acetone	0.05	500	0.0352	ND	ND	ND	0.0190	ND	0.0139	0.0405
Benzene	0.06	44	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.37	350	ND	ND	ND	ND	ND	ND	ND	ND
ETH benzene	1	350	0.0019	ND	ND	ND	ND	ND	ND	ND
m-Xylene			ND	0.00079	J	ND	ND	ND	ND	ND
Methyl Acetate			ND	ND	0.0094	0.0141	ND	ND	ND	ND
Methylene chloride	0.05	500	0.0034	ND	ND	ND	0.0085	0.0087	0.0053	J 0.0057
o-Xylene			ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.3	150	ND	ND	ND	0.0023	J	ND	ND	ND
Xylene (total)	0.26	500	ND	0.00078	J	ND	ND	ND	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppm)			0.0405	0.00288	0.0117	0.0183	0.0275	0.0087	0.0192	0.0462
TOTAL NON-TARGETED GC/MS Volatiles (ppm)			1.08	0	0	0	0	0	0	0
TOTAL GC/MS Volatiles (ppm)			0.0405	0.00288	0.0117	0.0183	0.0275	0.0087	0.0192	0.0462
GC/MS Semi-volatiles (ppm)										
1,1-Biphenyl			ND	ND	0.0361	J	ND	ND	ND	ND
2-Methylnaphthalene			ND	ND	0.139	0.218	ND	ND	ND	ND
Acenaphthene	20	500	0.0320	ND	0.308	0.505	ND	ND	ND	ND
Acenaphthylene	100	500	0.0455	ND	0.0562	J	0.116	ND	ND	ND
Acetophenone			ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	100	500	0.0893	ND	0.746	1.20	ND	0.0295	J	ND
Benzaldehyde			ND	ND	ND	1.81	ND	0.0854	ND	ND
Benzo(a)anthracene	1	5.6	0.235	ND	0.978	1.43	ND	0.0684	J	0.0335
Benzo(a)pyrene	1	1	0.250	ND	0.791	1.30	ND	0.0680	J	0.0319
Benzo(b)fluoranthene	1	5.6	0.216	ND	0.711	1.30	ND	0.0464	J	0.0267
Benzofluoranthene	100	500	0.190	ND	0.461	0.858	ND	0.0667	J	ND
Benzok(j)fluoranthene	0.8	56	0.202	ND	0.483	0.945	ND	0.294	B	ND
bis(2-Ethylhexyl)phthalate			0.107	0.0631	J	0.0516	J	0.188	B	ND
Caprolactam			ND	ND	ND	ND	ND	ND	ND	ND
Carbazole			ND	ND	0.205	0.327	ND	ND	ND	ND
Chrysene	1	56	0.257	ND	0.944	1.83	ND	0.0777	J	0.0325
Dibenzo(a,h)anthracene	0.33	0.56	0.0541	ND	0.152	0.314	ND	ND	ND	ND
Dibenzofuran			ND	ND	0.223	0.355	ND	ND	ND	ND
Di-n-butyl phthalate			ND	0.0536	J	ND	ND	ND	ND	ND
Fluoranthene	100	500	0.570	0.0203	J	3.98	0.0178	J	0.0315	J
Fluorene	30	500	0.0739	0.369	0.602	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.5	5.6	0.167	ND	0.385	0.784	ND	0.0420	J	ND
Naphthalene	12	500	ND	ND	0.357	0.455	ND	ND	ND	ND
Phenanthrene	100	500	0.363	0.0219	J	2.89	5.35	0.0802	ND	0.0295
Pyrene	100	500	0.619	0.0190	J	2.48	4.77	0.0239	J	0.0472
TOTAL TARGETED GC/MS Semi-volatiles (ppm)			3.4708	0.1779	14.8595	27.242	0.0415	0.8883	0.0671	0.259
TOTAL NON-TARGETED GC/MS Semi-volatiles (ppm)			12.35	0	9.29	J 13.4	0	0.42	J	4.77
TOTAL GC/MS Semi-volatiles (ppm)			3.4708	0.1779	14.8595	27.242	0.0415	0.8883	0.0671	0.259

NA: Not Analyzed

ND: Not Detected

J: estimated value

Bold denotes unrestricted use criteria exceedance
Bold and Shade denotes commercial use exceedance

Table II - Soil Analytical Results Summary and Exceedances Table

River Center

City of Yonkers, New York

NYSDEC BCP # 360083

SESI Consulting Engineers Project # 7190

Sample No. Depth (ft) Laboratory ID # Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	MW-20-1 12-15' J68922-5 8/14/2007	MW-23-1 10-12 J68922-4 8/14/2007	MW-8-1 12-14 J68922-1 8/13/2007	MW-8-2 14-16 J68922-2 8/13/2007	MW-16-10-12 10-12 J69159-2 8/15/2007	MW-16-8-10 8-10 J69159-1 8/15/2007	MW-18-8-10 8-10 J69159-3 8/15/2007	MW-19-10-12 10-12 J69159-5 8/15/2007
Pesticides and PCBs (ppm)										
	0.0033	92		ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	0.0033	62		ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	0.0033	47		ND	0.0041	0.0056	ND	ND	ND	ND
4,4'-DDT	0.094	24		ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane										
Aroclor 1016	0.1	1		ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	0.1	1		ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	0.1	1		ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	0.1	1		ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	1.4		ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane				ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC Semi-volatiles (ppm)			0	0	0.0041	0.0056	0	0	0	0
Metals Analysis (ppm)										
Aluminum			11400	6690	9850	11700	15200	9880	9130	10900
Antimony	13	16	<2.1	<2.3	<2.1	<2.1	<2.4	<2.3	<2.4	<2.5
Arsenic	350	400	2.3	<2.3	2.8	2.7	3.6	<2.3	<2.4	<2.5
Barium	7.2	590	59.4	25.1	172	240	69.6	43.4	50.8	43.0
Beryllium	2.5	9.3	<0.53	<0.58	<0.53	<0.53	<0.61	<0.57	<0.61	<0.62
Cadmium			<0.53	<0.58	0.53	0.73	<0.61	<0.57	<0.61	<0.62
Calcium			4050	3420	4950	7850	3860	2160	6110	1100
Chromium	1	400	22.8	16.3	64.9	92.0	28.0	21.0	28.4	18.8
Cobalt			10.2	<5.8	9.2	11.8	15.0	5.9	<6.1	<6.2
Copper	50	270	36.0	24.0	50.6	71.8	32.9	28.4	19.1	46.7
Iron			15900	10300	18200	21600	23800	12400	10500	16100
Lead	63	1,000	27.9	3.4	75.8	77.4	6.6	27.0	83.9	5.0
Magnesium			6580	3580	6440	9370	8260	2950	2890	4050
Manganese	1600	10,000	176	215	282	276	452	143	108	154
Mercury	0.18	2.8	0.81	<0.037	1.2	2.0	<0.037	<0.038	0.18	0.52
Nickel	30	310	42.8	14.2	32.9	46.3	50.9	14.9	14.8	10.3
Potassium			<1100	<1200	2510	3610	1300	<1100	<1200	2270
Selenium	3.9	1,500	<2.1	<2.3	<2.1	<2.1	<2.4	<2.3	<2.4	<2.5
Silver	2	1,500	<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.2	<1.2
Sodium			<1100	<1200	<1100	<1100	<1200	<1100	<1200	<1200
Thallium			<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.2	<1.2
Titanium			26.6	23.4	32.6	41.1	37.1	21.5	16.7	22.1
Vanadium										
Zinc	109	10,000	38.0	20.6	78.2	98.3	40.4	37.5	27.1	54.3
General Chemistry (ppm)										
Cyanide	27	27	<0.23	<0.24	<0.22	0.29	<0.29	<0.26	<0.27	<0.25
Solids, Percent (%)			92.3	87.6	94.5	93.7	83.1	85.4	82.9	82.3

NA: Not Analyzed
 ND: Not Detected
 J: estimated value

Bold denotes unrestricted use criteria exceedance
Bold and Shade denotes commercial use exceedance

Table II - Soil Analytical Results Summary and Exceedances Table

River
Canter
City of York, New York
NYSDEC BCP # 360083
SESI Consulting Engineers Project # 7190

Sample No. Depth (ft) Laboratory ID.# Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	MW-19-8-10 8-10 J69159-4 8/15/2007	MW-22-10-12 10-12 J69159-8 8/16/2007	MW-24-10-12 10-12 J69159-7 8/16/2007	MW-2-10-12 10-12 J69290-3 8/17/2007	MW-12-14 12-14 J69290-4 8/17/2007	MW-30-6-8 8-8 J69290-1 8/17/2007	MW-30-8-10 8-10 J69290-2 8/17/2007	MW-3-6-8 6-8 J69505-5 8/20/2007	SV-1-6-8 6-8 J69505-1 8/20/2007
GC/MS Volatiles (ppm)											
Acetone	0.05	500	0.0352	0.0643	ND	ND	ND	ND	ND	ND	ND
Benzene	0.06	44	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	0.37	350	ND	ND	ND	ND	ND	ND	0.00074	ND	ND
Ethylbenzene	1	390	0.0012	0.0039	ND	0.00085	J	ND	ND	ND	ND
m,p-Xylene			0.0037	0.0259	ND	0.0339		ND	ND	ND	ND
Methyl Acetate			ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	0.05	500	0.0085	J	ND	ND	ND	ND	ND	ND	ND
o-Xylene			0.00084	J	0.00075	J	0.0287	ND	ND	ND	0.0018
Tetrachloroethene	1.3	150	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	0.26	500	0.0046	0.0422	0.00075	J	0.0626	ND	ND	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppm)			0.05404	0.16103	0.0015	0.13105	0	0	0.00074	0	0.0018
TOTAL NON-TARGETED GC/MS Volatiles (ppm)			0	0.634	J	0.398	J	0	0	0	0
TOTAL GC/MS Volatiles (ppm)			0.05404	0.16103	0.0015	0.13105	0	0	0.00074	0	0.0018
GC/MS Semi-volatiles (ppm)											
1,1-Biphenyl			ND	NA	NA	NA	NA	ND	ND	NA	ND
2-Methylnaphthalene			ND	NA	NA	NA	NA	ND	ND	NA	ND
Acenaphthene	20	500	ND	NA	NA	NA	NA	0.0458	J	NA	ND
Acenaphthylene	100	500	ND	NA	NA	NA	NA	0.0283	J	NA	ND
Acetophenone			ND	NA	NA	NA	NA	ND	ND	NA	ND
Anthracene	100	500	ND	NA	NA	NA	NA	0.151	0.0299	NA	ND
Benzaldehyde			ND	NA	NA	NA	NA	ND	ND	NA	ND
Benzofluoranthene	1	5.6	ND	NA	NA	NA	NA	0.455	0.104	NA	ND
Benzofluorene	1	1	ND	NA	NA	NA	NA	0.425	0.0958	NA	ND
Benzofluoranthene	1	5.6	ND	NA	NA	NA	NA	0.436	0.116	NA	ND
Benzofluoranthene	100	500	ND	NA	NA	NA	NA	0.296	0.0827	NA	ND
Benzofluoranthene	0.8	56	ND	NA	NA	NA	NA	0.287	0.0854	NA	ND
Bis(2-Ethylhexyl)phthalate			0.0741	J	NA	NA	NA	0.110	ND	NA	0.0609
Caprolactam			ND	NA	NA	NA	NA	ND	ND	NA	ND
Carbazole			ND	NA	NA	NA	NA	0.0667	J	NA	ND
Chrysene	1	56	ND	NA	NA	NA	NA	0.479	0.109	NA	ND
Dibenzofluoranthene	0.33	0.56	ND	NA	NA	NA	NA	0.0923	ND	NA	ND
Dibenzofuran			ND	NA	NA	NA	NA	0.0201	J	NA	ND
Di-n-butyl phthalate			ND	NA	NA	NA	NA	ND	ND	NA	ND
Fluoranthene	100	500	0.0333	J	NA	NA	NA	0.964	0.194	NA	ND
Fluorene	30	500	ND	NA	NA	NA	NA	0.0455	J	NA	ND
Indeno(1,2,3-cd)pyrene	0.5	5.6	ND	NA	NA	NA	NA	0.245	0.0549	NA	ND
Naphthalene	12	500	ND	NA	NA	NA	NA	ND	ND	NA	ND
Phenanthrene	100	500	ND	NA	NA	NA	NA	0.775	0.110	NA	ND
Pyrene	100	500	0.0310	J	NA	NA	NA	0.964	0.187	NA	ND
TOTAL TARGETED GC/MS Semi-volatiles (ppm)			0.1384	0	0	0	0	5.8657	1.1487	0	0.1159
TOTAL NON-TARGETED GC/MS Semi-volatiles (ppm)			0.83	J	NA	NA	NA	3.18	J	12.24	0.18
TOTAL GC/MS Semi-volatiles (ppm)			0.1384	0	0	0	0	5.8657	1.1487	0	0.1159

NA: Not Analyzed
ND: Not Detected
J: estimated value

Table II - Soil Analytical Results Summary and Exceedances Table

City of York
River Center
New York
NYSDEC BCP # 360083

SESI Consulting Engineers Project # 7190

Sample No.	Depth (ft)	Commercial/Use Criteria	Unrestricted Use Criteria	MW-19-8-10	MW-22-10-12	MW-24-10-12	MW-2-10-12	MW-2-12-14	MW-30-6-8	MW-30-8-10	MW-3-6-8	SV-1-6-8
				J69159-4 8/15/2007	J69159-8 8/16/2007	J69159-7 8/16/2007	J69290-3 8/17/2007	J69290-4 8/17/2007	J69290-1 8/17/2007	J69290-2 8/17/2007	J69505-5 8/20/2007	J69505-1 8/20/2007
Pesticides and PCBs (ppm)												
4,4'-DDD	0.0033	92	0.0033	ND	NA	NA	NA	NA	ND	ND	NA	ND
4,4'-DDE	0.0033	62	0.0033	ND	NA	NA	NA	NA	ND	ND	NA	ND
4,4'-DDT	0.0033	47	0.0033	ND	NA	NA	NA	NA	0.0031	ND	NA	ND
alpha-Chlordane	0.094	24	0.094	ND	NA	NA	NA	NA	ND	ND	NA	ND
Aroclor 1016	0.1	1	0.1	ND	NA	NA	NA	NA	ND	ND	NA	ND
Aroclor 1248	0.1	1	0.1	ND	NA	NA	NA	NA	ND	ND	NA	ND
Aroclor 1254	0.1	1	0.1	ND	NA	NA	NA	NA	ND	ND	NA	ND
Aroclor 1260	0.1	1	0.1	ND	NA	NA	NA	NA	ND	ND	NA	ND
Dieldrin	0.005	1.4	0.005	ND	NA	NA	NA	NA	ND	ND	NA	ND
gamma-Chlordane				0	0	0	0	0	0.0031	0	0	0
TOTAL TARGETED GC Semi-volatiles (ppm)												
Metals Analysis (ppm)												
Aluminum				12600	NA	NA	NA	NA	11100	13000	NA	8710
Antimony				<3.4	NA	NA	NA	NA	<2.3	<2.1	NA	<2.1
Arsenic	13	16	13	<3.4	NA	NA	NA	NA	7.2	6.4	NA	4.4
Barium	360	400	360	62.0	NA	NA	NA	NA	169	144	NA	56.6
Beryllium	7.2	590	7.2	<0.84	NA	NA	NA	NA	<0.58	<0.67	NA	<0.52
Cadmium	2.5	9.3	2.5	<0.84	NA	NA	NA	NA	0.59	<0.67	NA	0.56
Calcium				4050	NA	NA	NA	NA	11900	4370	NA	1080
Chromium	1	400	1	37.5	NA	NA	NA	NA	42.7	59.3	NA	39.8
Cobalt				<8.4	NA	NA	NA	NA	10.2	8.2	NA	<5.2
Copper	50	270	50	51.0	NA	NA	NA	NA	95.7	75.3	NA	11.8
Iron				14100	NA	NA	NA	NA	33200	21200	NA	20500
Lead	63	1,000	63	14.5	NA	NA	NA	NA	280	436	NA	8.5
Magnesium				3650	NA	NA	NA	NA	5350	4160	NA	2400
Manganese	1600	10,000	1600	89.1	NA	NA	NA	NA	248	127	NA	212
Mercury	0.18	2.8	0.18	0.46	NA	NA	NA	NA	2.2	2.1	NA	<0.033
Nickel	30	310	30	21.2	NA	NA	NA	NA	22.1	24.9	NA	9.4
Potassium				<1700	NA	NA	NA	NA	2330	1540	NA	<1000
Selenium	3.9	1,500	3.9	<3.4	NA	NA	NA	NA	<2.3	<2.7	NA	<2.1
Silver	2	1,500	2	<1.7	NA	NA	NA	NA	<1.2	<1.3	NA	<1.0
Sodium				<1700	NA	NA	NA	NA	<1200	<1300	NA	<1000
Thallium				<1.7	NA	NA	NA	NA	<1.2	<1.3	NA	<1.0
Vanadium				29.6	NA	NA	NA	NA	34.0	30.0	NA	33.5
Zinc	109	10,000	109	38.7	NA	NA	NA	NA	181	151	NA	37.7
General Chemistry (ppm)												
Cyanide	27	27	27	<0.37	NA	NA	NA	NA	<0.24	0.67	NA	<0.23
Solids, Percent (%)				60.8	91.8	90.4	91.3	88.5	87.4	74.9	96.1	93.8

Bold denotes unrestricted use criteria exceedance
Bold and Shade denotes commercial use exceedance

NA: Not Analyzed
ND: Not Detected
J: estimated value

Table II - Soil Analytical Results Summary and Exceedances Table

River
City of Yonkers, New York
NYSDEC BCP # 360083

SESI Consulting Engineers Project # 7190

Sample No.	SV-1-8-10	SV-2-10-12	SV-2-12-14	MW-28-10-12	MW-28-6-8	MW-29-6-8	MW-29-8-10	MW-4-8-10	MW-5-8-10
Depth (ft)	8-10	10-12	12-14	10-12	6-8	6-8	8-10	8-10	8-10
Laboratory ID #	J69505-2	J69505-4	J69505-3	J69752-4	J69752-3	J69752-1	J69752-2	J70027-3	J70027-1
Date Collected	8/20/2007	8/20/2007	8/20/2007	8/22/2007	8/22/2007	8/22/2007	8/22/2007	8/27/2007	8/27/2007
Unrestricted Use Criteria									
Commercial Use Criteria									
GC/MS Volatiles (ppm)									
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	0.0012	ND	ND
Chloroform	ND	ND	ND	ND	ND	0.0053	0.0024	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	0.0019
Methylene chloride	ND	0.0017	0.0024	ND	0.0013	ND	ND	0.0257	0.0346
o-Xylene	ND	ND	ND	ND	ND	ND	ND	0.0020	0.0024
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppm)	0	0.0017	0.0024	0	0.0013	0.00053	0.0036	0.0277	0.0408
TOTAL NON-TARGETED GC/MS Volatiles (ppm)	0	0.005	0	0	0.702	0	0	0	0.0214
TOTAL GC/MS Volatiles (ppm)	0	0.0017	0.0024	0	0.0013	0.00053	0.0036	0.0277	0.0408
GC/MS Semi-volatiles (ppm)									
1,1'-Biphenyl	ND	ND	ND	ND	0.129	0.0675	0.0382	NA	ND
2-Methylnaphthalene	ND	ND	ND	ND	0.259	0.369	0.148	NA	ND
Acenaphthene	0.0205	ND	ND	ND	0.318	0.107	0.322	NA	ND
Acenaphthylene	0.0273	ND	ND	ND	0.372	0.106	0.0770	NA	0.0271
Acetophenone	ND	ND	ND	ND	ND	ND	ND	NA	ND
Anthracene	0.0678	ND	ND	ND	1.05	0.290	0.897	NA	0.107
Benzaldehyde	ND	ND	ND	ND	ND	ND	ND	NA	ND
Benzofluoranthene	0.173	0.0197	ND	ND	1.92	0.863	1.63	NA	0.293
Benzo(a)pyrene	0.186	ND	ND	ND	1.80	0.836	1.35	NA	0.257
Benzo(b)fluoranthene	0.323	0.0365	ND	ND	1.40	0.990	1.30	NA	0.336
Benzo(k)fluoranthene	0.123	ND	ND	ND	0.904	0.654	0.983	NA	0.189
Bis(2-Ethylhexyl)phthalate	ND	ND	ND	ND	1.31	0.398	0.959	NA	0.0977
Caprolactam	2.82	0.205	0.0656	ND	0.277	0.0544	0.120	NA	0.115
Carbazole	ND	ND	ND	ND	1.60	ND	ND	NA	ND
Chrysene	0.0207	ND	ND	ND	0.283	0.111	0.354	NA	0.0444
Dibenzofluoranthene	0.190	0.0186	ND	ND	2.03	0.738	1.41	NA	0.250
Dibenzoturan	0.0388	ND	ND	ND	0.307	0.189	0.370	NA	0.0463
Di-n-butyl phthalate	0.113	ND	ND	ND	0.296	0.0538	0.197	NA	0.0402
Fluoranthene	0.348	0.0342	0.0686	ND	0.0447	ND	0.0766	NA	ND
Fluorene	0.0198	ND	0.0191	ND	4.90	1.58	3.54	NA	0.628
Indeno(1,2,3-cd)pyrene	0.103	ND	ND	ND	0.530	0.127	0.303	NA	0.164
Naphthalene	ND	ND	ND	ND	1.10	0.552	0.880	NA	0.0436
Phenanthrene	0.255	ND	ND	ND	0.263	0.0924	0.380	NA	0.742
Pyrene	0.401	0.0400	0.0241	ND	5.08	1.18	3.22	NA	0.541
TOTAL TARGETED GC/MS Semi-volatiles (ppm)	97.4299	0.3914	0.2453	0	29.8127	10.7581	21.4048	0	3.8163
TOTAL NON-TARGETED GC/MS Semi-volatiles (ppm)	9.92	0.57	0.63	0.62	22.87	46.95	9	NA	0.16
TOTAL GC/MS Semi-volatiles (ppm)	97.4299	0.3914	0.2453	0	29.8127	10.7581	21.4048	0	3.8163

NA: Not Analyzed
ND: Not Detected
J: estimated value

Bold denotes unrestricted use criteria exceedance
Bold and Shade denotes commercial use exceedance

Table II - Soil Analytical Results Summary and Exceedances Table

River Center

City of Yonkers, New York

NYSDEC BCP # 360083

SESI Consulting Engineers Project # 7190

Sample No. Depth (ft) Laboratory ID # Date Collected	SV-13-10 8-10 J69505-2 8/20/2007	SV-2-10-12 10-12 J69505-4 8/20/2007	SV-2-12-14 12-14 J69505-3 8/20/2007	MW-28-10-12' 10-12 J69752-4 8/22/2007	MW-28-6-8' 6-8 J69752-3 8/22/2007	MW-29-6-8' 6-8 J69752-1 8/22/2007	MW-29-8-10' 8-10 J69752-2 8/22/2007	MW-4-8-10' 8-10 J70027-3 8/27/2007	MW-5-8-10' 8-10 J70027-1 8/27/2007
Pesticides and PCBs (ppm)									
4,4'-DDD	0.0033	ND	ND	ND	ND	ND	ND	NA	NA
4,4'-DDE	0.0033	0.0310	ND	ND	ND	ND	ND	NA	NA
4,4'-DDT	0.0033	0.0810	ND	ND	ND	ND	ND	NA	NA
alpha-Chlordane	0.094	ND	ND	ND	ND	ND	ND	NA	NA
Aroclor 1016	0.1	ND	ND	ND	ND	ND	ND	NA	NA
Aroclor 1248	0.1	ND	ND	ND	ND	ND	ND	NA	NA
Aroclor 1254	0.1	ND	ND	ND	ND	ND	ND	NA	NA
Aroclor 1260	0.1	ND	ND	ND	ND	ND	0.192	NA	NA
Dieldrin	0.005	0.0462	ND	ND	ND	ND	ND	NA	NA
gamma-Chlordane	0.0110	ND	ND	ND	ND	ND	ND	NA	NA
TOTAL TARGETED GC Semi-volatiles (ppm)	0.2872	0	0	0	0	0	0.192	NA	NA
Metals Analysis (ppm)									
Aluminum	7060	16600	9910	14900	10700	48200	9990	NA	NA
Antimony	164	<2.2	<2.0	<2.4	<2.3	<11	<2.5	NA	NA
Arsenic	7.4	<2.2	<2.0	<2.4	7.8	12.5	2.7	NA	NA
Barium	350	121	87.4	47.8	113	431	98.4	NA	NA
Beryllium	7.2	<0.54	<0.50	<0.60	<0.66	<2.8	<0.61	NA	NA
Cadmium	2.5	0.82	<0.50	<0.60	0.59	<2.8	<0.61	NA	NA
Calcium	8090	11000	7210	861	10000	23400	7220	NA	NA
Chromium	1	25.0	34.6	21.0	51.8	103	35.9	NA	NA
Cobalt	5.8	13.5	6.8	8.0	13.3	34.7	7.7	NA	NA
Copper	69.6	47.7	34.6	24.7	77.8	178	33.8	NA	NA
Iron	21500	20700	12300	15500	43300	66600	14200	NA	NA
Lead	7170	26.7	19.7	5.4	139	288	102	NA	NA
Magnesium	3040	8530	4390	3370	7600	21500	4670	NA	NA
Manganese	282	353	204	115	418	1370	286	NA	NA
Mercury	0.97	0.052	0.051	<0.036	0.23	0.041	0.12	NA	NA
Nickel	16.6	39.7	20.6	23.7	29.3	69.4	22.8	NA	NA
Potassium	<1000	2010	1340	<1200	3000	<5600	<1200	NA	NA
Selenium	<2.1	<2.2	<2.0	<2.4	<2.3	<11	<2.5	NA	NA
Silver	1.6	<1.1	<1.0	<1.2	2.3	<5.6	<1.2	NA	NA
Sodium	<1000	1220	<1000	<1200	<1100	<5600	<1200	NA	NA
Thallium	<1.0	<1.1	<1.0	<1.2	<1.1	<1.1	<1.2	NA	NA
Vanadium	21.9	43.8	21.7	26.3	40.7	141	28.3	NA	NA
Zinc	727	66.5	73.0	36.4	107	353	89.2	NA	NA
General Chemistry (ppm)									
Cyanide	27	0.37	<0.21	<0.25	<0.26	<0.25	<0.24	NA	NA
Solids, Percent (%)	91.2	95.0	95.6	86.2	87.6	88.6	83.2	96.7	92.7

NA: Not Analyzed
 ND: Not Detected
 J: estimated value

Bold denotes unrestricted use criteria, exceedance
Bold and Shade denotes commercial use exceedance

Table II - Soil Analytical Results Summary and Exceedances Table

River Center
City of York, New York
NYSDEC BCP # 360083
SESI Consulting Engineers Project # 7190

Sample No.	SV-3 10-12	MW-10 1-3	MW-10 0-1	MW-11 0-5	MW-11 5-10	MW-17 0-5	MW-17 5-7	MW-9 0-5	MW-9 5-10
Depth (ft)	10-12	1-3	0-1	0-5	5-10	0-5	5-8	0-5	5-10
Laboratory ID #	J7027-2	J70289-2	J70289-1	J70289-5	J70289-6	J70289-7	J70289-8	J70289-3	J70289-4
Date Collected	8/27/2007	8/29/2007	8/29/2007	8/29/2007	8/29/2007	8/29/2007	8/29/2007	8/29/2007	8/29/2007
GC/MS Volatiles (ppm)									
Acetone	ND	0.0722	ND	0.0291	0.0548	ND	ND	0.0625	0.125
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	0.0019	ND	ND	ND	ND	ND	ND
m,p-Xylene	ND	0.0027	0.0058	0.0010	ND	ND	ND	ND	ND
Methyl Acetate	0.0480	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	0.0019	ND	0.0013	0.0016	ND	ND	ND	ND	ND
o-Xylene	ND	ND	0.0105	ND	ND	ND	0.0086	0.0032	0.0032
Tetrachloroethene	ND	0.0124	0.0105	ND	ND	ND	ND	ND	ND
Xylene (total)	ND	0.0027	0.0072	0.0010	ND	ND	ND	ND	ND
TOTAL TARGETED GC/MS Volatiles (ppm)	0.0499	0.1024	0.031	0.037	0.0548	0	0.00088	0.0779	0.1709
TOTAL NON-TARGETED GC/MS Volatiles (ppm)	0	0.015	0	0	0	0	0	0.4328	0.6018
TOTAL GC/MS Volatiles (ppm)	0.0499	0.1024	0.031	0.037	0.0548	0	0.00088	0.0779	0.1709
GC/MS Semi-volatiles (ppm)									
1,1-Ethylene	NA	ND	ND	ND	ND	0.0674	ND	0.0209	ND
2-Methylnaphthalene	NA	ND	ND	ND	ND	0.374	ND	0.0776	ND
Acenaphthene	NA	0.0741	0.195	0.124	ND	0.127	ND	0.141	ND
Acenaphthylene	NA	0.0664	0.983	0.238	J	0.0526	J	0.0175	J
Acetophenone	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	NA	0.287	1.40	0.320	J	0.261	ND	0.436	0.131
Benzaldehyde	NA	ND	ND	ND	ND	ND	ND	ND	0.213
Benzofluoranthene	NA	1.25	6.89	1.27	ND	0.593	ND	0.839	0.0674
Benzofluorene	NA	1.18	7.33	1.29	ND	0.600	ND	0.717	0.0460
Benzofluoranthene	NA	1.24	7.13	1.25	ND	0.700	ND	0.634	0.0411
Benzofluorene	NA	0.526	0.670	0.533	ND	0.142	ND	0.443	0.0286
Benzofluorene	NA	0.761	2.37	1.26	ND	0.375	ND	0.541	0.0440
Bis(2-Ethylhexyl)phthalate	NA	0.338	0.280	0.340	J	0.463	0.288	0.199	0.140
Carbazole	NA	ND	ND	ND	ND	0.952	ND	ND	ND
Chrysene	NA	0.159	0.372	0.186	J	0.113	ND	0.198	ND
Dibenzofluoranthene	NA	1.15	6.75	1.68	ND	0.637	ND	0.850	0.0727
Dibenzofluorene	NA	0.227	0.313	0.206	J	0.0768	ND	0.195	ND
Dibenzofluorene	NA	0.0345	0.0740	0.132	J	0.0876	ND	0.115	ND
Di-n-butylphthalate	NA	ND	6.89	ND	ND	ND	ND	ND	ND
Fluoranthene	NA	2.91	16.0	3.99	ND	1.38	0.0166	2.08	0.155
Indeno(1,2,3-cd)pyrene	NA	0.0546	0.209	0.210	J	0.142	ND	0.179	ND
Naphthalene	NA	0.572	0.906	0.603	ND	0.178	ND	0.434	0.0267
Phenanthrene	NA	ND	0.0598	0.193	J	0.142	ND	0.163	ND
Pyrene	NA	1.46	5.20	3.01	ND	0.998	ND	2.00	0.116
TOTAL TARGETED GC/MS Semi-volatiles (ppm)	0	14.6296	77.3218	19.721	0.14	9.4714	0.3221	11.81	1.3055
TOTAL NON-TARGETED GC/MS Semi-volatiles (ppm)	NA	12.49	24.69	2.88	J	16.91	J	3.07	J
TOTAL GC/MS Semi-volatiles (ppm)	0	14.6296	77.3218	19.721	0.14	9.4714	0.3221	11.81	1.3055

NA: Not Analyzed

Bold denotes unrestricted use criteria exceedance

ND: Not Detected

J: estimated value

Table II - Soil Analytical Results Summary and Exceedances Table

River Center

City of Yonkers, New York

NYSDEC BCP # 360083

SESI Consulting Engineers Project # 7190

Sample No. Depth (ft) Laboratory ID.# Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	SV-3 10-12' J7027-2 8/29/2007	MW-10 1-3' J7028-2 8/29/2007	MW-10-0-1' J7028-1 8/29/2007	MW-11 0-5' J7028-5 8/29/2007	MW-11 5-10' J7028-6 8/29/2007	MW-17 0-5' J7028-7 8/29/2007	MW-17 5-7' J7028-8 8/29/2007	MW-9 0-5' J7028-3 8/29/2007	MW-9 5-10' J7028-4 8/29/2007
Pesticides and PCBs (ppm)											
4,4'-DDD	0.0033	92	NA	ND	0.0075	ND	ND	ND	ND	ND	ND
4,4'-DDE	0.0033	62	NA	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	0.0033	47	NA	ND	0.0082	ND	ND	ND	ND	ND	ND
alpha-Chlordane	0.094	24	NA	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	0.1	1	NA	ND	ND	0.319	ND	ND	ND	ND	ND
Aroclor 1248	0.1	1	NA	ND	0.171	0.0635	ND	ND	ND	ND	ND
Aroclor 1254	0.1	1	NA	ND	0.0799	ND	ND	ND	ND	ND	ND
Aroclor 1260	0.1	1	NA	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	0.005	1.4	NA	ND	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane			NA	0	0.2866	0.3825	0	0	0	0	0
TOTAL TARGETED GC Semi-volatiles (ppm)											
Metals Analysis (ppm)											
Aluminum			NA	10300	9250	8660	16900	5820	8700	10900	8230
Antimony			NA	<2.5	<2.6	<2.4	<2.3	<2.3	<2.2	<2.2	<2.3
Arsenic	13	16	NA	10	20.2	<2.4	<2.3	6.6	2.6	4.2	138
Barium	350	400	NA	166	254	38.2	65.4	85.2	40.1	50.2	47.9
Beryllium	7.2	590	NA	<0.64	<0.66	<0.59	<0.57	<0.57	<0.56	<0.55	<0.59
Cadmium	2.5	9.3	NA	1.7	1.5	<0.59	<0.57	<0.57	<0.56	<0.55	<0.59
Calcium			NA	26400	30300	15400	2590	16800	2550	14800	29500
Chromium	1	400	NA	34.7	145	24.3	82.2	22.2	29.2	21.8	24.1
Cobalt			NA	6.7	7.1	<5.9	10.7	6.5	12.5	6.4	7.0
Copper	50	270	NA	120	2900	21.1	13.0	53.5	21.9	30.7	27.8
Iron			NA	28900	25800	10300	12500	13300	10500	11500	13500
Lead	63	1,000	NA	391	645	43.0	5.9	84.4	16.9	26.7	47.9
Magnesium			NA	6690	9200	7690	3310	2970	2070	3990	4570
Manganese	1600	10,000	NA	287	307	146	88.7	209	148	223	354
Mercury	0.18	2.8	NA	151	158	7.3	0.053	10.1	2.7	1.7	109
Nickel	30	310	NA	19.1	23.9	12.7	24.8	16.9	21.7	15.9	20.2
Potassium			NA	<1300	1320	<1200	1270	<1100	<1100	<1100	<1200
Selenium	3.9	1,500	NA	<2.5	<2.6	<2.4	<2.3	<2.3	<2.2	<2.3	<2.3
Silver	2	1,500	NA	<1.3	<1.3	<1.2	<1.1	<1.1	<1.1	<1.1	<1.2
Sodium			NA	<1300	<1300	<1200	<1100	<1100	<1100	<1100	<1200
Thallium			NA	<1.3	<1.3	<1.2	<1.1	<1.1	<1.1	<1.1	<1.2
Vanadium			NA	32.0	49.0	20.4	43.9	31.8	21.6	25.7	18.9
Zinc	109	10,000	NA	565	866	36.4	36.4	107	47.3	31.9	50.3
General Chemistry (ppm)											
Cyanide	27	27	NA	<0.26	0.56	<0.23	<0.23	<0.26	<0.25	<0.23	<0.23
Solids, Percent (%)			86.0	75.6	76.8	86.1	88.1	91.6	87.3	88.8	88.7

Bold denotes unrestricted use criteria exceedance
Bold and Shade denotes commercial use exceedance

NA: Not Analyzed
 ND: Not Detected
 J: estimated value

Table II - Soil Analytical Results Summary and Exceedances Table

River Center
City of York, New York
NYSDEC BCP # 360083
SESI Consulting Engineers Project # 7190

Sample No.	Depth (ft)	Unrestricted Use Criteria	Commercial Use Criteria	MW-14 16-18'	MW-15 18-20'	MW-14 18-20'	SV-9 10-12'	SV-9 8-10'
Laboratory ID #				16-18	18-20	18-20	10-12	8-10
Date Collected				9/5/2007	9/4/2007	9/5/2007	9/5/2007	9/5/2007
GC/MS Volatiles (ppm)								
Acetone	0.05		500	ND	0.0172	ND	ND	ND
Benzene	0.05		44	ND	ND	ND	ND	ND
Chloroform	0.37		350	ND	ND	ND	ND	ND
Ethylbenzene	1		390	ND	ND	ND	0.00076	J 0.00096
m,p-Xylene				ND	ND	ND	0.0162	0.0064
Methyl Acetate				ND	ND	ND	ND	ND
Methylene chloride	0.05		500	ND	ND	ND	ND	0.0855
o-Xylene				ND	ND	ND	0.0145	0.0056
Tetrachloroethene	1.3		150	ND	ND	ND	ND	ND
Xylene (total)	0.26		500	ND	ND	ND	0.0307	0.0120
TOTAL TARGETED GC/MS Volatiles (ppm)	0			0	0.0172	0.0033	0.06556	0.11366
TOTAL NON-TARGETED GC/MS Volatiles (ppm)				0	NA	NA	NA	NA
TOTAL GC/MS Volatiles (ppm)				0	0.0172	0.0033	0.06556	0.11366
GC/MS Semi-volatiles (ppm)								
1,1'-Biphenyl				NA	0.158	NA	0.139	NA
2-Methylnaphthalene				NA	0.610	NA	0.782	NA
Acenaphthene	20		500	NA	1.56	NA	0.0541	J
Acenaphthylene	100		500	NA	0.0775	NA	ND	NA
Acetophenone				NA	ND	NA	ND	NA
Anthracene	100		500	NA	3.95	NA	0.0474	J
Benzaldehyde				NA	ND	NA	ND	NA
Benzofluoranthene	1		5.6	NA	5.11	NA	0.0957	NA
Benzofluoranthene	1		1	NA	4.29	NA	0.0829	NA
Benzofluoranthene	1		5.6	NA	4.23	NA	0.119	NA
Benzofluoranthene	100		500	NA	0.977	NA	0.0324	J
Benzofluoranthene	0.8		56	NA	1.11	NA	0.0750	NA
bis(2-Ethylhexyl)phthalate				NA	0.234	NA	0.131	NA
Caprolactam				NA	ND	NA	ND	NA
Carbazole				NA	1.27	NA	0.0221	J
Chrysene	1		56	NA	4.75	NA	0.110	NA
Dibenzofluoranthene	0.33		0.56	NA	0.481	NA	ND	NA
Dibenzofluoranthene				NA	1.07	NA	ND	NA
Di-n-butyl phthalate				NA	ND	NA	ND	NA
Fluoranthene	100		500	NA	13.8	NA	0.175	NA
Fluorene	30		500	NA	1.86	NA	0.0755	NA
Indeno(1,2,3-cd)pyrene	0.5		5.6	NA	1.14	NA	0.0345	J
Naphthalene	12		500	NA	0.794	NA	0.203	NA
Phenanthrene	100		500	NA	16.0	NA	0.250	NA
Pyrene	100		500	NA	10.4	NA	0.153	NA
TOTAL TARGETED GC/MS Semi-volatiles (ppm)				0	73.8715	0	2.5816	0
TOTAL NON-TARGETED GC/MS Semi-volatiles (ppm)								
TOTAL GC/MS Semi-volatiles (ppm)								

Bold denotes unrestricted use criteria exceedance
Bold and Shade denotes commercial use exceedance

NA: Not Analyzed
ND: Not Detected
J: estimated value

Table II - Soil Analytical Results Summary and Exceedences Table

River Center
City of York, New York
NYSDEC BCP # 360083
SESI Consulting Engineers Project # 7190

Sample No.	Depth (ft)	Laboratory ID #	Date Collected	Unrestricted Use Criteria	Commercial Use Criteria	MW-14 16-18' 18-18	MW-15 18-20' 18-20	MW-14-18-20' 18-20	SV-9 10-12' 10-12	SV-9-8-10' 8-10
Pesticides and PCBs (ppm)										
4,4'-DDD		0.0033		92	ND	ND	ND	ND	ND	ND
4,4'-DDE		0.0033		62	0.0053	ND	ND	0.0029	ND	ND
4,4'-DDT		0.0033		47	0.0269	ND	ND	0.0147	ND	ND
alpha-Chlordane		0.094		24	ND	ND	ND	ND	ND	ND
Aroclor 1016		0.1		1	ND	ND	ND	ND	ND	ND
Aroclor 1248		0.1		1	ND	ND	ND	ND	ND	ND
Aroclor 1254		0.1		1	ND	ND	ND	ND	ND	ND
Aroclor 1260		0.1		1	ND	ND	ND	ND	ND	ND
Dieldrin		0.005		1.4	ND	ND	ND	ND	ND	ND
gamma-Chlordane		0.005		1.4	ND	ND	ND	ND	ND	ND
TOTAL TARGETED GC Semi-volatiles (ppm)					0.0322	0	0	0.0176	0	0
Metals Analysis (ppm)										
Aluminum					8020	3190	3190	6900	5550	7160
Antimony					<2.2	<2.2	<2.2	<2.1	<2.1	<2.2
Arsenic		13		16	<2.2	7.3	7.3	<2.1	8.1	8.0
Barium		350		400	168	46.8	46.8	114	54.1	82.9
Beryllium		7.2		590	<0.55	<0.55	<0.55	<0.53	<0.53	<0.55
Cadmium		2.5		9.3	<0.55	<0.55	<0.55	<0.53	<0.53	<0.55
Calcium					6760	22200	22200	4340	13800	11000
Chromium		1		400	20.4	12.1	12.1	18.7	21.9	31.0
Cobalt					6.2	<6.5	<6.5	5.4	6.4	8.1
Copper		50		270	24.0	75.8	75.8	18.5	109	148
Iron					10400	12000	12000	9590	12800	14800
Lead		63		1,000	374	35.7	35.7	169	67.2	66.1
Magnesium					3030	8870	8870	2690	7080	6260
Manganese		1600		10,000	157	68.0	68.0	189	94.1	103
Mercury		0.18		2.8	0.84	1.4	1.4	0.17	0.91	1.0
Nickel		30		310	15.3	14.9	14.9	14.4	18.1	21.0
Potassium					<1100	<1100	<1100	<1100	<1100	2050
Selenium		3.9		1,500	<2.2	<2.2	<2.2	<2.1	<2.1	<2.2
Silver		2		1,500	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Sodium					<1100	<1100	<1100	<1100	<1100	<1100
Thallium					<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Vanadium					21.2	14.4	14.4	18.9	20.4	25.7
Zinc		109		10,000	134	28.2	28.2	64.4	38.9	52.6
General Chemistry (ppm)										
Cyanide		27		27	<0.22	0.35	0.35	<0.26	0.32	0.36
Solids, Percent (%)					92.6	92.8	92.8	92.1	92.8	91.9

Bold denotes unrestricted use criteria exceedence
Bold and Shade denotes commercial use exceedence

NA: Not Analyzed
 ND: Not Detected
 J: estimated value

TABLE IB _ ADDITIONAL SAMPLE SUMMARY TABLE

River Park Center

City of Yonkers, Westchester County, New York

SESI Consulting Engineers Project No. 7190

Boring Number	Sample ID	Depth (ft below grade)	Date Collected	Depth to bedrock (ft)	Analytical Parameters
SB-1		0-2	No Recovery		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
		5-7	No Recovery		Plus TOC
	SB-1/S-1/10-12	10-12	11/30/07		Plus TOC
	SB-1/S-2/15-17	15-17	11/30/07		Plus TOC
	SB-1/S-3/20-22	20-22	11/30/07		Plus TOC
SB-2	SB-2/S-1/0-2	0-2	11/28/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-2/S-2/9.5-10	9.5-10	11/28/07		Plus TOC
	SB-2/S-3/15-17	15-17	11/29/07		Plus TOC
	SB-2/S-4/20-22	20-22	11/29/07		Plus TOC
SB-3	SB-3/S-1/1-3	1-3	11/29/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-3/S-2/11-13	11-13	11/29/07		Plus TOC
	SB-3/S-3/16-18	16-18	11/29/07		Plus TOC
	SB-3/S-4/21-23	21-23	11/29/07		Plus TOC
SB-4	SB-4/S-1/0-2	0-2	11/29/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-4/S-2/14-16	14-16	11/29/07		Plus TOC
	SB-4/S-3/19-21	19-21	11/29/07		Plus TOC
	SB-4/S-4/24-26	24-26	11/29/07		Plus TOC
SB-5	SB-5/S-1/1-3	1-3	11/29/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-5/S-2/18-20	18-20	11/30/07		Plus TOC
	SB-5/S-3/23-25	23-25	11/30/07		Plus TOC
		28-30	No Recovery		Plus TOC
SB-6	SB-6/S-1/1-3	1-3	11/27/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-6/S-2/18-20	18-20	11/28/07		Plus TOC
	SB-6/S-3/23-25	23-25	11/28/07		Plus TOC
	SB-6/S-4/28-30	28-30	11/28/07		Plus TOC
SB-7	SB-7/S-1/1-3	1-3	12/03/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-7/S-2/5-7	5-7	12/03/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-7/S-3/10-12	10-12	12/3/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-7/S-4/15-17	15-17	12/3/2007		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
SB-8	SB-8/S-1/1-3	1-3	11/26/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-8/S-2/5-7	5-7	11/26/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-8/S-3/10-12	10-12	11/26/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-8/S-4/15-17	15-17	11/27/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
SB-9	SB-9/S-1/1-3	1-3	11/28/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-9/S-2/5-7	5-7	11/28/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-9/S-3/10-12	10-12	11/28/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	SB-9/S-4/15-17	15-17	11/28/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
MW-32	MW-32/S-1/1-3	1-3	11/27/07	48	TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	MW-32/S-2/20-22	20-22	11/27/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
MW-33	MW-33/S-1/1-3	1-3	11/26/07	45	TCL VOC, SVOC TAL Metals, Pesticides, PCbs
	MW-33/S-2/5-7	5-7	11/26/07		TCL VOC, SVOC TAL Metals, Pesticides, PCbs
		20-22	NC		TCL VOC, SVOC TAL Metals, Pesticides, PCbs

TABLE IB _ ADDITIONAL SAMPLE SUMMARY TABLE

River Park Center

City of Yonkers, Westchester County, New York

SESI Consulting Engineers Project No. 7190

Boring Number	Sample ID	Depth (ft below grade)	Date Collected	Depth to bedrock (ft)	Analytical Parameters
MW-34	MW-34/ S-1/ 1-3	1-3	11/18/07	45	TCL VOC, SVOC TAL Metals, Pesticides, PCBs
	MW-34/ S-2/ 5-7	5-7	11/18/07		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
		20-22	NC		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
MW-35	MW-35/ S-1/ 1-3	1-3	11/26/07	40	TCL VOC, SVOC TAL Metals, Pesticides, PCBs
	MW-35/ S-2/ 5-7	5-7	11/26/07		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
		40-42	NC		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
MW-36	MW-36/ S-1/ 0-2	0-2	11/29/2007	35	TCL VOC, SVOC TAL Metals, Pesticides, PCBs
		35-37	NC		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
MW-37	MW-37/ S-1/ 1-3	1-3	11/26/07	49	TCL VOC, SVOC TAL Metals, Pesticides, PCBs
	MW-37/S-2/20-22	20-22	12/4/07		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
	MW-37/S-3/47-49	47-49	12/04/07		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
MW-38	MW-38/S-1/1-3	1-3	11/27/07	38	TCL VOC, SVOC TAL Metals, Pesticides, PCBs
	MW-38/S-2/4-6	4-6	11/27/07		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
	MW-38/S-3/8-10	8-10	11/27/07		TCL VOC, SVOC TAL Metals, Pesticides, PCBs
	MW-38/S-4/30-32	30-32	11/28/07		TCL VOC, SVOC TAL Metals, Pesticides, PCBs

Notes:

NC - Sample Not Collected (Drilling Refusal)

TABLE IA - INITIAL SAMPLE SUMMARY TABLE

River Park Center

City of Yonkers, Westchester County, New York

SESI Consulting Engineers Project No. 7190

Well No.	Date Installed	Depth (ft below grade)	Screened Interval (ft below grade)	Development Date	Soil Samples Collected	Groundwater or Vapor Sample Date
Groundwater Monitoring Wells						
MW-1	08/17/07	20	20-5	8/31/2007	None Collected	9/18/2007
MW-2	08/17/07	20	20-5	8/21/2007	#2-1, 10'-12'; #2-2, 12'-14'	9/15/2007
MW-3	08/20/07	18	18-6	8/28/2007	#3-1, 6'-8'	9/17/2007
MW-4	08/27/07	17.5	17.5-2.5	8/28/2007	#4-1, 8'-10'	9/17/2007
MW-5	08/27/07	29	29-14	8/28/2007	#5-1, 8'-10'	9/17/2007
MW-6	08/13/07	25.5	25.5-5.5	8/31/2007	None Collected	9/18/2007
MW-7	Removed, could not access this location					
MW-8	08/13/07	25	25-5	8/31/2007	#8-1, 12'-14'; #8-2, 14'-16'	9/18/2007
MW-9	08/29/07	10	10-1	8/29/2007	#9-1, 0'-5'; #9-2, 5'-10'	9/14/2007
MW-10	08/29/07	10	10-1	8/29/2007	#10-1, 0'-1'; #10-2, 1'-2'	9/14/2007
MW-11	08/29/07	10	10-1	8/29/2007	#11-1, 0'-5'; #11-2, 5'-11'	9/14/2007
MW-12	08/28/07	20	20-5	8/31/2007	None Collected	9/18/2007
MW-13	Removed, unsafe access due to proximity of roadway					
MW-14	09/05/07	28	28-13	9/7/2007	#14-1, 16'-18'; #14-2, 18'-20'	9/18/2007
MW-15	09/04/07	40	40-25	9/7/2007	#15-1, 18'-20'	9/15/2007
MW-16	08/15/07	15	15-5	8/21/2007	#16-8-10, 8'-10'; #16-10-12, 10'-12'	9/17/2007
MW-17	08/29/07	8	8-1	8/29/2007	#17-1, 0'-5'; #17-2, 5'-8'	9/15/2007
MW-18	08/15/07	15	15-5	8/21/2007	#18-1, 8'-10'	9/18/2007
MW-19	08/15/07	14	14-4	8/21/2007	#19-1, 8'-10'; #19-2, 10'-12'	9/18/2007
MW-20	08/14/07	15	15-5	8/17/2007	#20-1, 12'-15'	9/15/2007
MW-21	08/14/07	15	15-5	8/17/2007	None Collected	9/15/2007
MW-22	08/16/07	19	14.5-4.5	8/23/2007	#22-1, 10'-12'	9/15/2007
MW-23	08/14/07	20	15-5	8/23/2007	#23-1, 10'-12'	9/15/2007
MW-24	08/16/07	20	20-5	8/17/2007	#24-1, 10'-12'	9/15/2007
MW-25	08/14/07	15	15-5	8/21/2007	None Collected	9/15/2007
MW-26	Removed, poor utility clearance					
MW-27	Removed, poor utility clearance					
MW-28	08/22/07	17		8/31/2007	#28-1, 6'-8'; #28-2, 10'-12'	9/15/2007
MW-29	08/22/07	18		8/27/2007	#29-1, 6'-8'; #29-2, 8'-10'	9/14/2007
MW-30	08/17/07	16	16-4	8/31/2007	#30-1, 6'-8'; #30-2, 8'-10'	9/14/2007
MW-31	Removed, poor utility clearance					
Soil Vapor Wells						
SV-1	08/20/07	16	6-4		#sv-1-1, 6'-8'; #sv-1-2, 8'-10'	9/20/2007
SV-2	08/20/07	19	7-5		#sv-2-1, 10'-12'; #sv-2-2, 12'-14'	9/20/2007
SV-3	08/27/07	13	10-8		#sv-3-1, 10'-12'	9/20/2007
SV-4	Groundwater within two feet of ground surface, no vapor well installed.					
SV-5	Removed, poor utility clearance					
SV-6	Removed, poor utility clearance					
SV-7	Removed, poor utility clearance					
SV-8	08/16/07	6	6-4		None Collected	9/20/2007
SV-9	09/05/07	13.5	13-11		#sv-9-1, 8'-10'; #sv-9-2, 10'-12'	9/20/2007

Notes:

All MW's are 2" diameter.

All SV's are 4" diameter.

TABLE IA - INITIAL SAMPLE SUMMARY TABLE
River Park Center
City of Yonkers, Westchester County, New York
SESI Consulting Engineers Project No. 7190

Well No.	Date Installed	Sample Center Collected
Sediment/Surface Water Samples		
SED/SW1	08/24/07	Stream sediment and surface water sample
SED/SW2	08/24/07	Stream sediment and surface water sample
SED/SW3	08/24/07	Stream sediment and surface water sample
SW4	08/24/07	Stream surface water sample
SW5	08/24/07	Stream surface water sample
SW6	08/24/07	Stream surface water sample
SED4	08/31/07	Stream sediment sample
SED5	08/31/07	Stream sediment sample
SED6	08/31/07	Stream sediment sample
SED/SW7		No access to this area, no sampling conducted

TABLE X - PRELIMINARY REMEDIATION COST ESTIMATE
RIVER PARK CENTER
CITY OF YONKERS, NY
November 12, 2007
SES Consulting Engineers Project No. 7190

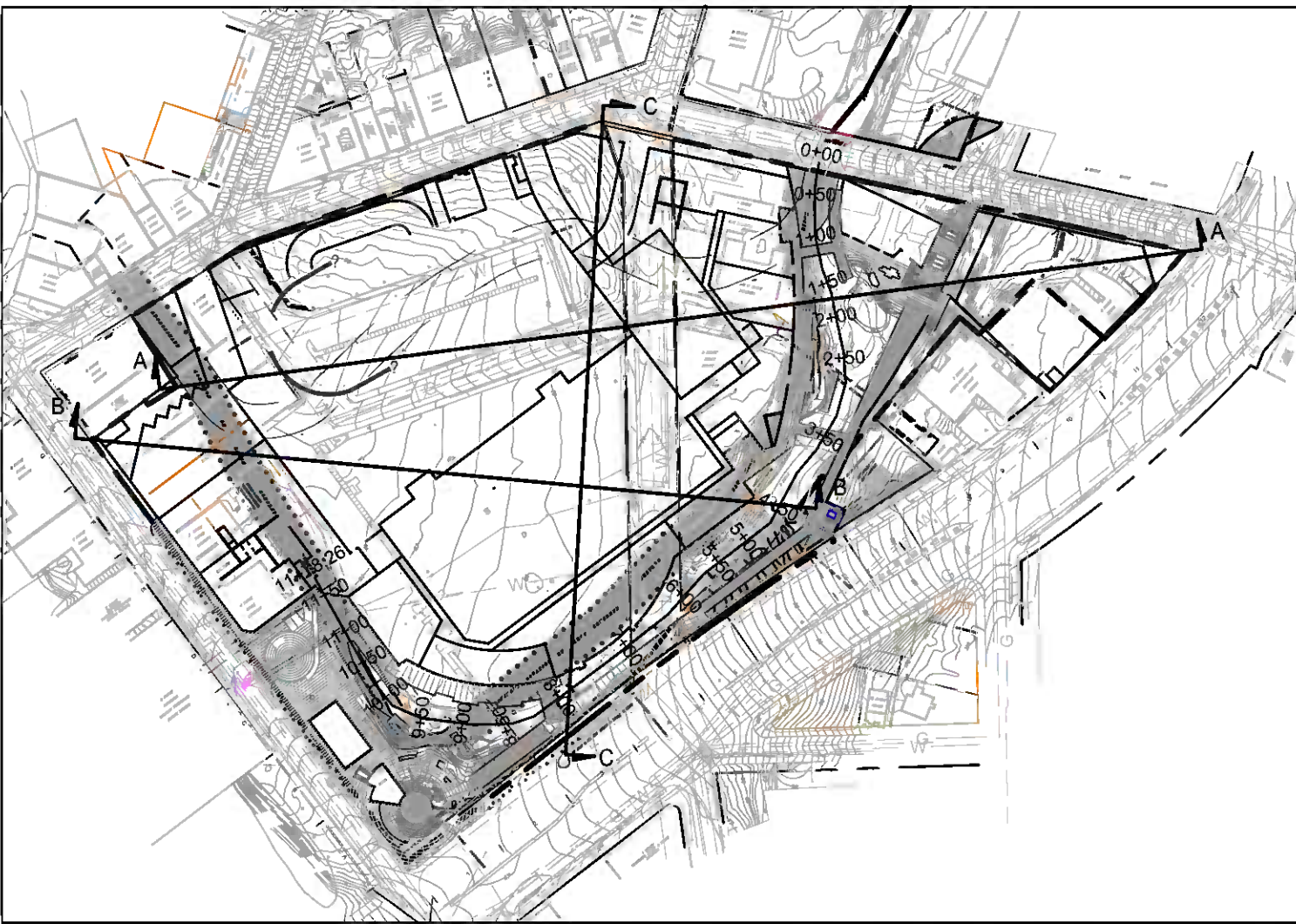
NO.	TASK	QUANTITY	UNITS	UNIT PRICE (⁽¹⁾)	EXTENDED COST (⁽²⁾)	SUBTOTAL (⁽³⁾)
1.1	Bidding and Contract Preparation	1	LS	\$75,000.00	\$75,000	
1.2	General Conditions	1	Mo.	\$75,000.00	\$75,000	
1.3	Mobilization	1	LS	\$50,000.00	\$50,000	\$200,000
2	Cleaning & Site Preparation	13	AC	\$3,500.00	\$45,500	\$45,500
3	Soil Erosion & Sediment Control					
3.1	Silt Fence	10,000	LF	\$4.00	\$40,000	
3.2	Dust Control	1	LS	\$50,000.00	\$50,000	
3.3	Road Cleaning	150	Days	\$360.00	\$54,000	
3.4	Maintenance of Silt Fence	1	LS	\$15,000.00	\$15,000	
3.5	Truck Wash for Tires	1	LS	\$20,000.00	\$20,000	\$179,000
4	Seal and Abandon Wells	40	Ea	\$1,400.00	\$56,000	\$56,000
5	UST Removals					
5.1	Capacity of 500 gallons or less	20	Ea	\$4,750.00	\$95,000	
5.2	Capacity of between 500 and 5,000 gallons	10	Ea	\$9,500.00	\$95,000	
5.3	Capacity of between 5,000 and 10,000 gallons	5	Ea	\$17,000.00	\$85,000	\$275,000
6	Soil Excavation and Off-Site Disposal					
6.1	Drill Cuttings Disposal - Drums	50	Ea	140.00	\$7,000	
6.2	Petroleum Impacted Soil (appx. 150' x 100' x 10')	5500	CY	51.00	\$280,500	
6.3	Post Excavation Samples (VOCs and SVOCs)	30	Ea	500.00	\$15,000	
6.4	Mercury Contaminated Soil (appx. 1.6 acres of site, 10' deep)	25000	CY	144.00	\$3,625,000	
6.5	Post Excavation Samples (50 samples with variance from DEC for Mercury and SVOCs)	50	Ea	380.00	\$19,000	\$3,845,500
7	Dewatering - Sampling and Coordination of Permitting					
7.1	Samples for VOCs, SVOCs, PCBs and Metals	1	LS	50000.00	\$50,000	\$50,000
8	Capping Cost (Relocated Saw Mill River Vicinity Only - appx. 1000'x30'x2')					
8.1	2 feet of capping material	2250	CY	\$40	\$90,000	\$90,000
9	Final Engineering Report	1	LS	75000.00	\$75,000	\$75,000
10	Groundwater Remediation (Natural Attenuation)					
10.1	Monitoring Wells	10	Ea	\$4,000.00	\$40,000	
10.2	Compliance Sampling (semi-annually for 5 years)	10	Ea	\$8,000.00	\$80,000	
10.3	Reporting	10	Ea	\$3,000.00	\$30,000	\$150,000
11	Compliance Air Sampling					
11.1	Summa Canisters (3 events x 25 samples per event)	75	Ea	\$500.00	\$37,500	\$37,500
12	Vapor Intrusion Mitigation System (6 Acres - 282,360 ft ³)					
12.1	Gravel Bed (1' x 6 Acres) appx.	10000	CY	\$28.00	\$280,000	
12.2	AOS Slotted Piping (20' spacing) appx.	12000	LF	\$20.00	\$240,000	
12.3	Blower	4	Ea	\$20,000.00	\$80,000	
12.4	Treatment System (appx. Cost)	1	LS	\$50,000.00	\$50,000	
12.5	Operation Monitoring and Maintenance (10 samples per year + equipment maintenance)	30	Yr	\$25,000.00	\$750,000	\$1,400,000
13	Project Management & Regulatory Liaison (~15% of overall costs)					\$960,675
14	Contingency (~35% of overall costs)					\$2,577,811
	Total					\$9,942,986

TABLE X - PRELIMINARY REMEDIATION COST ESTIMATE
 RIVER PARK CENTER
 CITY OF YONKERS, NY
 November 12, 2007
 SESI Consulting Engineers Project No. 7190

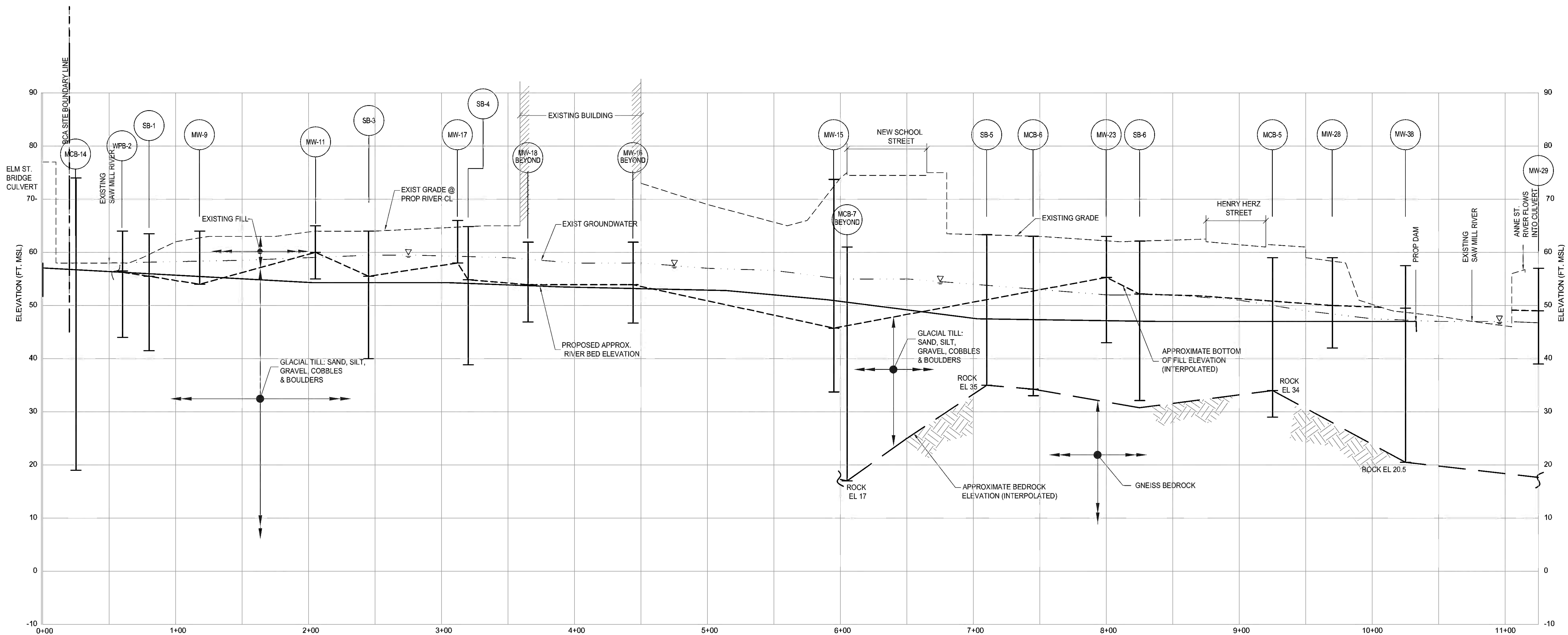
Legend:

AC	Acre
CY	Cubic Yard
Ea	Each
ECHOS	Environmental Cost Handling Options and Solutions
LF	Linear Foot
LS	Lump Sum
Mo.	Month
PCI	Partial Construction, Inc.
SF	Square Foot
Yr	Year

Notes:
 Cost estimate is based on numerous assumptions.
 Contingency Costs include a Bid Contingency of 15% and a Scope Contingency of 20% in accordance with the USEPA's A Guide to Developing and Documenting Cost Estimates During the Feasibility Study, dated January 2000 (EPA 640-R-00-002)



KEY MAP
SCALE: 1" = 200'



PROFILE OF PROPOSED SAW MILL RIVER RELOCATION

SCALE: VERT.: 1"=10';
HOR.: 1"=40'

REFERENCE:

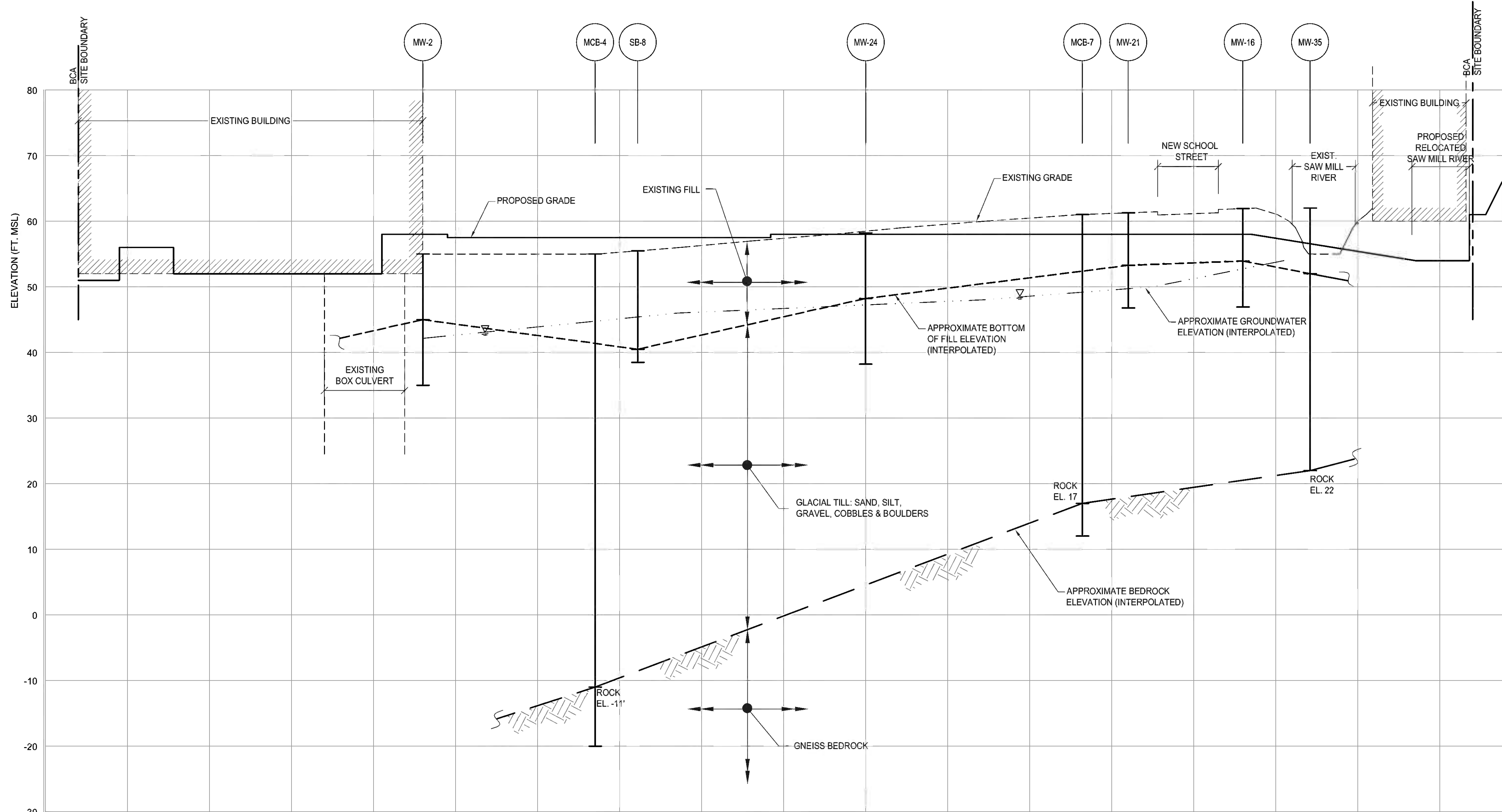
MW - ALL SESI MONITORING WELL & SOIL VAPOR SAMPLE LOCATIONS WERE SURVEYED IN THE FIELD BY CONTRACTORS LINE & GRADE AND BY CONTROL POINT ASSOCIATES, INC.
MCTP - MCLAREN ENGINEERING GROUP BORING & TEST PIT LOCATIONS TAKEN FROM 'PRELIMINARY GEOTECHNICAL REPORT' BY MCLAREN ENGINEERING GROUP, DATED JANUARY 30, 2007.
WPB - WARREN & PANZER ENGINEERS BORING LOCATIONS TAKEN FROM 'PRELIMINARY GEOTECHNICAL REPORT' BY WARREN & PANZER ENGINEERS, P.C. DATED DECEMBER 3, 2004, AND ARE SHOWN AS APPROXIMATE ONLY.
SB - SOIL BORING LOCATIONS WERE OBTAINED BY TAPING FROM FIXED OBJECTS IN THE FIELD. NO SURVEY WAS PERFORMED FOR SOIL BORING LOCATIONS.

GROUNDWATER ELEVATIONS TAKEN FROM SHEET RI-2 FROM THE REMEDIAL INVESTIGATION REPORT PREPARED BY SESI CONSULTING ENGINEERS NOVEMBER 2007.

NOTES:

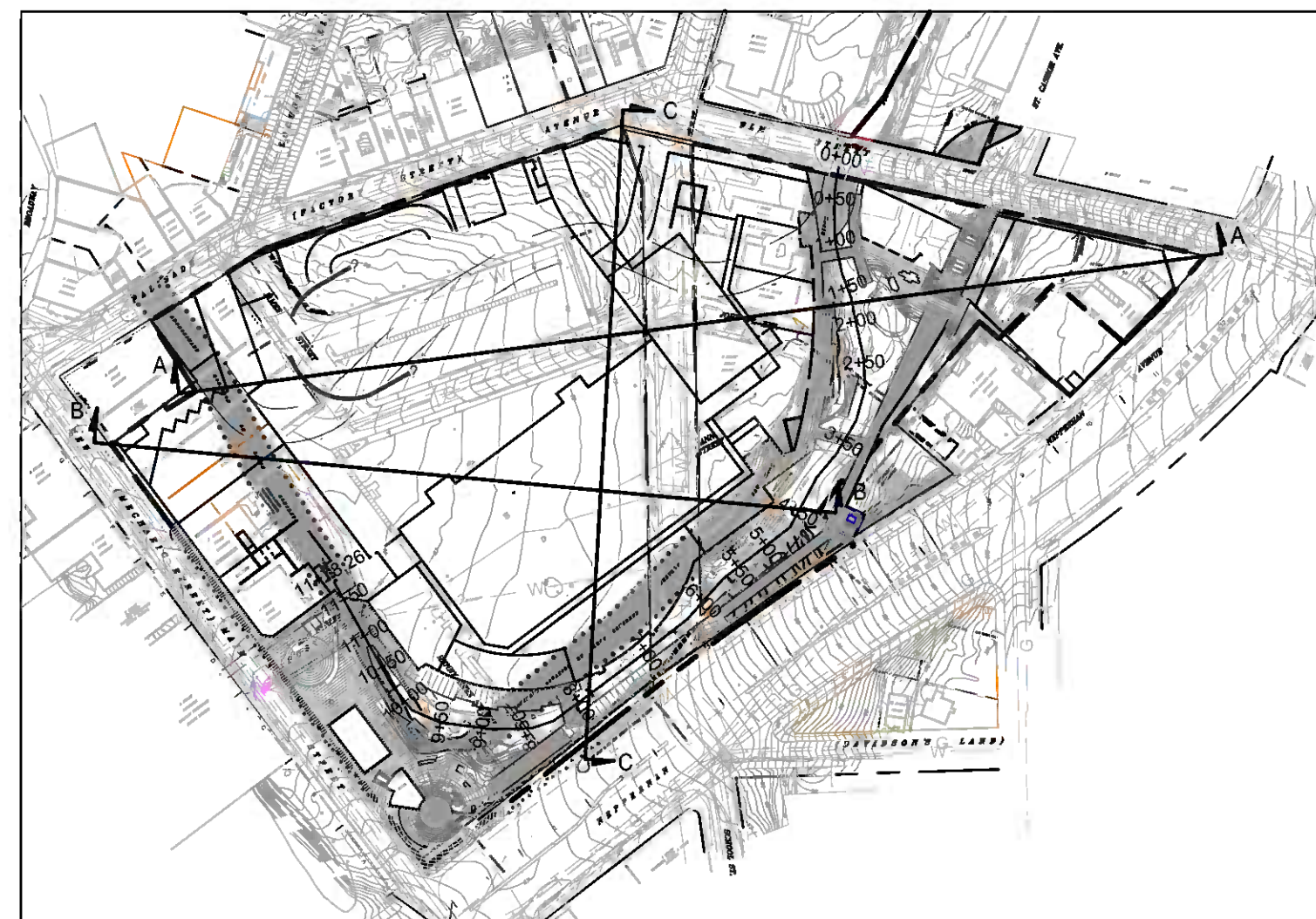
ALL MONITORING WELL, BORING & TEST PIT LOCATIONS & DATA SHOWN ARE APPROXIMATE & MAY BE OFFSET FROM ACTUAL SECTION LOCATION. SEE RA-5 FOR LOCATION IN RELATION TO SECTION.

1	12-14-07	REVISE SECTIONS			YY
NO.	DATE	REVISION			BY
REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK					
PROPOSED STREAM RELOCATION CENTERLINE PROFILE					
 12A MAPLE AVE., PINE BROOK, N.J. 07068 PH: 973-808-9050		DESIGNED BY	RH	DATE PREPARED	11-9-07
		DRAWN BY	YY	SCALE	1" = 40'
		CHECKED BY	RH	PROJECT NO.	7190
				SHEET NUMBER	RA-6C
				SHEET	8 OF 9



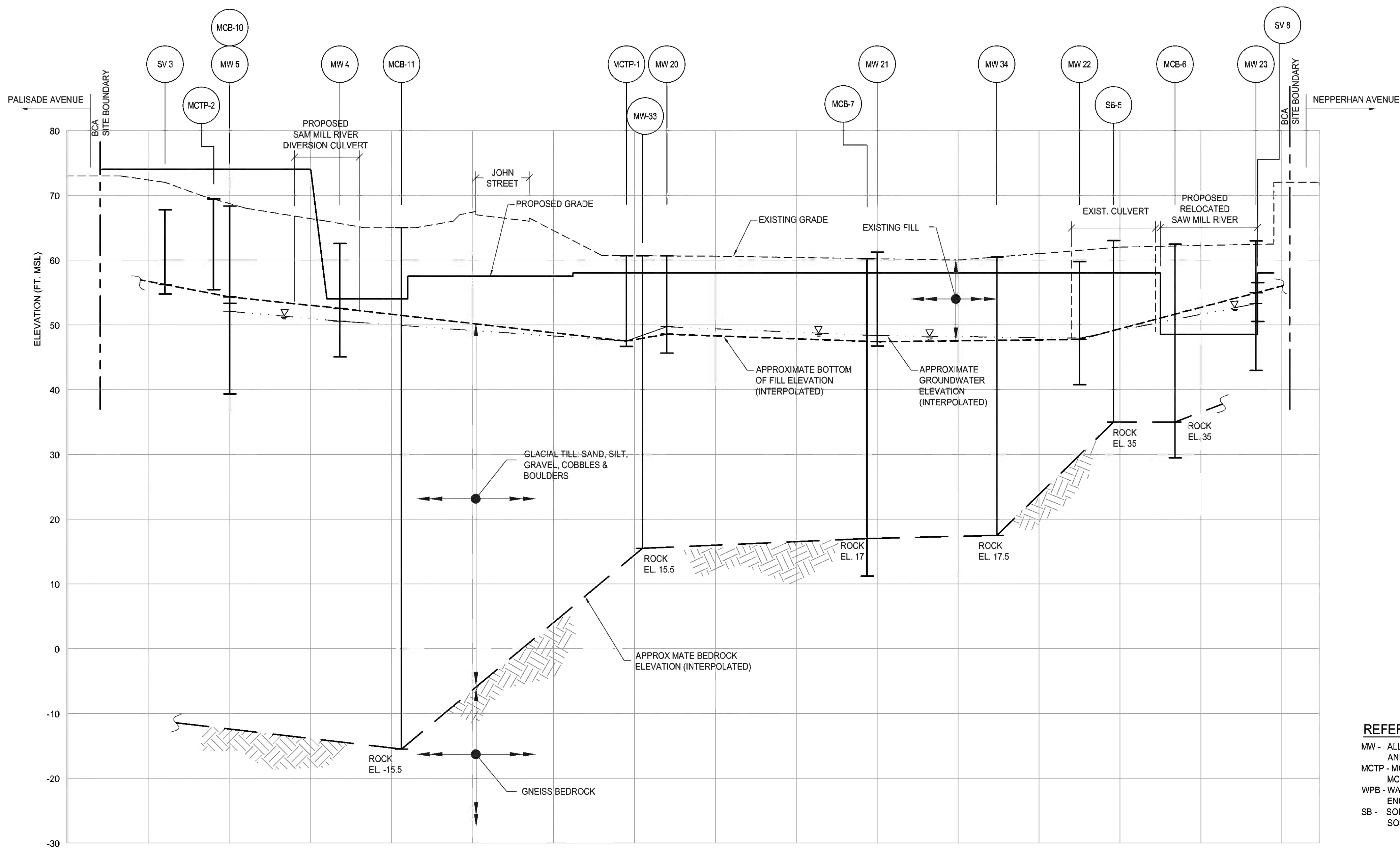
SECTION B-B

SCALE: VERT.: 1"=10'
HOR.: 1"=40'



KEY MAP

SCALE: 1" = 200'




SECTION C-C

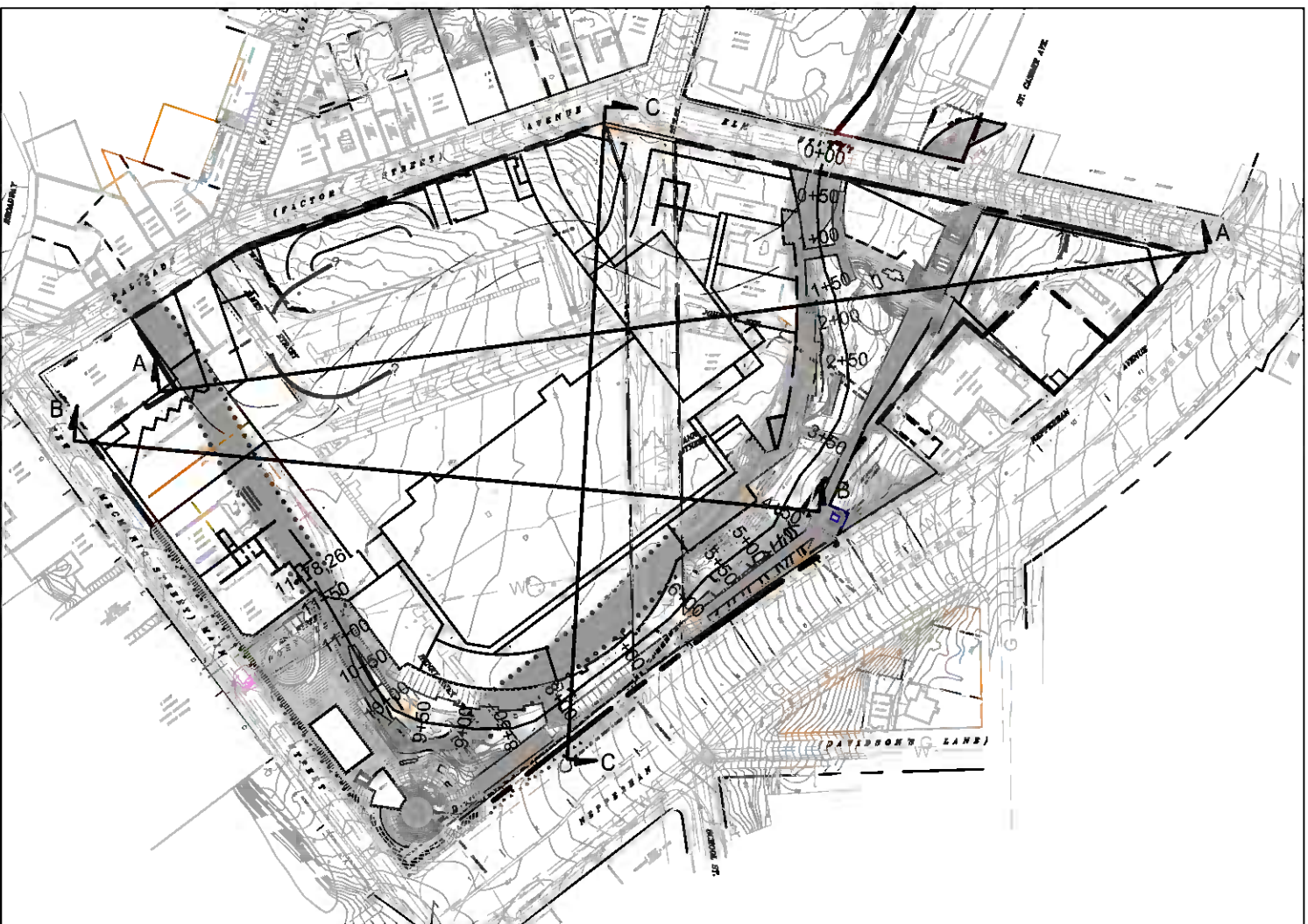
SCALE: VERT.: 1"=10'
HOR.: 1"=40'

NOTES:
ALL MONITORING WELL, BORING & TEST PIT LOCATIONS & DATA SHOWN ARE APPROXIMATE & MAY BE OFFSET FROM ACTUAL SECTION LOCATION. SEE RA-5 FOR LOCATION IN RELATION TO SECTION.

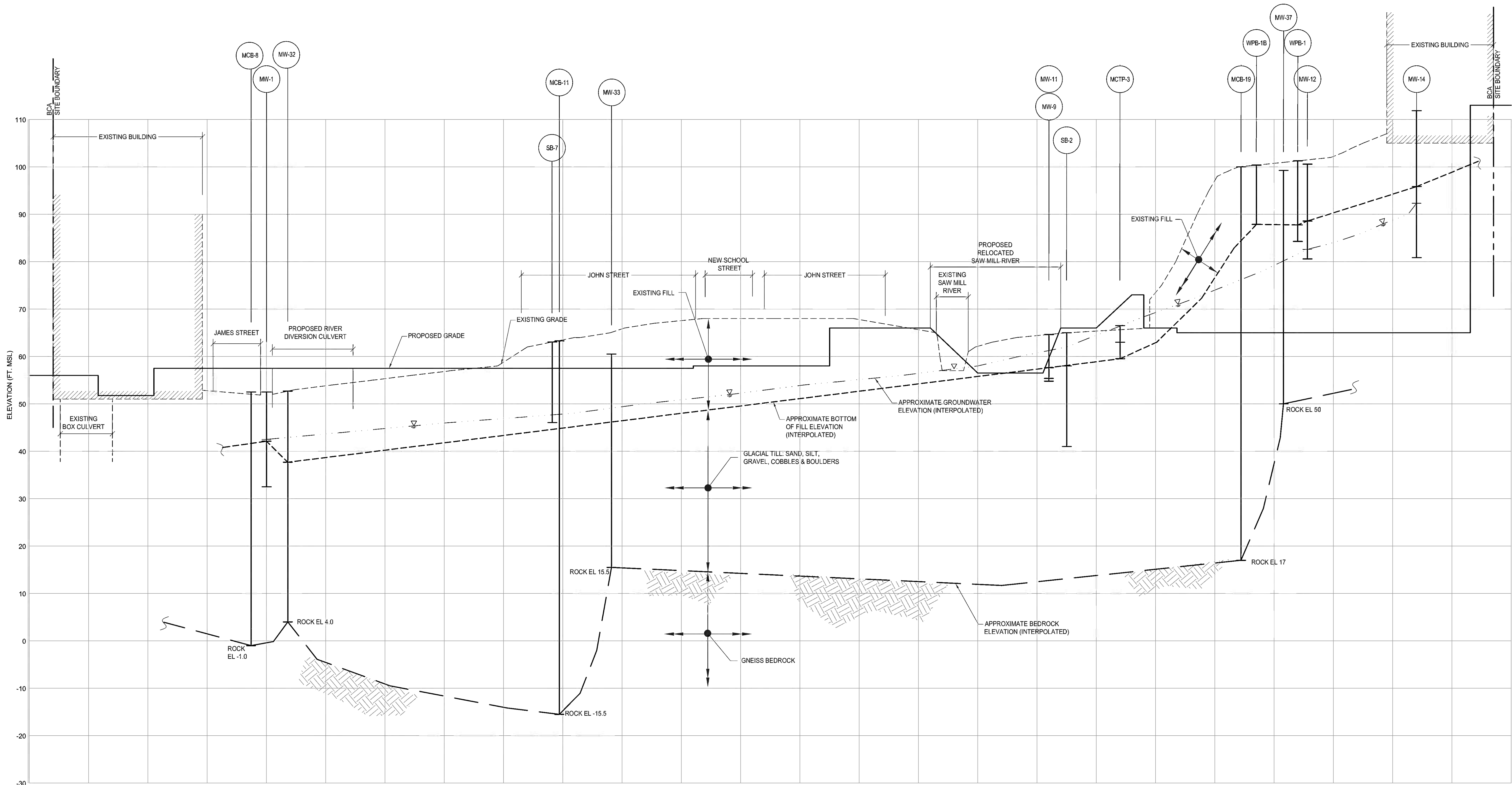
REFERENCE:

MW - ALL SESI MONITORING WELL & SOIL VAPOR SAMPLE LOCATIONS WERE SURVEYED IN THE FIELD BY CONTRACTORS LINE & GRADE AND BY CONTROL POINT ASSOCIATES, INC.
MCTP - MCLAREN ENGINEERING GROUP BORING & TEST PIT LOCATIONS TAKEN FROM "PRELIMINARY GEOTECHNICAL REPORT" BY MCLAREN ENGINEERING GROUP, DATED JANUARY 30, 2007.
WPB - WARREN & PANZER ENGINEERS BORING LOCATIONS TAKEN FROM "PRELIMINARY GEOTECHNICAL REPORT" BY WARREN & PANZER ENGINEERS, P.C. DATED DECEMBER 3, 2004, AND ARE SHOWN AS APPROXIMATE ONLY.
SB - SOIL BORING LOCATIONS WERE OBTAINED BY TAPING FROM FIXED OBJECTS IN THE FIELD. NO SURVEY WAS PERFORMED FOR SOIL BORING LOCATIONS.

1	12-14-07	REVISE SECTIONS	YY
NO.	DATE	REVISION	BY
REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK			
CROSS SECTIONS B-B & C-C			
 SESI CONSULTING ENGINEERS, P.C. ENVIRONMENTAL 12A MAPLE AVE. PINE BROOK, N.J. 07068 PH: 973-808-9059	DESIGNED BY	DATE PREPARED	
	RH	11-9-07	
	DRAWN BY	SCALE	
	YY	1" = 40'	
CHECKED BY	RH	PROJECT NO.	7190
		SHEET NUMBER	RA-6B
		SHEET	7 OF 8



KEY MAP
SCALE: 1" = 200'




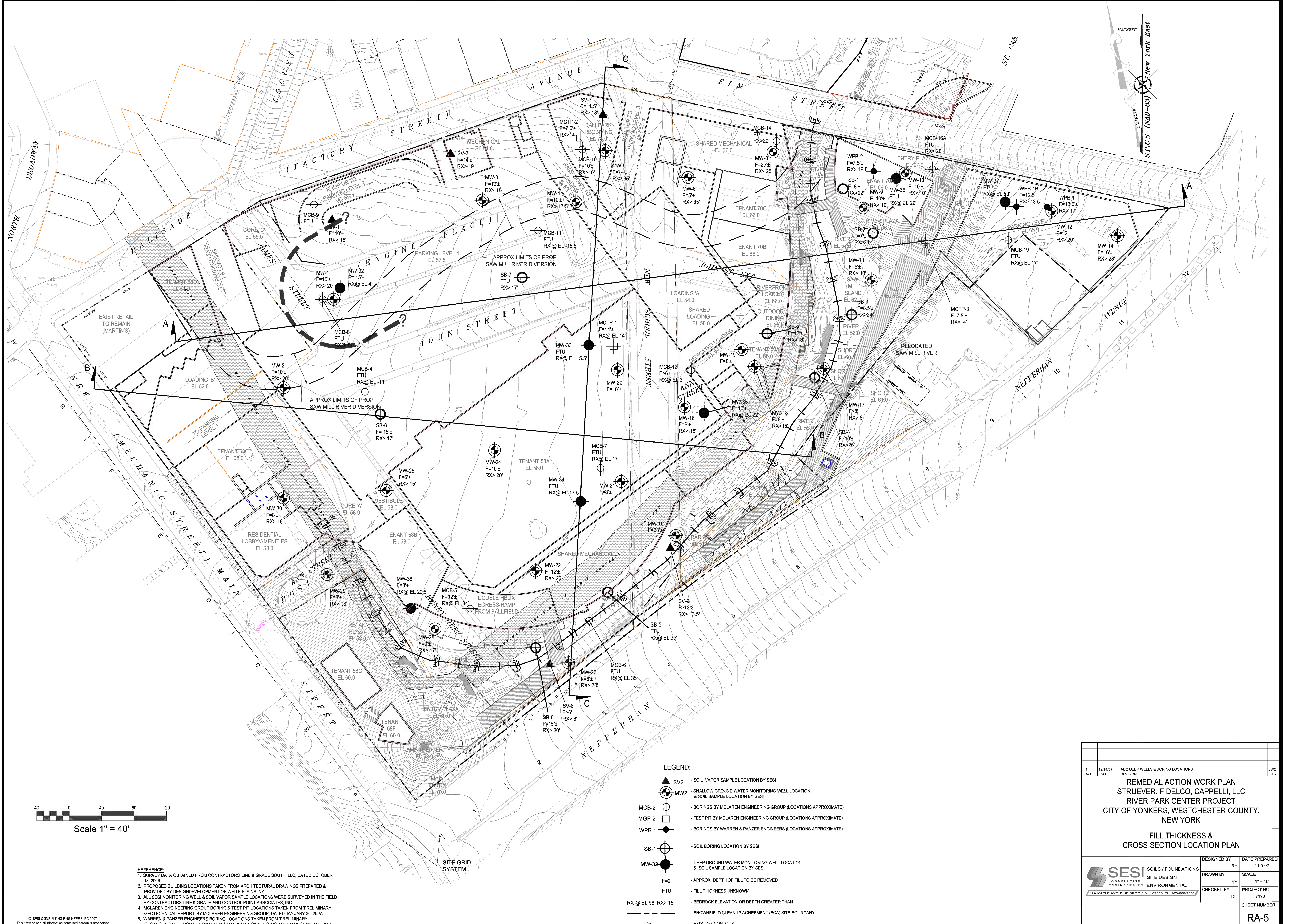
SECTION A-A
SCALE: VERT: 1"=10';
HOR: 1"=40'

NOTES:
ALL MONITORING WELL, BORING & TEST PIT LOCATIONS & DATA SHOWN ARE APPROXIMATE & MAY BE
OFFSET FROM ACTUAL SECTION LOCATION. SEE RA-5 FOR LOCATION IN RELATION TO SECTION.

REFERENCE:

MW - ALL SESI MONITORING WELL & SOIL VAPOR SAMPLE LOCATIONS WERE SURVEYED IN THE FIELD BY CONTRACTORS LINE & GRADE
AND BY CONTROL POINT ASSOCIATES, INC.,
MCTP - MCLAREN ENGINEERING GROUP BORING & TEST PIT LOCATIONS TAKEN FROM 'PRELIMINARY GEOTECHNICAL REPORT' BY
MCLAREN ENGINEERING GROUP, DATED JANUARY 30, 2007.
WPB - WARREN & PANZER ENGINEERS BORING LOCATIONS TAKEN FROM 'PRELIMINARY GEOTECHNICAL REPORT' BY WARREN & PANZER
ENGINEERS, PC, DATED DECEMBER 3, 2004, AND ARE SHOWN AS APPROXIMATE ONLY.
SB - SOIL BORING LOCATIONS WERE OBTAINED BY TAPING FROM FIXED OBJECTS IN THE FIELD. NO SURVEY WAS PERFORMED FOR
SOIL BORING LOCATIONS.

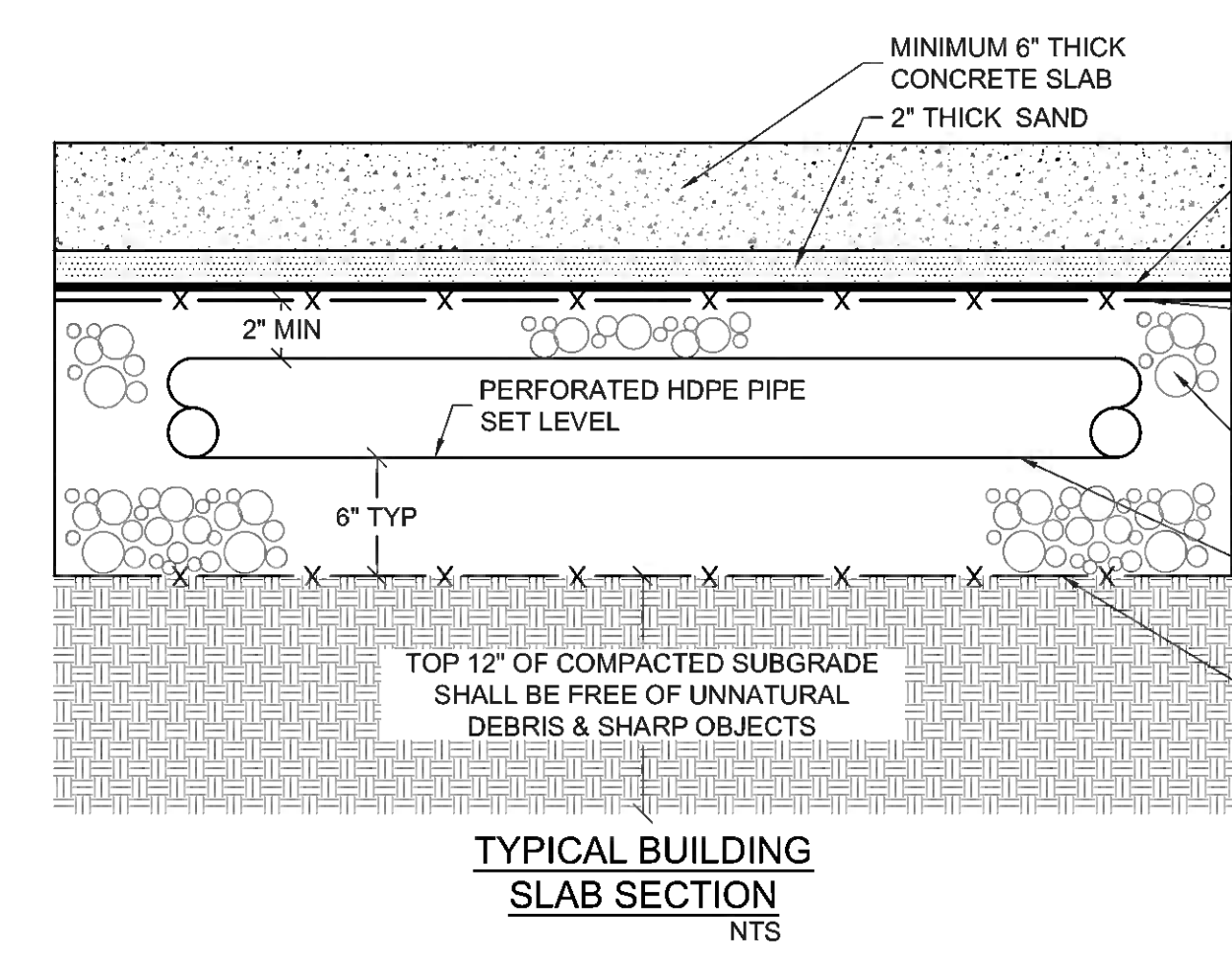
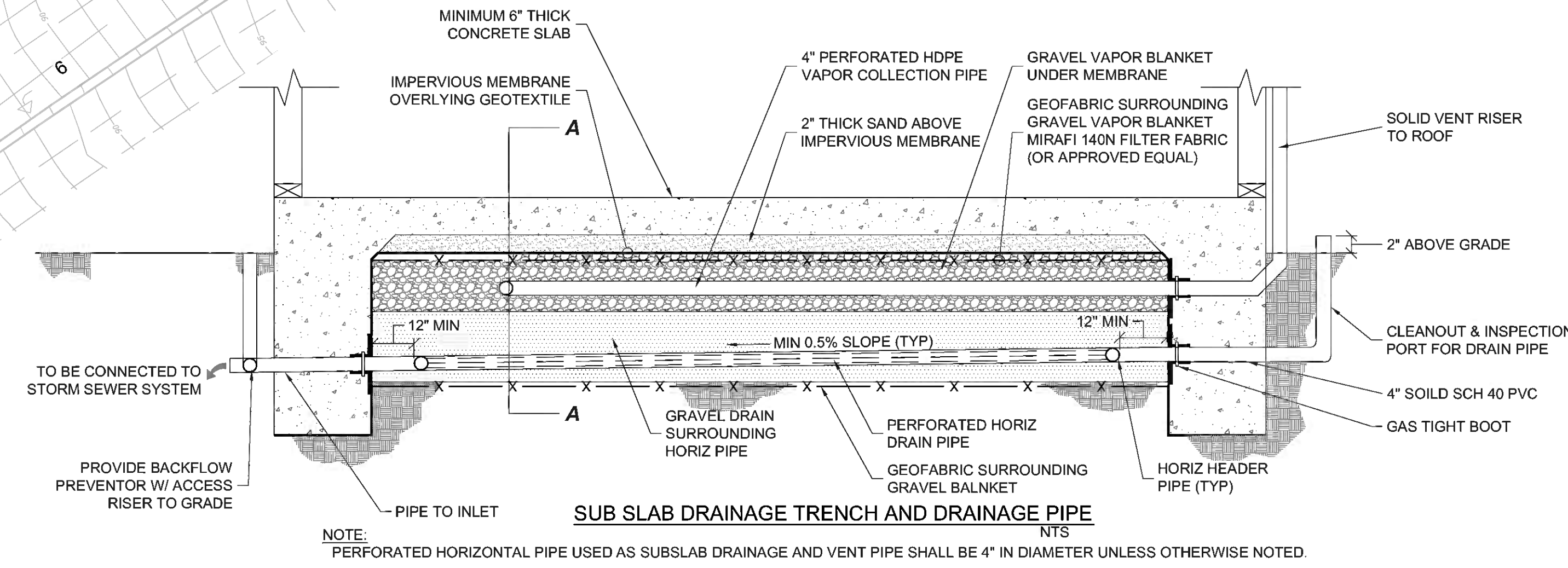
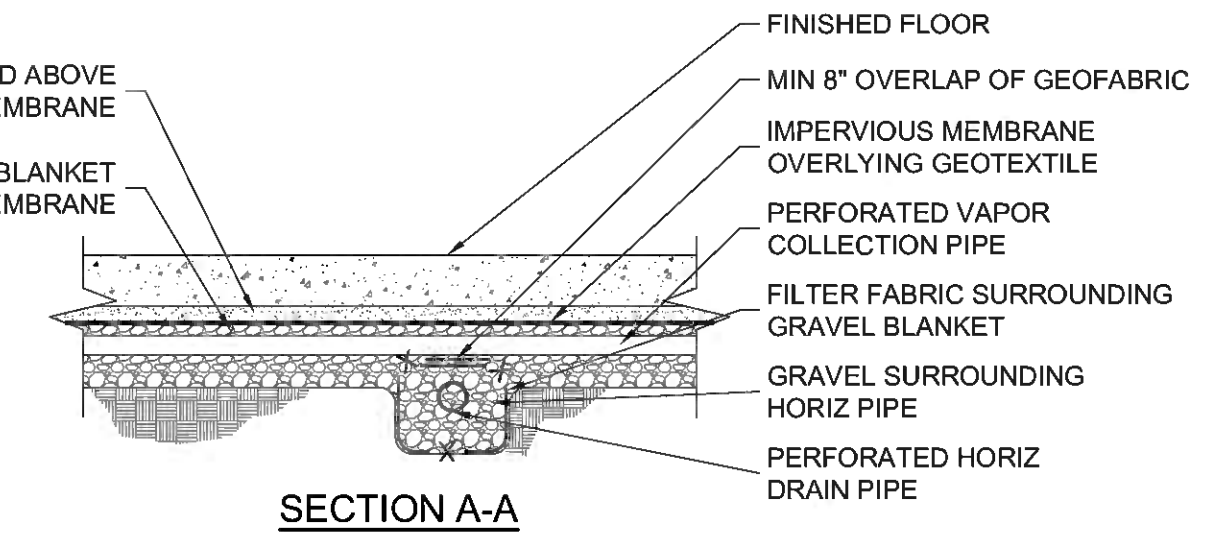
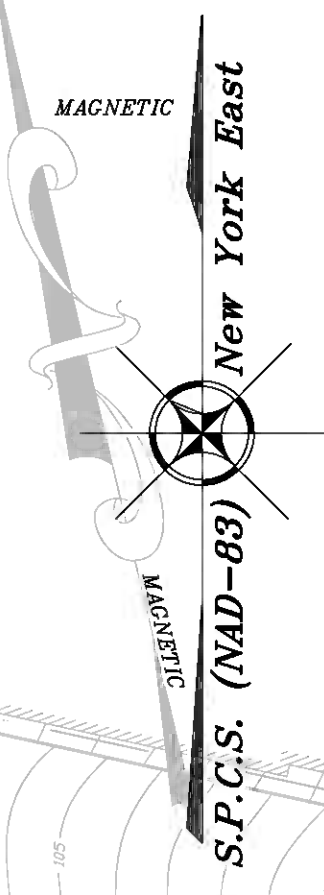
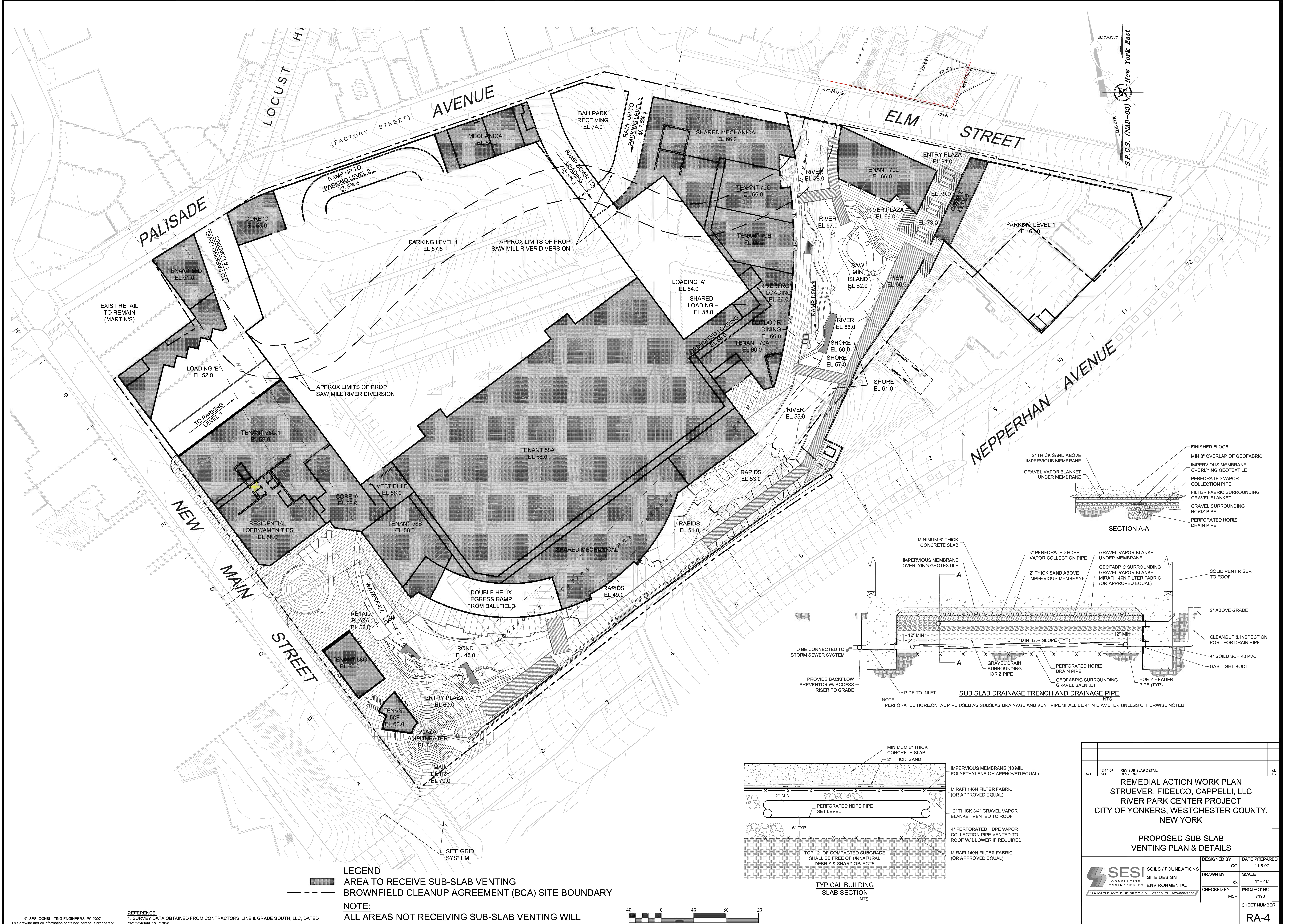
1	12-14-07	REVISE SECTIONS			YY
NO.	DATE	REVISION			BY
REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK					
CROSS SECTION A-A					
 SOILS / FOUNDATIONS ENGINEERS, P.C. ENVIRONMENTAL <div>12A MAPLE AVE. PINE BROOK, N.J. 07058 (714) 973-8208 (9020)</div>		DESIGNED BY	DATE PREPARED		
		RH	11-9-07		
		DRAWN BY	SCALE		
		YY	1" = 40'		
		CHECKED BY	PROJECT NO.		
		RH	7190		
				SHEET NUMBER	
				RA-6A	
				SHEET 6 OF 8	



REFERENCE:
1. SURVEY DATA OBTAINED FROM CONTRACTORS' LINE & GRADE SOUTH, LLC, DATED OCTOBER 13, 2006.
2. PROPOSED BUILDING LOCATIONS TAKEN FROM ARCHITECTURAL DRAWINGS PREPARED & PROVIDED BY DESIGNED/DEVELOPMENT OF WHITE PLAINS, NY.
3. ALL SESI MONITORING WELL & SOIL VAPOR SAMPLE LOCATIONS WERE SURVEYED IN THE FIELD BY CONTRACTORS LINE & GRADE AND CONTROL POINT ASSOCIATES, INC.
4. MCLAREN ENGINEERING GROUP BORING & TEST PIT LOCATIONS TAKEN FROM 'PRELIMINARY GEOTECHNICAL REPORT' BY MCLAREN ENGINEERING GROUP, DATED JANUARY 30, 2007.
5. WARREN & PANZER ENGINEERS BORING LOCATIONS TAKEN FROM 'PRELIMINARY GEOTECHNICAL REPORT' BY WARREN & PANZER ENGINEERS, P.C. DATED DECEMBER 3, 2004, AND ARE SHOWN AS APPROXIMATE ONLY.

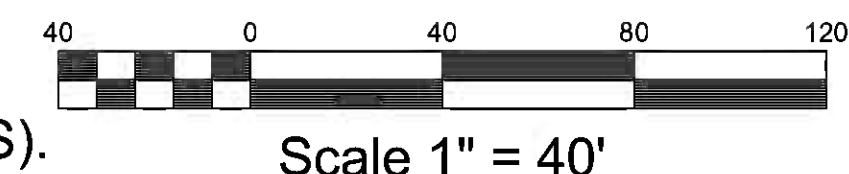
- LEGEND:**
- SV2 - SOIL VAPOR SAMPLE LOCATION BY SESI
 - MW2 - SHALLOW GROUND WATER MONITORING WELL LOCATION & SOIL SAMPLE LOCATION BY SESI
 - MCB-2 - BORINGS BY MCLAREN ENGINEERING GROUP (LOCATIONS APPROXIMATE)
 - MGP-2 - TEST PIT BY MCLAREN ENGINEERING GROUP (LOCATIONS APPROXIMATE)
 - WPB-1 - BORINGS BY WARREN & PANZER ENGINEERS (LOCATIONS APPROXIMATE)
 - SB-1 - SOIL BORING LOCATION BY SESI
 - MW-32 - DEEP GROUND WATER MONITORING WELL LOCATION & SOIL SAMPLE LOCATION BY SESI
 - F=2' - APPROX. DEPTH OF FILL TO BE REMOVED
 - FTU - FILL THICKNESS UNKNOWN
 - RX @ EL. 56; RX > 15' - BEDROCK ELEVATION OR DEPTH GREATER THAN
 - 60 - BROWNFIELD CLEANUP AGREEMENT (BCA) SITE BOUNDARY
 - 60 - EXISTING CONTOUR

12/14/07				ADD DEEP WELLS & BORING LOCATIONS	JWC
NO. DATE REVISION					BY
REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK					
FILL THICKNESS & CROSS SECTION LOCATION PLAN					
		DESIGNED BY RH		DATE PREPARED 11-9-07	
SOILS / FOUNDATIONS SITE DESIGN		DRAWN BY YY		SCALE 1" = 40'	
122 MAPLE AVE., PINE BROOK, N.J. 07658 PH: 973-826-9099		CHECKED BY RH		PROJECT NO. 7190	
				SHEET NUMBER	
				RA-5	
				SHEET 5 OF 8	





LEGEND
[Shaded Area] AREA TO RECEIVE SUB-SLAB VENTING
[Dashed Line] BROWNFIELD CLEANUP AGREEMENT (BCA) SITE BOUNDARY



NOTE:
ALL AREAS NOT RECEIVING SUB-SLAB VENTING WILL EITHER BE OPEN-AIR OR PROPERLY VENTED (GARAGE AREAS).






12-14-07		REV SUB SLAB DETAIL	dk
NO.	DATE	REVISION	BY
REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK			
PROPOSED SUB-SLAB VENTING PLAN & DETAILS			
DESIGNED BY	GQ	DATE PREPARED	11-8-07
DRAWN BY	dk	SCALE	1" = 40'
CHECKED BY	MSP	PROJECT NO.	7190
SSES CONSULTING ENGINEERS, P.C.		SHEET NUMBER	
12A MAPLE AVE., PINE BROOK, N.J. 07068 PH: 973-808-9090		RA-4	
SOILS / FOUNDATIONS SITE DESIGN		SHEET 4 OF 8	
ENVIRONMENTAL			



\\ACAD017\B\STATE\DEV\1960\TEDEV\Ang RA-4 12/18/2007 4:58:24 PM



 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	



 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	



 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	



 SES CONSULTING ENGINEERS P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9090				PROPOSED EXCAVATION PLAN	
SOILS / FOUNDATIONS SITE DESIGN ENVIRONMENTAL		DESIGNED BY GQ	DATE PREPARED 11-9-07		
		DRAWN BY YY	SCALE 1" = 40'		
		CHECKED BY MSP	PROJECT NO. 7190		
		SHEET NUMBER RA-3			
		SHEET 3 OF 9			

 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	

 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	

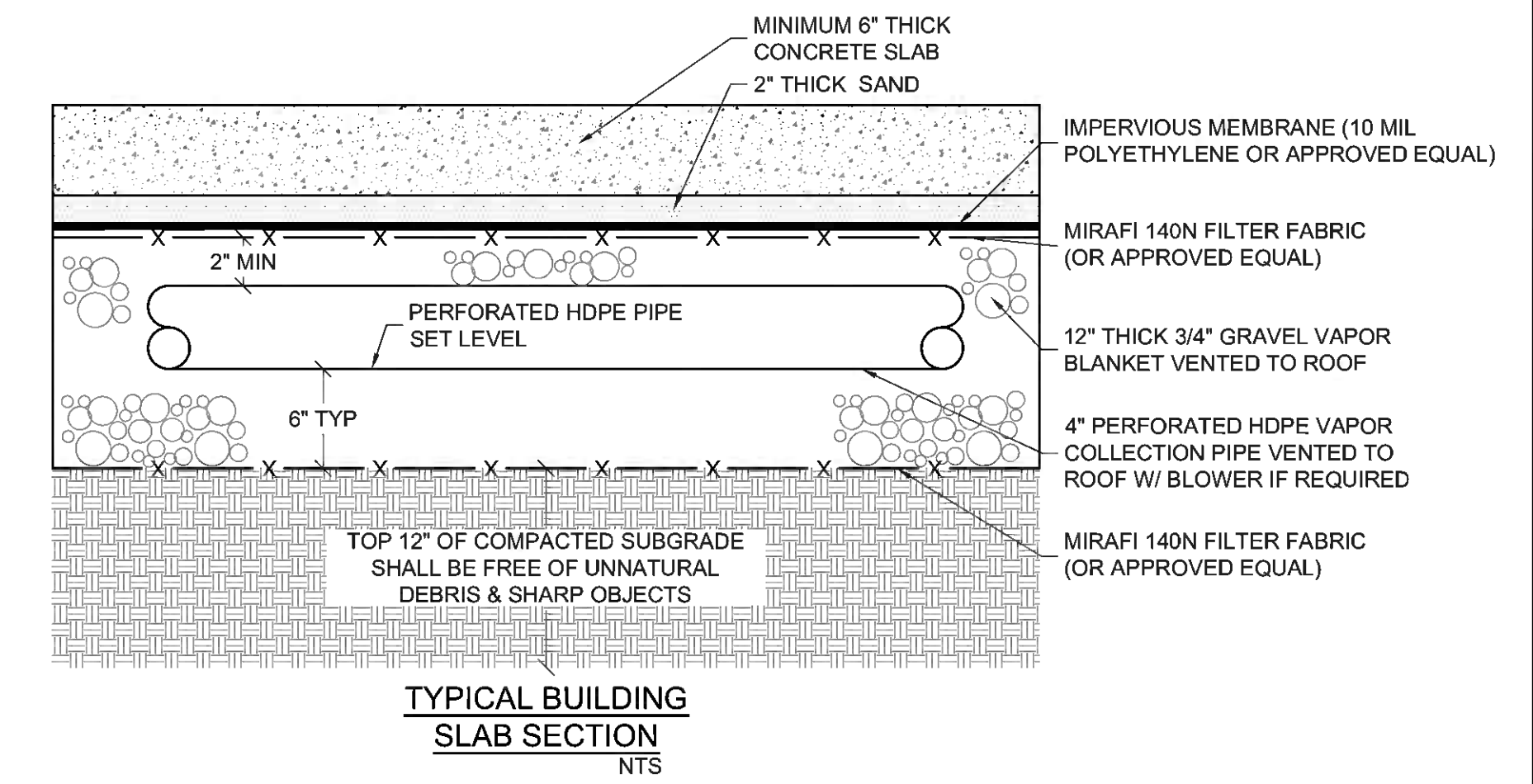
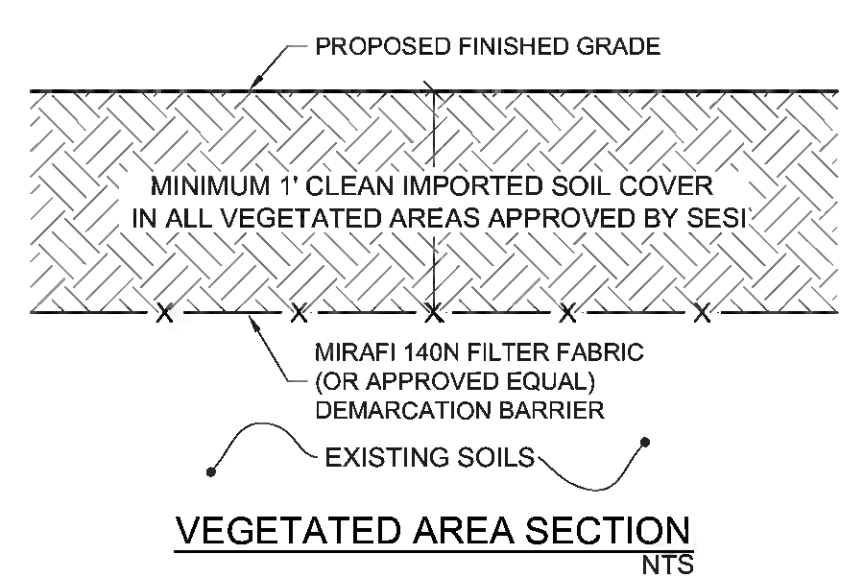
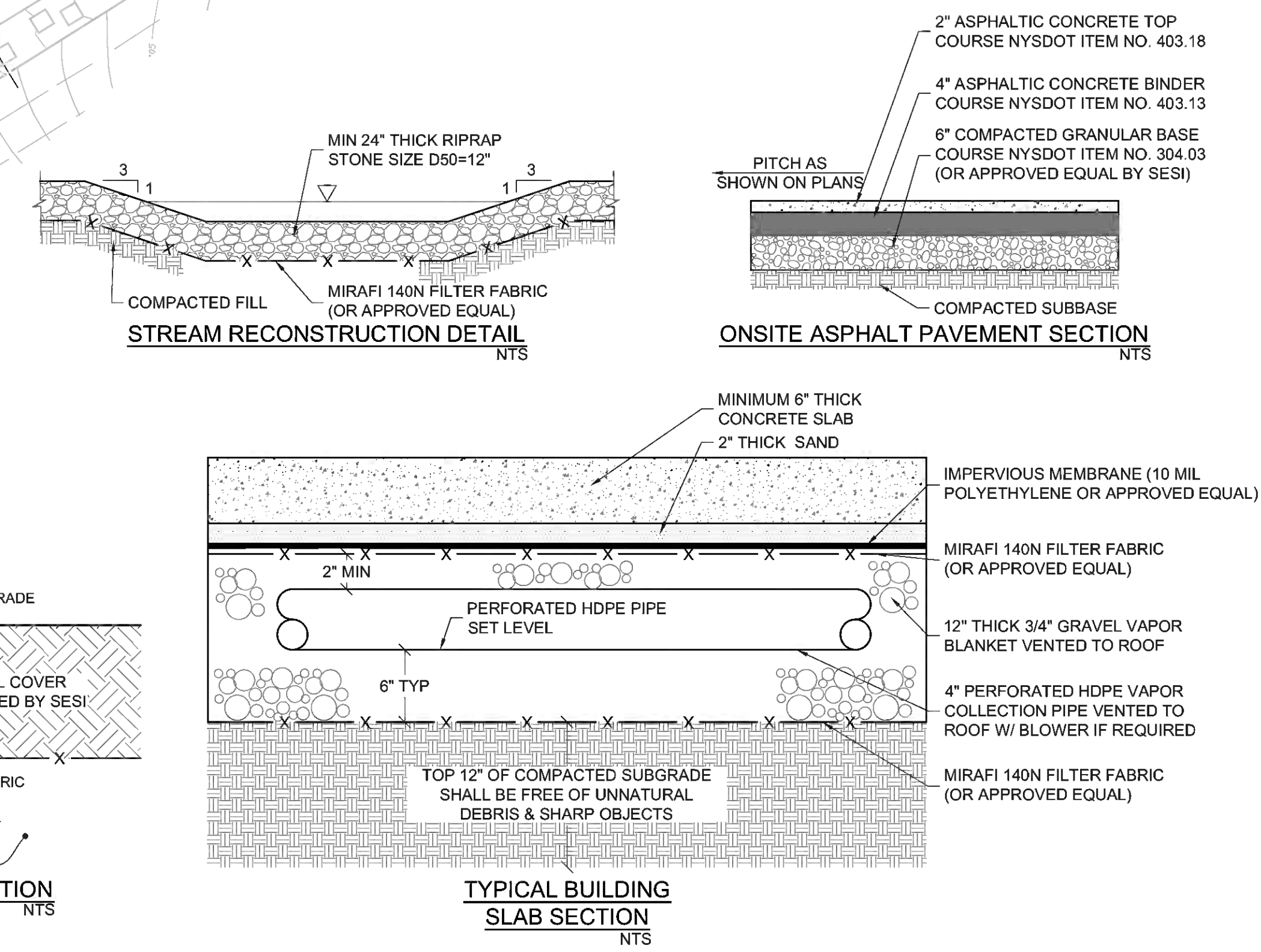
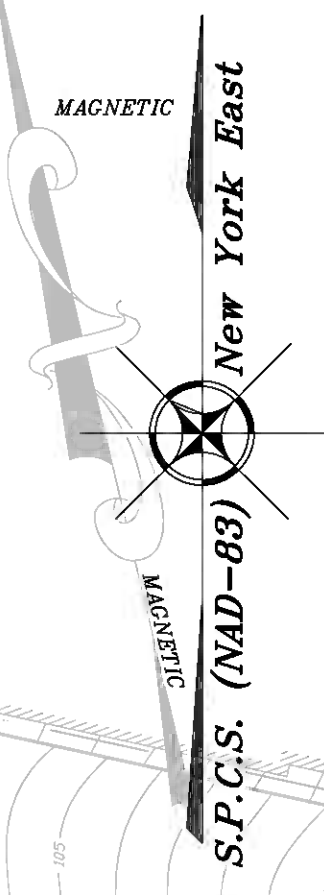
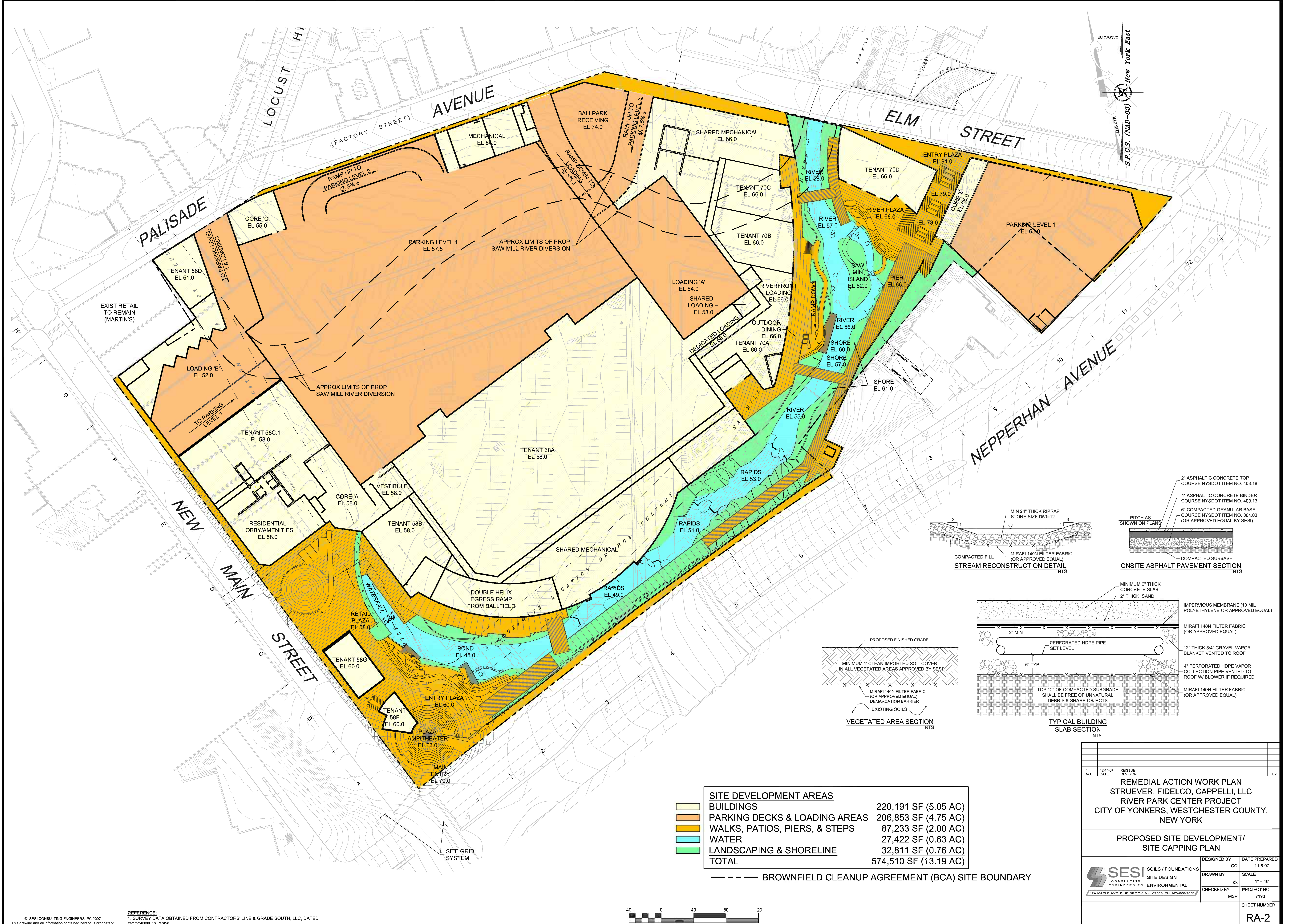
 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	

 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	

 SES CONSULTING ENGINEERS, P.C. 12A MAPLE AVE. HINE BROOK, N.J. 07026 TEL: 973-626-9000		PROPOSED EXCAVATION PLAN	
		DESIGNED BY GQ	DATE PREPARED 11-9-07
		DRAWN BY YY	SCALE 1" = 40'
		CHECKED BY MSP	PROJECT NO. 7190
		SHEET NUMBER RA-3	
		SHEET 3 OF 9	

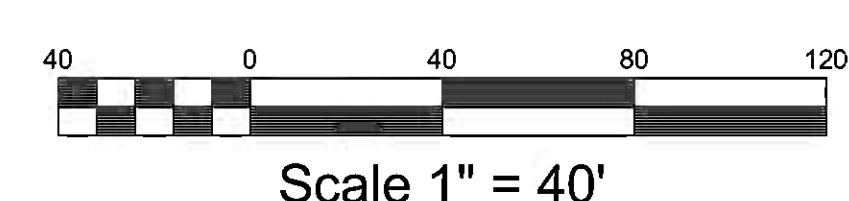
- SED/SW-2 - SEDIMENT & SURFACE WATER SAMPLE LOCATION
- SV-3 - SOIL VAPOR SAMPLE LOCATION
- MW-5 - SHALLOW GROUND WATER MONITORING WELL LOCATION & SOIL SAMPLE LOCATION
- MW-32 - DEEP GROUND WATER MONITORING WELL LOCATION & SOIL SAMPLE LOCATION BY SESI
- SB-1 - SOIL BORING LOCATION BY SESI
- MW-36 - CONTAINS COMPOUND(S) WITH CONCENTRATIONS THAT EXCEED UNRESTRICTED USE CRITERIA
- MW-26 - CONTAINS COMPOUND(S) WITH CONCENTRATIONS THAT EXCEED COMMERCIAL USE CRITERIA
- BCA SITE BOUNDARY
- APPROXIMATE EXTENTS OF CVOC IMPACTED GROUNDWATER
- APPROXIMATE EXTENTS OF PETROLEUM IMPACTED GROUNDWATER
- APPROXIMATE EXTENTS OF PETROLEUM IMPACTED SOIL

SESI SOILS / FOUNDATIONS
CONSULTING ENGINEERS, P.C. SITE DESIGN
ENVIRONMENTAL
124 MAITLAND AVE. PINE BROOK, N.J. 07058, PH: 973-826-9250



SITE DEVELOPMENT AREAS	
BUILDINGS	220,191 SF (5.05 AC)
PARKING DECKS & LOADING AREAS	206,853 SF (4.75 AC)
WALKS, PATIOS, PIERS, & STEPS	87,233 SF (2.00 AC)
WATER	27,422 SF (0.63 AC)
LANDSCAPING & SHORELINE	32,811 SF (0.76 AC)
TOTAL	574,510 SF (13.19 AC)

--- BROWNFIELD CLEANUP AGREEMENT (BCA) SITE BOUNDARY

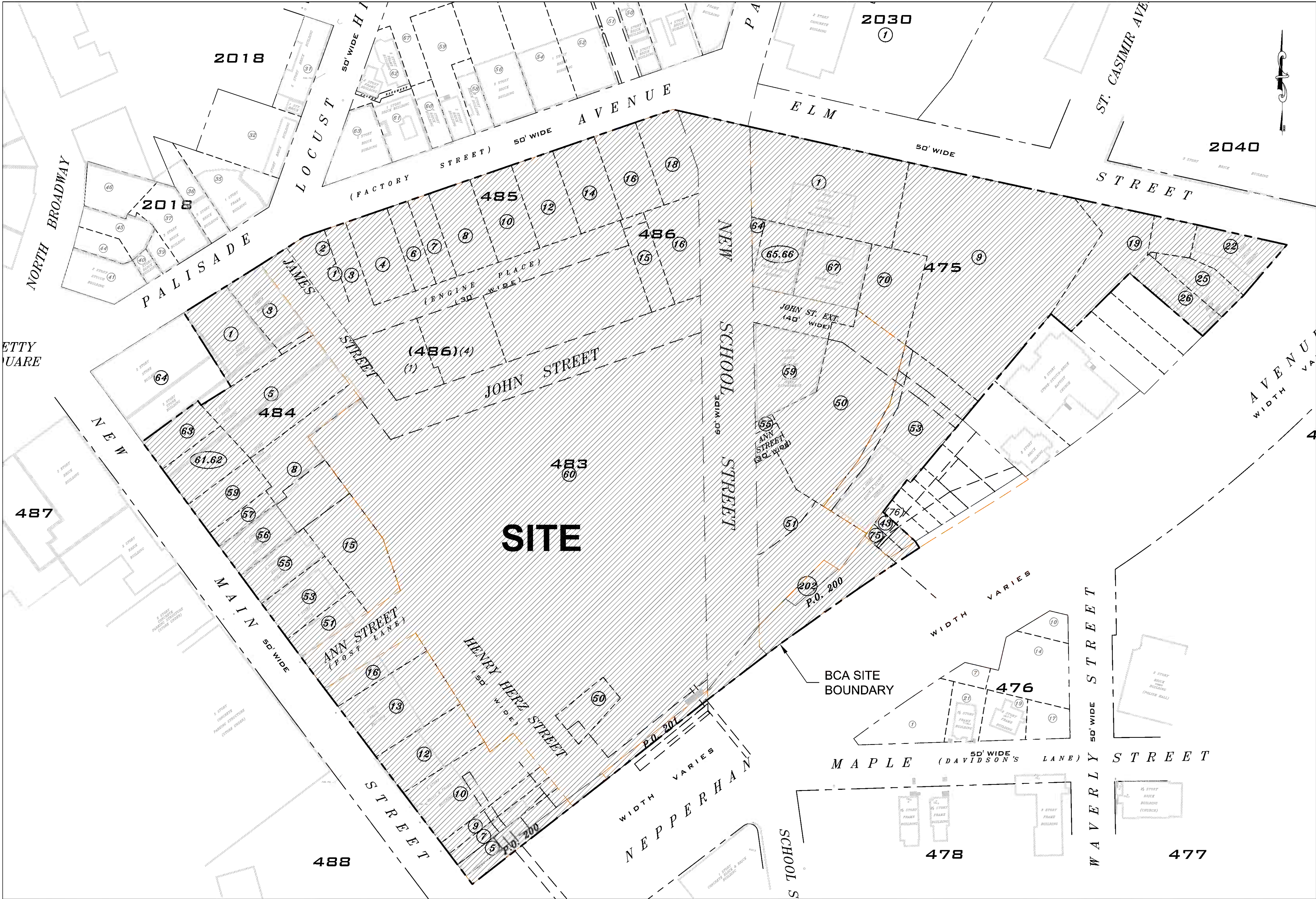


REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK			
PROPOSED SITE DEVELOPMENT/ SITE CAPPING PLAN			
DESIGNED BY	GO	DATE PREPARED	11-8-07
DRAWN BY	dk	SCALE	1" = 40'
CHECKED BY	MSP	PROJECT NO.	7190
SHEET		2 OF 8	

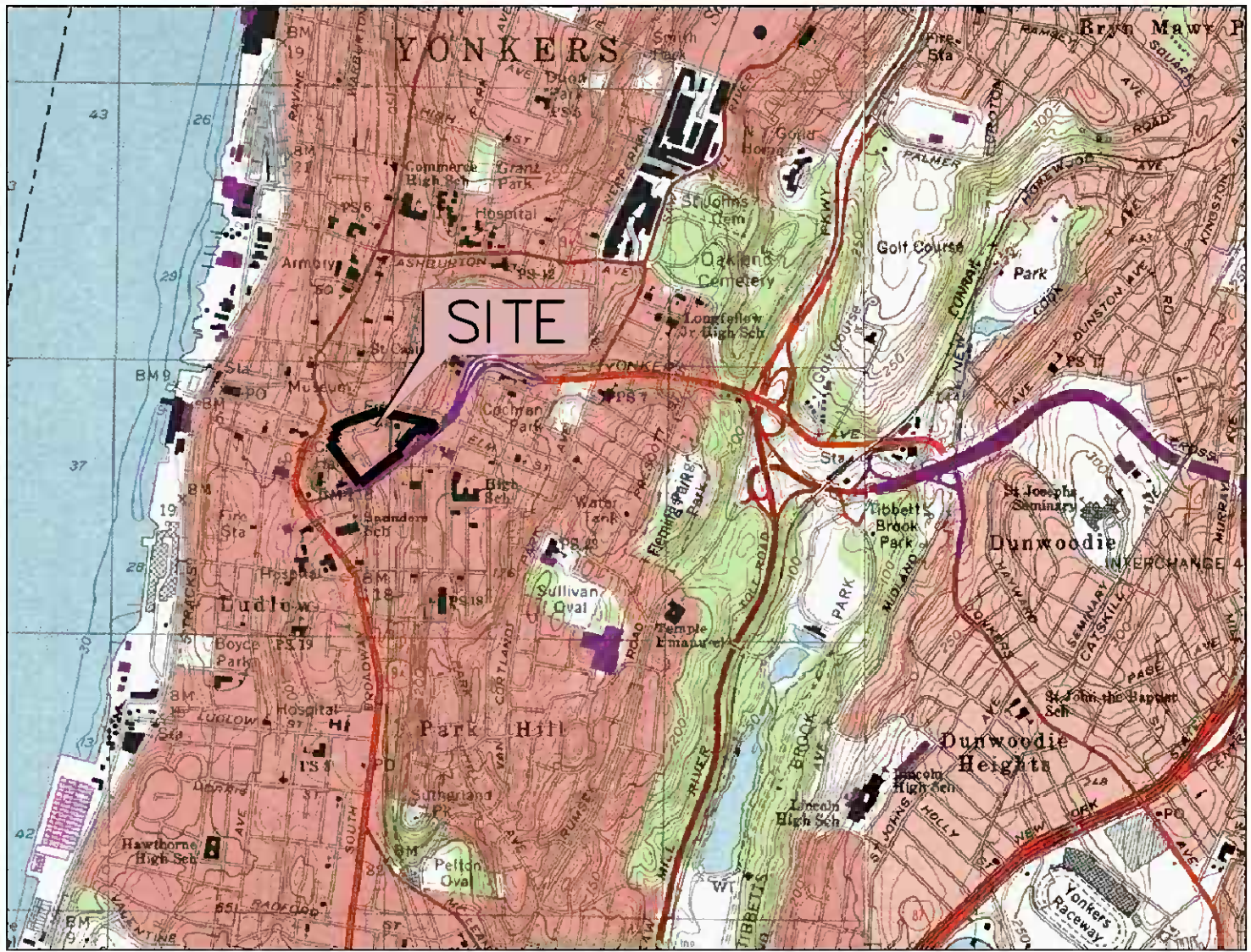
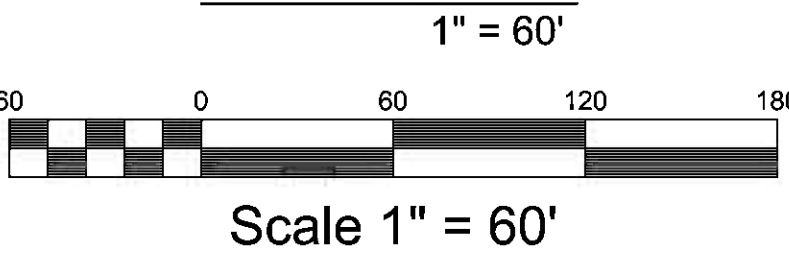
© SESI CONSULTING ENGINEERS, PC 2007
This drawing and all information contained herein is proprietary information of SESI CONSULTING ENGINEERS, PC and may not be copied or reproduced, either in whole or in part, by any method, without written permission of SESI CONSULTING ENGINEERS, PC.

REFERENCE:
1. SURVEY DATA OBTAINED FROM CONTRACTORS' LINE & GRADE SOUTH, LLC, DATED OCTOBER 13, 2006.
2. PROPOSED BUILDING LOCATIONS TAKEN FROM ARCHITECTURAL DRAWINGS PREPARED & PROVIDED BY DESIGN/DEVELOPMENT OF WHITE PLAINS, NY.

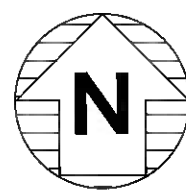
REMEDIAL ACTION WORK PLAN
FOR
STRUEVER, FIDELCO, CAPPELLI, LLC
RIVER PARK CENTER PROJECT
CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK



SITE MAP



LOCATION MAP
SCALE: 1" = 2000'



EXISTING PROPERTIES

BLOCK #483
LOTS 5, 7, 9, 10, 12, 13, 16, 50, 60

BLOCK #484
LOTS 1, 3, 5, 8, 15, 51, 53, 55, 56, 57, 59, 61, 62, 63


BLOCK #485
LOTS 1, 2, 3, 4, 6, 7, 8, 10, 12, 14, 16, 18

BLOCK #486
LOTS 15, 16

BLOCK #475
LOTS 1, 9, 19, 22, 25, 26, 43, 50, 51, 53, 55, 59, 64,
65, 66, 67, 70, 75, 200, 202

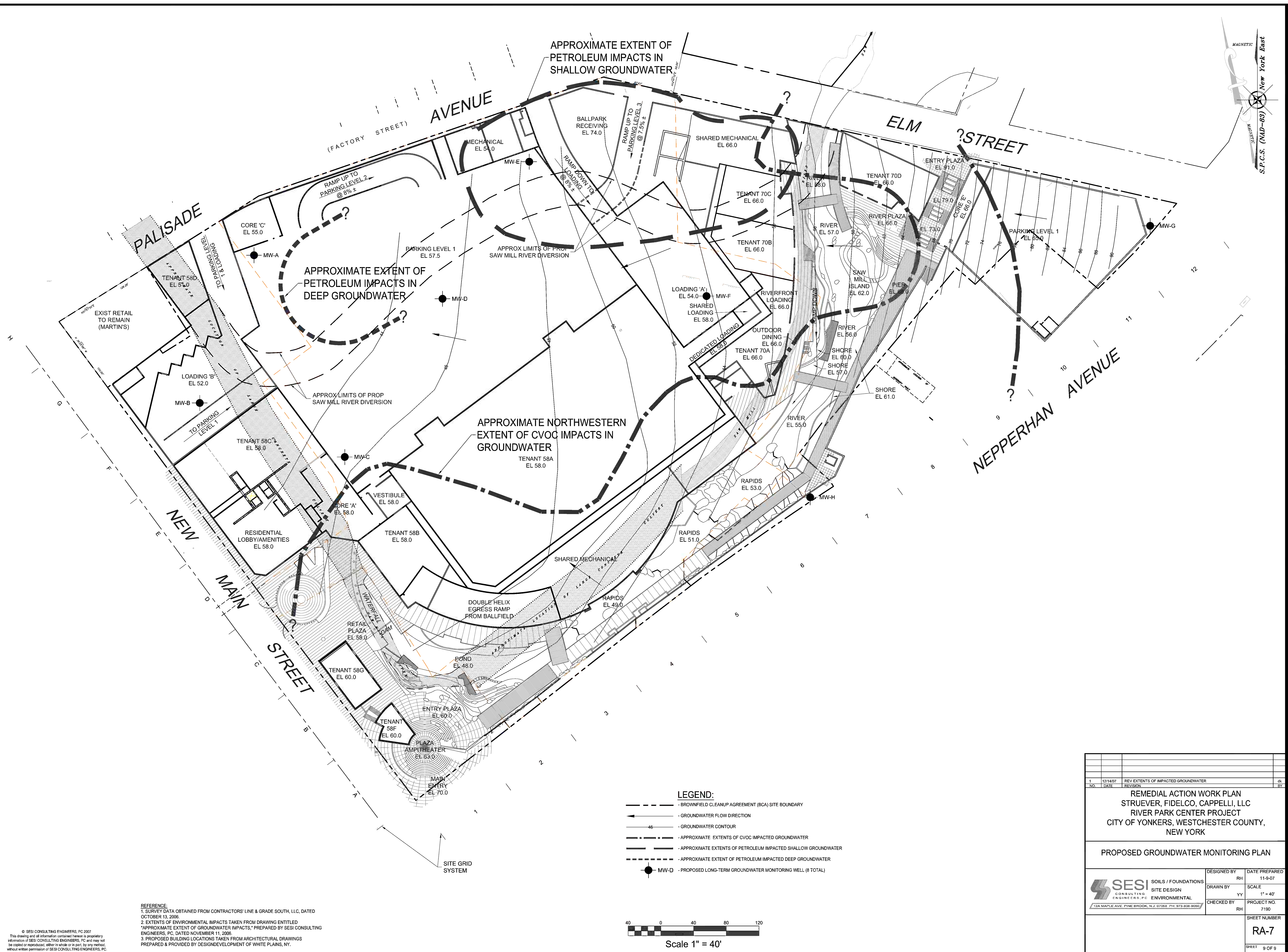
DRAWING LIST

RA-1	TITLE SHEET
RA-2	PROPOSED SITE DEVELOPMENT/SITE CAPPING PLAN
RA-3	PROPOSED EXCAVATION PLAN
RA-4	PROPOSED SUB-SLAB VENTING PLAN & DETAILS
RA-5	FILL THICKNESS & CROSS - SECTION LOCATION PLAN
RA-6A	CROSS SECTION A-A
RA-6B	CROSS SECTIONS B-B & C-C
RA-6C	PROPOSED STREAM RELOCATION
RA-7	CENTERLINE PROFILE
	PROPOSED GROUNDWATER MONITORING PLAN

1	12-14-07	REISSUE	BY
NO.	DATE	REVISION	
REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK			
TITLE SHEET			
 122A MAPLE AVE., PINE BROOK, N.J. 07058 PH: 973-808-9050	DESIGNED BY	DATE PREPARED	
	RH	11-9-07	
	DRAWN BY	SCALE	
	YY	AS NOTED	
	CHECKED BY	PROJECT NO.	
	RH	7190	
	SHEET NUMBER		
	RA-1		
	SHEET 1 OF 9		


\\NYCADDY16\ENVIRONMENTAL\MONITOR\EXCAV\figs_GW_MONITORING_12162007_419233.PLT

11

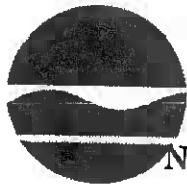


REFERENCE:
1. SURVEY DATA OBTAINED FROM CONTRACTORS' LINE & GRADE SOUTH, LLC, DATED OCTOBER 13, 2006.
2. EXTENTS OF ENVIRONMENTAL IMPACTS TAKEN FROM DRAWING ENTITLED "APPROXIMATE EXTENT OF GROUNDWATER IMPACTS," PREPARED BY SESI CONSULTING ENGINEERS, P.C. DATED NOVEMBER 11, 2006.
3. PROPOSED BUILDING LOCATIONS TAKEN FROM ARCHITECTURAL DRAWINGS PREPARED & PROVIDED BY DESIGN/DEVELOPMENT OF WHITE PLAINS, NY.

© SESI CONSULTING ENGINEERS, P.C. 2007
This drawing and all information contained herein is proprietary information of SESI CONSULTING ENGINEERS, P.C. and may not be copied or reproduced, either in whole or in part, by any method, without written permission of SESI CONSULTING ENGINEERS, P.C.

1	12/14/07	REV EXTENTS OF IMPACTED GROUNDWATER		dk												
NO.	DATE	REVISION		BY												
REMEDIAL ACTION WORK PLAN STRUEVER, FIDELCO, CAPPELLI, LLC RIVER PARK CENTER PROJECT CITY OF YONKERS, WESTCHESTER COUNTY, NEW YORK																
PROPOSED GROUNDWATER MONITORING PLAN																
<div><div><div>SOILS / FOUNDATIONS ENGINEERS, P.C. SITE DESIGN ENVIRONMENTAL 122A MAPLE AVE. PINE BROOK, N.J. 07658 PH: 973-808-9050</div></div><div><table><tr><td>DESIGNED BY</td><td>DATE PREPARED</td></tr><tr><td>RH</td><td>11-9-07</td></tr><tr><td>DRAWN BY</td><td>SCALE</td></tr><tr><td>YY</td><td>1" = 40'</td></tr><tr><td>CHECKED BY</td><td>PROJECT NO.</td></tr><tr><td>RH</td><td>7190</td></tr></table></div></div>					DESIGNED BY	DATE PREPARED	RH	11-9-07	DRAWN BY	SCALE	YY	1" = 40'	CHECKED BY	PROJECT NO.	RH	7190
DESIGNED BY	DATE PREPARED															
RH	11-9-07															
DRAWN BY	SCALE															
YY	1" = 40'															
CHECKED BY	PROJECT NO.															
RH	7190															
SHEET NUMBER																
RA-7																
SHEET 9 OF 9																

Appendix H
Citizen Participation Plan



New York State Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan for Chicken Island Downtown Yonkers Baseball Project

Site # C360083
Chicken Island
City of Yonkers
County of Westchester, New York

September 2006

Contents

<u>Section</u>	<u>Page Number</u>
1. What is New York's Brownfield Cleanup Program?	3
2. Citizen Participation Plan Overview.....	3
3. Site Information	5
4. Remedial Process	6
5. Citizen Participation Activities.....	8
6. Major Issues of Public Concern	8
Appendix A – Project Contacts and Document Repositories	9
Appendix B – Identification of Citizen Participation Activities	10
Appendix C – Brownfield Site Contact List	12
Appendix D – Site Location Map	17
Appendix E – Fact Sheet – Draft Remedial Investigation Work Plan.....	18

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's remedial process.

Applicant: Struever Fidelco Capelli, LLC ("Applicant")
Site Name: Chicken Island (Gateway Center Project) ("site")
Site Number: C360083
Site Address: Nepperhan Avenue, Yonkers, New York
Site County: Westchester County

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) is designed to encourage the private sector to investigate, remediate (clean up) and redevelop brownfields. A brownfield is any real property, the redevelopment or reuse of which may be complicated by the presence or potential presence of a contaminant. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal and financial burdens on a community. If the brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants accepted into the BCP as they conduct brownfield site remedial activities. The BCP contains strict investigation and remediation (cleanup) requirements, ensuring that cleanups protect public health and the environment based on the intended use of the brownfield site. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use. For more information about the BCP, go online at: www.dec.state.ny.us/website/der/bcp

2. Citizen Participation Plan Overview

A Citizen Participation (CP) Plan provides members of the affected and interested public with information about how NYSDEC will inform and involve them during the investigation and remediation (cleanup) of a site under the BCP.

This CP Plan has been developed for the site under the BCP. Appendix D contains a map locating the site. NYSDEC is committed to informing and involving the public concerning the investigation and remediation (cleanup) of the site. This CP Plan describes the public information and involvement program that will be carried out with assistance from the Applicant.

Appendix A of this CP Plan identifies NYSDEC project contact(s) to whom the public may address questions or request information about the site's remedial program. The locations of the site's document repositories also are identified in Appendix A. The document repositories provide convenient access to important project documents for public review and comment.

Appendix B contains the brownfield site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and remediation process. The brownfield site contact list includes, at a minimum:

- chief executive officer and zoning board of each county, city, town and village in which the site is located;
- residents on and/or adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on and/or adjacent to the site for purposes of posting and/or dissemination at the facility;
- document repositories and their contacts.

The brownfield site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project, including notifications of upcoming remedial activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.

The brownfield site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A.

Appendix C identifies the CP activities that have been and will be conducted during the site's remedial program.

The CP activities are designed to achieve the following objectives:

- Help the interested and affected public to understand contamination issues related to a brownfield site, and the nature and progress of an Applicant's efforts, under State oversight, to investigate and, if appropriate, remediate (clean up) a brownfield site.
- Ensure open communication between the public and project staff throughout a brownfield site's remedial process.
- Create opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a brownfield site's investigation and remediation (cleanup).

This CP Plan may be revised due to changes in major issues of public concern or in the nature and scope of remedial activities. Modifications may include additions to the site contact list,

updates to major issues of concern to the public, and changes in planned citizen participation activities. The public is encouraged to discuss its ideas and suggestions about the citizen participation program with the project contact(s) listed in Appendix A.

3. Site Information

Site Description

The "Site" is made up of 56 parcels in the City of Yonkers, Westchester County, New York which are bounded to the west by New Main Street, to the north by Palisade Avenue, to the east by New School Street and to the south by Nepperhan Avenue.

Approximately 3-4 acres of the "Site" consist of one and two story buildings. Those structures are currently occupied by retail businesses (e.g. food stores, clothing stores, etc.) and offices. There is also a five-story residential building present on the "Site". The undeveloped portions of the property consist of 1-2 acres of grass covered land on the northeastern portion of the property; asphalt parking lots and roadways that make up the eastern portion of the site; and approximately 990 lineal feet of a portion of the Saw Mill River runs along the southern and western portions of the "Site" (approximately 760 feet of which, is bridged and covered).

Environmental History

The "Site" has been developed since at least 1876. From 1889 until the present, the perimeter properties have been occupied by 1 and 2 story wood framed and brick retail/commercial type buildings. The interior portion of the "Site" that is presently a parking lot was at one time occupied by larger industrial businesses including a hat factory, brewery and contractor's yard. Other smaller buildings within the interior of the site consisted of garages, carpenter shops, auto repair businesses, wagon sheds, a laundry business, a bakery, etc. Most of these structures were demolished sometime between 1942 and the late 1950's and replaced with the current parking lot. Based on past uses, the potential for metals, solvents and petroleum contamination exists at the "Site".

In addition to the long industrial history of the "Site", several other environmental impacts have been identified at the "Site" through Phase I Environmental Site Assessments performed by Advanced Cleanup Technologies, Inc. and S&W Redevelopment of North America, LLC.

Past petroleum spills were identified at 127-129 New Main Street as well as spills at adjacent properties on Palisade Avenue. The Yonkers Fire Station located at 5-7 New School Street also has a history of petroleum spills. In addition to spill data, visual evidence of USTs (fill and vent pipes) was identified during Phase I site inspections.

The Chicken Island property will be a 9.2 acre mixed-use development that will include a 6,500 seat minor league baseball park with approximately 100,000 square feet of adjacent retail space. Parking

will be accommodated off-site. Struever Bros. Eccles & Rouse, Inc. has created an LLC, Struever Fidelco Yonkers LLC, to own and operate this project. This project has been named the "Downtown Yonkers Ballpark Project". While project design continues, and the final cost of development is not yet known, the average cost of a ballpark this size is in the \$30-40 million range. However, given the amount of earthwork necessary to build the ballpark, remediation costs will also be extensive and in proportion to the cost of development. Since approval of the Revised Final Environmental Impact Statement, Yonkers has engaged in an extensive community outreach effort to rally support for the project.

With the creation of the new Brownfield Cleanup Program (BCP), Struever Fidelco Yonkers LLC has elected to move this project into the new BCP for purposes of conducting an investigation, and if necessary, remediation of the Chicken Island Site. Although only some minor investigation has been performed, the presence of mercury contamination, petroleum and solvents on the site due to the historical presence of a hat factory and other industries is suspected.

4. Remedial Process

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants.

The Applicant in its Application proposes that the site will be used for restricted commercial/industrial purposes.

To achieve this goal, the Applicant will conduct remedial activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement provides the responsibilities of each party in conducting a remedial program at the site.

If the Applicant conducts a remedial investigation (RI) of the site, it will be performed with NYSDEC oversight, and with the following goals:

- 1) Define the nature and extent of contamination in soil, surface water, groundwater and any other impacted media;
- 2) Identify the source(s) of the contamination;
- 3) Assess the impact of the contamination on public health and/or the environment; and
- 4) Provide information to support the development of a Remedial Work Plan to address the contamination, or to support a conclusion that the contamination does not need to be addressed.

The Applicant will prepare an RI Report after it completes the RI. This report will summarize the results of the RI and will include the Applicant's recommendation of whether remediation (cleanup) is needed to address site-related contamination. The RI Report is subject to review and approval by NYSDEC. Before the RI Report is approved, a fact sheet that describes the RI Report will be sent to the site's contact list.

NYSDEC determines whether the site poses a significant threat to public health and/or the environment. If NYSDEC determines that the site is a "significant threat," a qualifying community group may apply for a TAG. The purpose of a TAG is to provide funds to the qualifying community group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

For more information about the TAG Program and the availability of TAGs, go online at: www.dec.state.ny.us/website/der

After NYSDEC approves the RI Report, the Applicant will be able to develop a Remedial Work Plan. The Remedial Work Plan describes how the Applicant would address the contamination related to the site.

The public would have the opportunity to review and comment on the remediation (cleanup) proposal. The site contact list would be sent a fact sheet that describes the Remedial Work Plan and announces a 45-day public comment period. NYSDEC would factor this input into its decision to approve, reject or modify the Remedial Work Plan.

Approval of the Remedial Work Plan by NYSDEC would allow the Applicant to design and construct the alternative selected to remediate (clean up) the site. The site contact list would receive notification before the start of site remediation. When the Applicant completes remedial activities, it will prepare a Remedial Action Report that certifies that remediation (cleanup) activities have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the remediation is protective of public health and the environment for the intended use for the site. The site contact list would receive a fact sheet that announces the completion of remedial activities and the review of the Remedial Action Report.

NYSDEC would then issue the Applicant a Certificate of Completion. This Certificate states that remediation (cleanup) goals have been achieved, and relieves the Applicant from future remedial liability, subject to statutory conditions. If the Applicant used institutional controls or engineering controls to achieve remedial objectives, the site contact list would receive a fact sheet discussing such controls.

An institutional control is a non-physical means of enforcing a restriction on the use of real property that limits human or environmental exposure, restricts the use of groundwater, provides

notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of site management at or pertaining to a brownfield site. An example of an institutional control is an environmental easement.

An engineering control is a physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Examples include caps and vapor barriers.

Site management will be conducted by the Applicant as required with appropriate NYSDEC oversight.

Activities required to be conducted to inform and involve the public during the site's remedial process are introduced in section 5. and identified in the chart in Appendix C.

5. Citizen Participation Activities

CP activities that have already occurred and are planned during the investigation and remediation of the site under the BCP are included in Appendix C: Summary of Citizen Participation Activities. NYSDEC will ensure that these CP activities are conducted, with appropriate assistance from the Applicant.

All CP activities seek to provide the public with significant information about site findings and planned remedial activities, and some activities announce comment periods and request public input about important draft documents such as the Proposed Remedial Work Plan.

The CP Plan for the site may be revised based on changes in the site's remedial program or major issues of public concern.

All written materials developed for the public will be reviewed and approved by NYSDEC for clarity and accuracy before they are distributed.

6. Major Issue of Public Concern

This section of the CP Plan identifies major issues of public concern as they relate to the site. Additional major issues of public concern may be identified during the site's remedial process.

Currently, there are no identified major issues of public concern.

Appendix A – Project Contacts and Document Repositories

Project Contacts

For information about the site's remedial program, the public may contact the following NYSDEC project contacts:

Matthew Hubicki
Project Manager
NYSDEC
Division of Environmental Remediation
625 Broadway, 11th Floor
Albany, NY 12233-7014
(518) 402-9662

Document Repositories

The document repositories identified below have been established to provide the public with convenient access to important project documents:

Yonkers Public Library
Riverfront Branch
One Lincoln Center
Yonkers, NY 10701
Phone: (914) 337-1500
Hours: Monday – Thursday 9:00-8:00
Friday 10:00-5:00
Saturday 9:00-5:00
Sunday 12:00-5:00

Appendix B – Identification of Citizen Participation Activities

Required Citizen Participation Activity	CP activity(ies) occur at this point	Date Completed
Application Process:		
• Prepare brownfield site contact list (BSCL)	At time of preparation of application to participate in BCP	April 2006
• Establish document repositories		April 2006
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day comment period	When NYSDEC determines that BCP application is complete. The 30-day comment period begins on date of publication of notice in ENB. End date of comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice and notice to the BSCL should be provided to the public at the same time.	Sept 6, 2006
• Publish above ENB content in local newspaper		Sept 6, 2006
• Mail above ENB content to BSCL		Sept 6, 2006
After Execution of Brownfield Site Cleanup Agreement:		
• Prepare citizen participation (CP) plan	Draft CP Plan must be submitted within 20 days of entering Brownfield Site Cleanup Agreement. CP Plan must be approved by NYSDEC before distribution	{insert date of CP Plan final approval}
After Remedial Investigation (RI) Work Plan Received:		
• Mail fact sheet to BSCL about proposed RI activities and announcing 30-day public comment period on draft RI Work Plan	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, comment periods will be combined and public notice will include fact sheet. 30-day comment period begins/ends as per dates identified in fact sheet.	{insert date mailed}
After RI Completion:		
• Mail fact sheet to BSCL describing results of RI	Before NYSDEC approves RI Report	{insert date mailed}
After Remedial Work Plan (RWP) Received:		
• Mail fact sheet to BSCL about proposed RWP and announcing 45-day comment period	Before NYSDEC approves RWP. 45-day comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day comment period.	{insert date mailed}
• Public meeting by NYSDEC about proposed RWP (if requested by public)		{insert date of public meeting}
After Approval of RWP:		
• Mail fact sheet to BSCL summarizing upcoming remedial construction	Before the start of remedial construction	{insert date mailed}
After Remedial Action Completed:		
• Mail fact sheet to BSCL announcing that remedial construction has been completed	At the time NYSDEC approves Final Engineering Report. These two fact sheets	{insert date mailed}

Required Citizen Participation Activity	CP activity(ies) occur at this point	Date Completed
<ul style="list-style-type: none"> • Mail fact sheet to BSCL announcing issuance of Certificate of Completion (COC) 	should be combined when possible if there is not a delay in issuance of COC	{insert date mailed}

APPENDIX C – BROWNFIELD SITE CONTACT LIST

- 1.) Philip A. Amicone, Mayor
City of Yonkers
Yonkers City Hall
40 South Broadway
Yonkers, NY 10701

Francis B. McKenna, Chair
Westchester County Planning Board
Michaelian Office Building
148 Martine Avenue
White Plains, NY 10601

Joseph Cianciulli, Chairman
Zoning Board of Appeals
87 Nepperhan Avenue
Yonkers, NY 10701

2.) **Adjacent Neighbors**

1.-473-1
Norma Coreas
17 Linden Street
Yonkers, NY 10701

1.-473-2
Wayne Richard Allen
19 Linden Street
Yonkers, NY 10701

1.-473-3
Mieczyslaw Zuchowski
21 Linden Street
Yonkers, NY 10701

1.-473-4
Jeffrey Lewis
23 Linden Street
Yonkers, NY 10701

1.-473-5
Marcel Thomas
25 Linden Street
Yonkers, NY 10701

1.-473-6
L. Angel Laboy & Maria Pantoja
27 Linden Street
Yonkers, NY 10701

1.-473-7.8
Adrian Hess
29 Linden Street
Yonkers, NY 10701

1.-473-9
Charles & Janet Bochnik
33 Linden Street
Yonkers, NY 10701

1.-473-10
Erwin & Enisa Jasavac
35 Linden Street
Yonkers, NY 10701

1.-473-11
Shabnan & Mir Hasnain
37 Linden Street
Yonkers, NY 10701

1.-473-13 (41 Linden Street)
41-43 Linden Corporation
85 West 188th Street
Bronx, NY 10468

1.-473-15 (45 Linden Street)
David Tavares
P.O. Box 1180
Peekskill, NY 10566

1.-473-16 (47 Linden Street)
Albert Fakhoury
15 Arden Place
Yonkers, NY 10710

1.-473-17 (49 Linden Street)
JOJ Realty Corporation
217 Hawthorne Avenue
Yonkers, NY 10705

1.-473-18 (107 Elm Street)
Randa Rabadi
42 Virginia Place
Yonkers, NY 10703

1-473.19 (103 Elm Street)
West Hab Inc.
85 Executive Blvd.
Elmsford, NY 10523

1.-473.200 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, NY 12603-2553

1.-473-201 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, NY 12603-2553

1.-473-202 (Arterial)
State of NY
Arterial
4 Burnett Boulevard
Poughkeepsie, NY 12603-2553

1.-473.203 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, NY 12603-2553

1.-473-204 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, NY 12603-2553

1.-473-205 (Arterial)
State of NY
Arterial
4 Burnett Boulevard
Poughkeepsie, NY 12603-2553

1.-473-206 (Arterial)
State of NY
Arterial
4 Burnett Boulevard
Poughkeepsie, NY 12603-2553

1.474.1 (Waverly Street)
TKCC Holding Corp
c/o Polish Community Ctr.
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.474-6.44 (92 Waverly Street)
TKCC Holding Corp
c/o Polish Community Ctr.
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.474-13 (178 Nepperhan Ave)
TKCC Holding Corp
c/o Polish Community Ctr.
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.474-14 (180 Nepperhan Ave)
TKCC Holding Corp
c/o Polish Community Ctr.
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701
1.474-13 (178 Nepperhan Ave)

1.474-15 (184 Nepperhan Ave)
TKCC Holding Corp
c/o Polish Community Ctr.
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.474-19 (192 Nepperhan Ave)
Jose Peixoto
192 Nepperhan Ave
Yonkers, NY 10701

1.474-25 (102 Elm Street)
Jose Peixoto
192 Nepperhan Ave
Yonkers, NY 10701

1.474-200 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, New York 12603-2553

1.476-1 (144 Nepperhan Ave)
TKCC Holding Corp
c/o Polish community Ctr
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.476-7 (150 Nepperhan Ave)
TKCC Holding Corp
c/o Polish community Ctr
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.476-10 (158 Nepperhan Ave)
TKCC Holding Corp
c/o Polish community Ctr
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.476-14 (87 Waverly Street)
TKCC Holding Corp
c/o Polish community Ctr
Attention: Treasurer
92 Waverly Street
Yonkers, NY 10701

1.476-17 (11 Maple Street)
Ralph Mercado
Attn: Diana Mercado
1534 Ericson Place
Bronx, NY 10461

1.476-19 (7 Maple Street)
Eduardo & Lula Lima
Same

1.476-21 (5 Maple Street)
Marvin & Genette Toone
Same

1.476-200 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, New York 12603-2553

1.476-202 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, New York 12603-2553

1.-481-1 (202 New Main Street)
Yonkers, New York 10701
M. Fichera
Same

1.-481-2 (204 New Main Street)
Yonkers, New York 10701
Ibrahim Kuri, Rasha Kuri
335 Upland Ave
Yonkers, NY 10703

1.481-47 (3 Morgan Street)
Yonkers, New York 10701
Ibrahim Kuri, Rasha Kuri
335 Upland Ave
Yonkers, NY 10703

1.-481-48 (1 Morgan Street)
Yonkers, New York 10701
Automated Business Consultants
Attn: Louis Colucci
1009 Brinsmade Ave
Bronx, NY 10465

1.-481-49 (120 Nepperhan Street)
Yonkers, New York 10701
Alfonso Alvarez
122 Nepperhan Ave
Yonkers, NY 10701

1.-481-50 (9 Morgan Street)
Yonkers, New York 10701
Ibrahim Kuri, Rasha Kuri
335 Upland Ave
Yonkers, NY 10703

1.481-51 (200 New Main Street)
Yonkers, New York 10701
Automated Business Consultants
Attn: Louis Colucci
1009 Brinsmade Ave
Bronx, NY 10465

1.-482-1 (124 Nepperhan Street)
Yonkers, New York 10701
Fir Tree Realty Inc.
c/o John Romano Esq
2168 Central Park Ave
Yonkers, NY 10710

1.-482-4 (130 Nepperhan Street)
Yonkers, New York 10701
Fir Tree Realty Inc.
c/o John Romano Esq
2168 Central Park Ave
Yonkers, NY 10710

1.-482-6.7 (134 Nepperhan Street)
Yonkers, New York 10701
Jesus Aguilar, Pedro Aguilar
Same

1.-482-8 (138 Nepperhan Street)
Yonkers, New York 10701
ZEG Realty Corp.
10 Allison Lane
Mt. Kisco, NY 10549

1.482-44 (4 Morgan Street)
Yonkers, New York 10701

Fir Tree Realty Inc.
c/o John Romano Esq
2168 Central Park Ave
Yonkers, NY 10710

1.-483-200 (Nepperhan Avenue)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, New York 12603-2553

1.-483-201 (Arterial)
State of New York
Arterial
4 Burnett Boulevard
Poughkeepsie, New York 12603-2553

1.-484-64 (101 New Main Street)
Yonkers, New York 10701
Goldman Martin LLC
20-26 Industrial Avenue
Fairview, New Jersey 07022

1.-487-7 (2 South Broadway)
Yonkers, New York 10701
Two South Broadway Corp.
Attn: USI Management Corp
464 Avenue U Suite 2R
Brooklyn, NY 11223

1.-487-11 (106 New Main Street)
Yonkers, New York 10701
106 New Main St. LLC
Attn: USI Management Corp
464 Avenue U Suite 2R
Brooklyn, NY 11223

1.-487-13.15 (110 New Main Street)
Yonkers, New York 10701
The Salvation Army
R. New York Division
Divisional Headquarters
120 West 14th Street
NY, NY 10011

2.2018.32 (3 Locust Hill)
Ester Bera
P.O. Box 706
Yonkers, NY 10702

2.-2018-35 (1 Locust Hill)
Yonkers, New York 10701
ER Check Cashing Corp.
Attn: Regina Check Cashing
739 West Nyack Road
P.O. Box 723
West Nyack, NY 10994

2.-2018-36 (11 Palisade)
Yonkers, New York 10701
Leonard Cantor
Attn: Robert Cantor
6 Marc Lane
Westport, CT 06880

2.2018-37 (7 Palisade)
Yonkers, New York 10701
North Broadway Realty LLC
95 Bluff Road
Fort Lee, NJ 07024

2.-2018-39 (5 Palisade)
Yonkers, New York 10701
Getty Square Realty LLC
Attn: USI Management Corp
464 Avenue U Suite 2R
Brooklyn, NY 11223

2.-2018-40 (3 Palisade)
Yonkers, New York 10701
Getty Square Land Co.
Attn: Joseph J. Mccann Jr
1906 Palisade Drive
Pacific Palisades, CA 90272

2.-2018-41 (2 North Broadway)
Yonkers, New York 10701
Getty Square Realty LLC
Attn: USI Management Corp
464 Avenue U Suite 2R
Brooklyn, NY 11223

2.-2027-45 (49 Palisades)
Yonkers, New York 10701
DRF Management Corp.
Attn: Donato Dell'orso
214 Park Hill Ave
Yonkers, NY 10705

2.-2027-48 (45 Palisades)
Yonkers, New York 10701
All County Homes Corp.
Same

2.-2027-50 (43 Palisades)
Yonkers, New York 10701
Anthony La Vista
Edward Stinson
70 Alta Drive
Mt. Vernon, NY 10552

2.-2027-51 (41 Palisades)
Yonkers, New York 10701
CDA Yonkers
87 Nepperhan Ave
Yonkers, NY 10701

2.-2027-52 (39 Palisades)
Yonkers, New York 10701
Kawous & Jilla Balazadeh
2 East Road
Kings Point, NY 11024

2.-2027-54 (33 Palisades)
Yonkers, New York 10701
Fernando & Maria Morais
801 Palisade Ave
Yonkers, NY 10701

2.-2027-56 (31 Palisades)
Yonkers, New York 10701
The Salvation Army 7455 3RD Ave
Mt. Vernon, NY 10550

2.-2027-58 (27 Palisades)
Yonkers, New York 10701
Ralph Cardinale & Michael Hughes

Same

2.-2027-59 (25 Palisades)
Yonkers, New York 10701
Rodriguez Realty Co.
9409 Carleyale Ave
Surfside, FL 33154

2.-2027-60 (23 Palisades)
Yonkers, New York 10701
Robert Cantor
6 Marc Lane
Westport, CT 06880

2.-2027-61 (21 Palisades)
Yonkers, New York 10701
Robert Cantor
6 Marc Lane
Westport, CT 06880

2.-2027-63 (19 Palisades)
Yonkers, New York 10701
Robert Cantor
6 Marc Lane
Westport, CT 06880

2.2030-250 (11 St. Casimir Ave)
Yonkers IDA
Attn: 11-23 St Casimir LP
294 Bronxville Road, Apt 2h
Bronxville, NY 10708

2.2030-I (50 Palisade Ave)
Pwn Associates LLC
58 Palisade Ave
Yonkers, NY 10701

2.2030-10 (60 Palisade Ave)
Philippi Pentecoastal Church
Same

2.2030-15.17 (70 Palisade Ave)
70 Palisade Ave LLC
Same

2.2040-1 (209 Nepperhan Ave)

Flp Corp
Same

2.2040-5 (201 Nepperhan Ave)
D. Walid Fakhouri
Same

2.2040-8 (199 Nepperhan Ave)
Nelson Realty
99 ½ Elm Street
Yonkers, NY 10701

2.2040-10.11 (97 Elm Street)
Michael & Angelina Tenore
255 Kneeland Ave
Yonkers, NY 10705

2.2040-1295 (Elm Street)
93 Elm Street Holding Corp
93 Elm Street
Yonkers, NY 10701

2.2040-14 (91 Elm Street)
Seacoast Corp
80 Pleasant Ridge Road
Harrison, NY 10528

2.2040-15 (89 Elm Street)
Shabnam Hasnain
Same

State Officials:

Marc Moran, Regional Director
NYSDEC Region 3
21 South Putt Corners
New Paltz, NY 12561

Wendy Rosenbach
Public Affairs Officer
NYSDEC Region 3
21 South Putt Corners
New Paltz, NY 12561

Richard Baldwin

NYSDEC Region 3
21 South Putt Corners
New Paltz, NY 12561

Ram Pergadia
NYSDEC Region 3
21 South Putt Corners
New Paltz, NY 12561

Michael J. Knipfing
NYSDEC Region 3
21 South Putt Corners
New Paltz, NY 12561

Local/Elected Officials

Honorable Louis A. Mosiello
35 East Grassy Sprain Rd, 4th Floor
Yonkers, NY 10710

Honorable Nicolas Spano
1 Executive Boulevard
Yonkers, NY 10701

Honorable Gordon Burrows
800 Michaelian Office Building
White Plains, NY 10601

Perry M. Ochacher, Clerk
County Legislature
800 Michaelian Office Building
White Plains, NY 10601

Lenord Spano, Clerk
Westchester County
110 Dr. Martin Luther King, Jr. Blvd.
Yonkers, NY 10601

Dr. Joshua Lipsman, Commissioner
County Health Department
145 Huguenot Street
New Rochelle, NY 10801

Bruce Berger, Executive Director
Solid Waste Commission
Michaelian Office Building

148 Martine Avenue
White Plains, NY 10601

Honorable Charles E. Schumer
US Senate
Washington, DC 20510

Honorable Hillary R. Clinton
US Senate
Washington, DC 20510

Media

The Journal News
1 Gannett Drive
White Plains, NY 10604
(914) 694-9300

The Journal News
200 North Route 303
West Nyack, New York 10994
(845) 358-2200

Environmental Groups

Scenic Hudson
1 Civic Center Plaza
Poughkeepsie, NY 12601

Clearwater, Inc.
112 Market Street
Poughkeepsie, NY 12601

Greenway Conservancy
Capitol Building
Capitol Station, Rm 254
Albany, NY 12224

The Nature Conservancy
Eastern NY Chapter
19 North Moger Avenue
Mt. Kisco, NY 10549

Westchester Environmental Coalition
P.O. Box 488

White Plains, NY 10602

Federated Conservationists of Westchester
78 N. Broadway
White Plains, NY 10603

Karl Coplan, Esq.
Pace/Riverkeeper
78 N. Broadway
White Plains, NY 10603

Beczak Environmental Center
21 Alexander Street
Yonkers, NY 10701

Environmental Citizens Coalition
33 Central Avenue
Albany, NY 12210

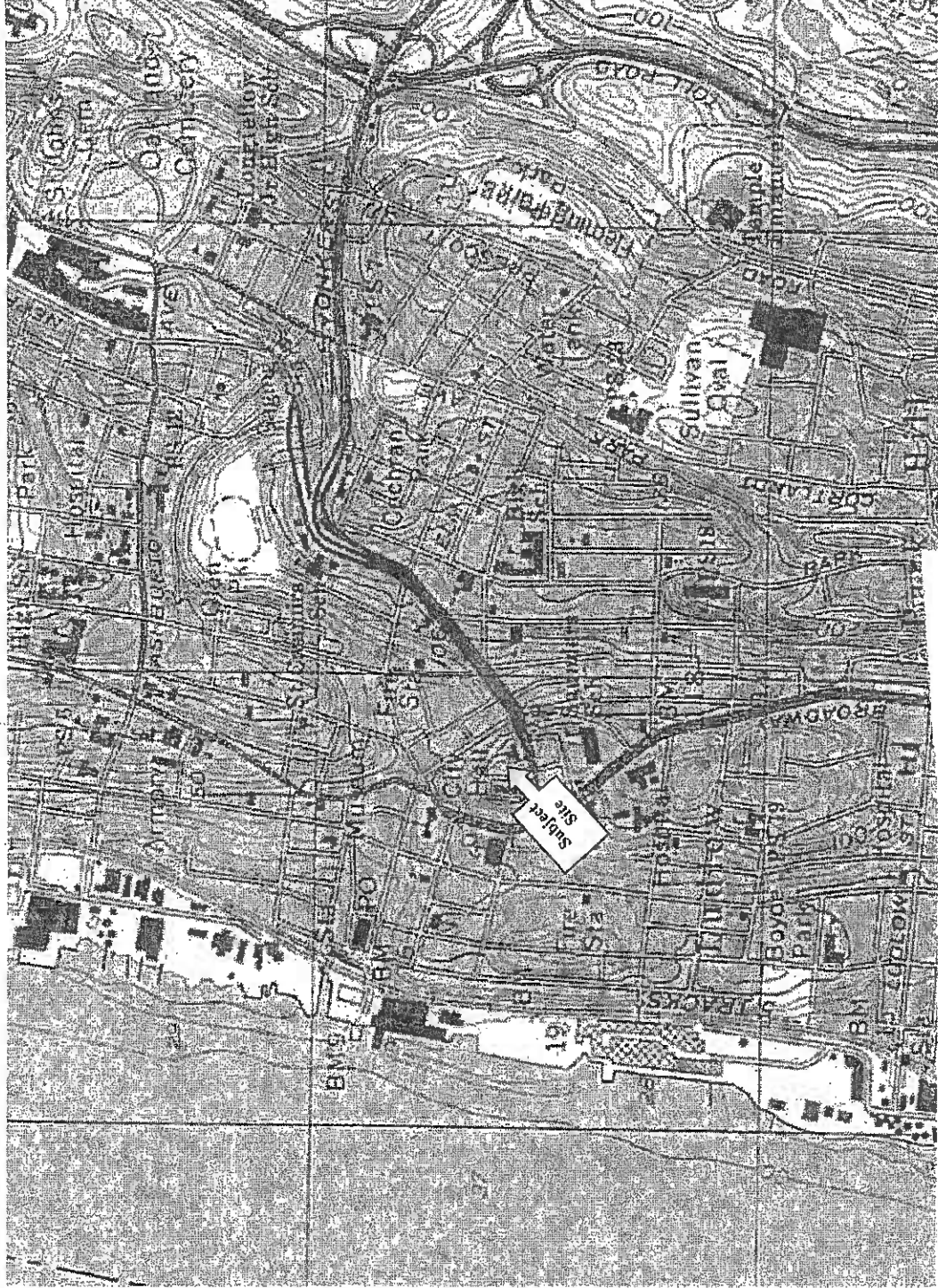
Laura Haight
NYPIRG
107 Washington Avenue
Albany, NY 12210

Westchester County EMC
414 Michaelian Office Building
White Plains, NY 10601

Others

Westchester County Industrial Development Agency
Michaelian Office Building, Room 903
148 Martine Avenue
White Plains, NY 10601

- 4.) School or Daycare Administration (None Nearby)
- 5.) Document Repository is established at: Yonkers Public Library,
Riverfront Branch, One Larkin Center, Yonkers, NY 10701



Appendix D – Site Location

September 2006
 TWM
 Job # N6007
 Not to Scale

S&W Redevelopment of North America, LLC

SFC
 Chicken Island Parcels
 Yonkers, New York

Appendix G

Community Air Monitoring Plan

Community Air Monitoring Plan
River Park Center
City of Yonkers, New York
Brownfield Cleanup Program Site # 360083

D.1 - INTRODUCTION

This document presents a Community Air Monitoring Plan for the River Park Center (BCP Site No. 360083) in the town of Yonkers, Westchester County, New York.

The site is comprised of approximately 12.94 acres, within a wedge-shaped area bounded by New Main Street (west), Palisade Avenue and Elm Street (north), and Nepperhan Avenue (south and east). New School Street bisects the site north-to-south, connecting Palisade and Nepperhan Avenues (Sheet RI-1) with the exception of Lot 35, the Church owned parcels consolidated into one lot.

One- and two-story buildings, occupied by various retail businesses, restaurants, and offices, line New Main Street and Palisade Avenue, west of School Street. Behind these buildings, toward the interior of the site, is a paved parking lot. There are several commercial/industrial buildings east of School Street, which include an automotive body and repair shops, a gasoline service station, and a café. A single lane bridge connects John Street to a construction equipment/vehicle storage yard. The City's Engine No.1 Fire Department Headquarters is located on the corner of New School Street and John Street. The Saw Mill River travels through the site in a northeast to southwest direction to a culvert under School Street and the adjacent parking lot. The River emerges from the culvert on the west side of the parking lot, bends in a northwestern direction for approximately 200 feet and then again enters a concrete culvert. The River does not re-emerge from the culvert within the site's boundaries.

The site has a long history of industrial use that spans over 150 years, and included hat factories, leather factories, and chemical dye manufacturers. Present structures include one- and two-story buildings, and an open paved parking lot. The Saw Mill River courses through the site.

The site will be redeveloped into a mixed-use retail, residential, office, and baseball stadium complex. The completed project will include a 6,500-seat minor league baseball park with adjacent retail space. Parking will be accommodated on and off site.

All development at ground level will be commercial, retail, parking garages, and loading docks. Residential development will be restricted to upper levels of the proposed buildings.

In order to support the proposed future use of the property, a volunteer Remedial Action Workplan (RAW) will be completed at the site in accordance with a Brownfield Cleanup Agreement (BCA). Under the terms of the BCA, the Volunteers must define the nature and extent of site contamination in a manner that enables the selection of an appropriate remediation strategy to support the site's contemplated future use. SESI Consulting Engineers, P.C. (SESI) will complete the site investigation on behalf of the Volunteers. This Community Air Monitoring Plan (CAMP) describes the measures that will be undertaken during field work to monitor ambient air at the downwind site perimeter.

D.2 - OBJECTIVES

The objective of this CAMP is to provide a measure of protection for the downwind community from potential airborne contaminant releases that might arise as a result of the planned fieldwork, which will include test pits and soil borings.

D.3 - METHODS

The CAMP will include monitoring for volatile organic compounds (VOCs) and particulate matter (e.g., airborne "dust") when deemed by SESI to be applicable. Readings will be recorded and will be available for State (DEC and DOH) personnel to review, as requested.

D.3.1 VOC MONITORING

When deemed by SESI to be applicable, a MiniRAE photoionization detector (PID) will be used to measure VOCs in air. VOCs will be monitored at the downwind perimeter of the site, based on the prevailing wind direction as determined at the beginning of each workday. The site perimeter is defined as the existing property boundary.

Upwind concentrations of VOCs will be measured at the beginning of every workday to establish background conditions. VOC concentrations will be measured continuously at the property boundary directly downwind of the work area. Downwind data will be checked as needed to provide a measure of assurance that contaminants are not being spread off site through the air. The PID will continuously record and store VOC measurements such that a 15-minute running average can be computed for the data each time the PID is checked.

- If the ambient air concentration for total organic vapors at the downwind property boundary exceeds 5 parts per million (ppm) above background for a 15-minute

average, work activity will be halted and monitoring will continue until levels decline to below 5 ppm over background. At this point, work will resume and monitoring will continue.

- If total organic vapor levels at the downwind property boundary persist at levels above 5 ppm over background but less than 25 ppm, work activities will be halted, the source of the vapors will be identified, and corrective actions will be taken to abate emissions. Work will resume after organic vapor levels fall to below 5 ppm over background at the downwind property boundary.
- If organic vapor levels exceed 25 ppm at the downwind, property boundary activities will be shut down. An appropriate course of action to abate emissions in order to resume work will be discussed with NYSDEC personnel.

D.3.2 PARTICULATE MONITORING

When deemed by SESI to be applicable, particulate (e.g. "dust") emissions will be measured continuously at the upwind and downwind property boundaries. Real time monitoring equipment (e.g. MiniRAM or equivalent), with audible alarms and capable of measuring particulate matter less than 10 micrometers in size, will be used.

- If the downwind particulate level is 100 micrograms per cubic meter (ug/m³) greater than background (upwind) for a 15-minute period, then dust suppression techniques will be employed. Work will continue with dust suppression provided that downwind particulate levels do not exceed 150 ug/m³ above upwind levels and provided that no visible dust is migrating from the work area.
- If, after dust suppression techniques, downwind particulate levels are greater than 150 ug/m³ above upwind levels, work will be stopped and a re-evaluation of activities will be initiated. Work will resume, provided that dust suppression measures and other controls are successful in reducing downwind particulate concentrations to within 150 ug/m³ of the upwind level and in preventing visible dust migration.

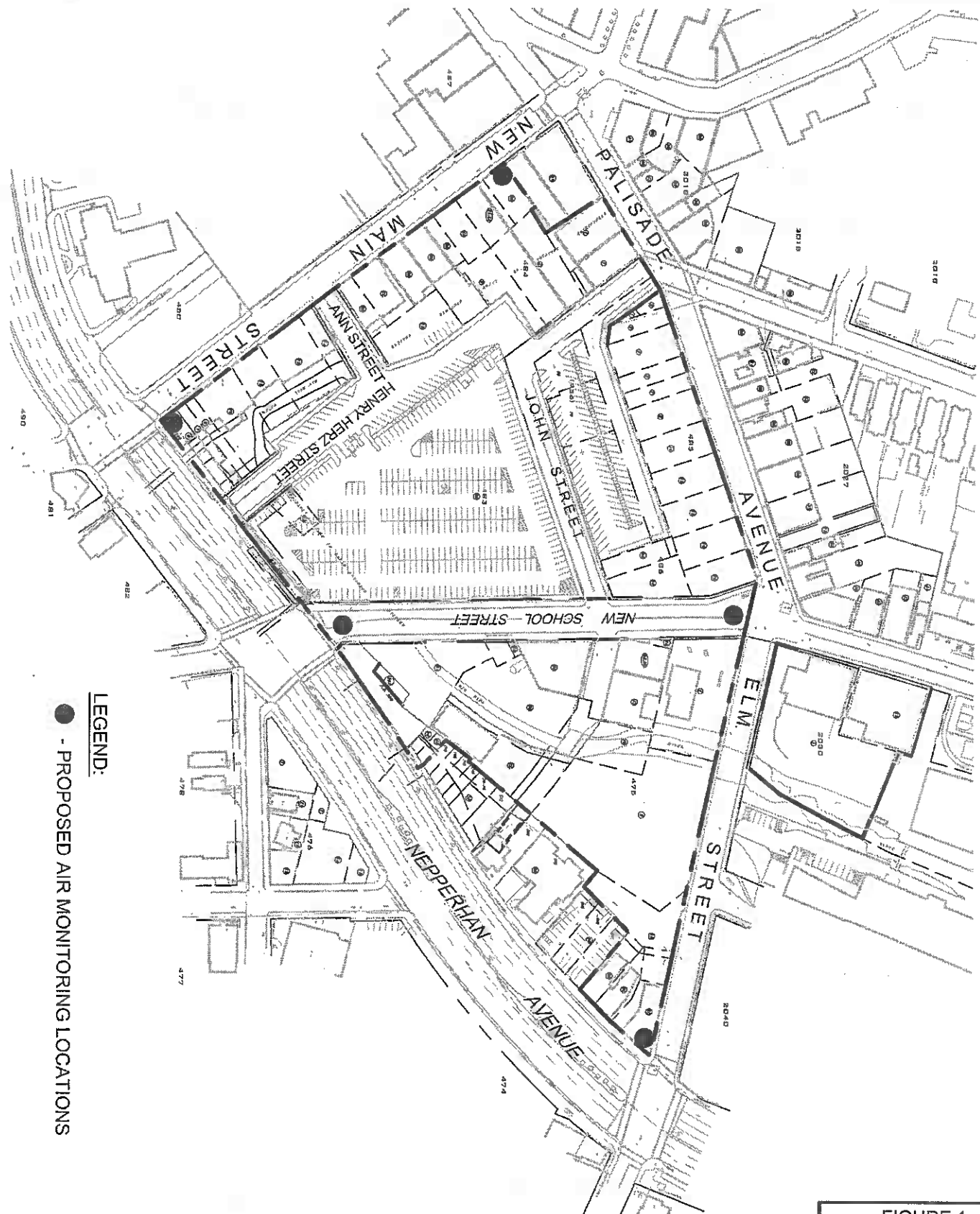


FIGURE 1

STRUEVER, FIDELCO, CAPPELLI, LLC
RIVER PARK CENTER PROJECT
CITY OF YONKERS, WESTCHESTER COUNTY,
NEW YORK

PROPOSED AIR MONITORING
LOCATIONS



SESI
CONSULTING
ENGINEERS, PC

SOILS / FOUNDATIONS
SITE DESIGN
ENVIRONMENTAL

12A MAPLE AVE. PINE BROOK, N.J. 07058 PH: 973-808-9050

DRAWN BY: YY

CHECKED BY: VN

SCALE: 1"=200

DATE: 11/12/07

JOB NO.: 7190

Appendix F

Quality Assurance Project Plan

Quality Assurance Project Plan

River Park Center Brownfield Cleanup Program Site #C360083 City of Yonkers, Westchester County, New York

1.0 PROJECT DESCRIPTION

This document presents the Quality Assurance Project Plan (QAPP) for the Remedial Action Workplan (RAWP) for multiple contiguous parcels located in the City of Yonkers, New York, which have been combined under the New York State Brownfield Cleanup Program (BCP) into a single BCP site (Site No. C360083).

The BCP site consists of approximately 12.94 acres, within a wedge-shaped area bounded by New Main Street (west), Palisade Avenue and Elm Street (north), and Nepperhan Avenue (south and east). New School Street bisects the site north-to-south, connecting Palisade and Nepperhan Avenues (Sheet RI-1) with the exception of Lot 35, the Church owned parcels consolidated into one lot.

2.0 PROJECT ORGANIZATION

The RAWP will be conducted by Soils Engineering Services, Inc. (SESI), on behalf of the BCP volunteer/developer Struever Fidelco Cappelli, LLC, (SFC),. The organization of SESI's key project management and field staff, and respective areas of responsibility, is presented below.

2.1 Project Principal

Michael W. St. Pierre, P.E.

Provide technical and administrative oversight and guidance throughout the project, assist in securing company resources, participate in technical review of deliverables, and attend key meetings as needed.

2.2 Principal Engineer

Christopher F. Zwingle, P.E.

Provide technical guidance and review of reports, analytical data. Will have key involvement in screening and development of remedial alternatives.

2.3 Project Manager

Dean Giovanetti.

Responsible for maintaining the day-to-day schedule for completing the fieldwork and deliverables according to BCP program requirements and client expectations.

2.4 Remedial Investigation Program Manager

Valerie Navib, PhD

Responsible for coordinating and directing field efforts of SESI staff and subcontractors, and for maintaining that work is done according to QAPP specifications.

2.5 Field Team Leader

Robert Fioretti

Responsible for overseeing field work during the RI, including observing subcontractors, maintaining field notes, and collecting samples of various environmental media, in accordance with the NYSDEC-approved Work Plan.

3.0 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA

In cases where NYSDOH ELAP Certification exists for a specific group or category of parameters, the laboratories performing analysis in connection with this project will have appropriate NYSDOH ELAP Certification. For analysis of samples where Analytical Service Protocol (ASP, June 2000) Category B deliverables are required, NYSDOH ELAP CLP certification is required.

Detection limits set by NYSDEC-ASP (June 2000) will be used for all sample analyses unless otherwise noted. If NYSDEC-ASP-dictated detection limits prove insufficient to assess project goals (i.e., comparison to drinking water standards or attainment of ARARs), then ASP Special Analytical Services (SAS) or other appropriate methods will be utilized.

The quality assurance/quality control objectives for all measurement data include completeness, representativeness, comparability, precision and accuracy.

3.1 COMPLETENESS

The analyses performed must be appropriate and inclusive. The parameters selected for analysis are chosen to meet the objectives of the study.

Completeness of the analyses will be assessed by comparing the number of parameters intended to be analyzed with the number of parameters successfully determined and validated. Data must meet QC acceptance criteria for 100 percent or more of requested determinations.

3.2 REPRESENTATIVENESS

Samples must be taken of the population and, where appropriate, the population will be characterized statistically to express the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process, or environmental condition.

Non-dedicated sampling devices will be cleaned between sampling points by washing and rinsing with pesticide-grade methanol, followed by a thorough rinse with distilled water. Specific cleaning techniques are described in the Field Sampling Procedure. Two types of blank samples will accompany each sample set where Target Compound List (TCL) volatiles are to be analyzed (water matrix only). A trip blank, consisting of a 40 ml VOA vial of organic-free water prepared by the laboratory, will accompany each set of sample bottles from the laboratory to the field and back. This bottle will remain sealed throughout the shipment and sampling process. This blank will be analyzed for TCL volatile organic compounds along with the groundwater samples to

ensure that contamination with TCL volatile compounds has not occurred during the bottle preparation, shipment and sampling phase of the project. In order to check for contaminant carryover when non-dedicated sampling equipment is used, a rinsate blank will be submitted to the laboratory. This blank will also be analyzed for TCL volatile organic compounds. The TCL compounds are identified in the United States Environmental Protection Agency (USEPA) Contract Laboratory Program dated 7/85 or as periodically updated.

The analysis results obtained from the determination of identical parameters in field duplicate samples can be used to further assess the representativeness of the sample data.

3.3 COMPARABILITY

Consistency in the acquisition, preparation, handling and analysis of samples is necessary in order for the results to be compared where appropriate. Additionally, the results obtained from analyses of the samples will be compared with the results obtained in previous studies, if available.

To ensure the comparability of analytical results with those obtained in previous or future testing, all samples will be analyzed by NYSDEC-approved methods. The NYSDEC-ASP mandated holding times for various analyses will be strictly adhered to.

3.4 PRECISION AND ACCURACY

The validity of the data produced will be assessed for precision and accuracy. Analytical methods which will be used include gas chromatography/mass spectrometry (GC/MS), gas chromatography (GC), colorimetry, atomic spectroscopy, gravimetric and titrimetric techniques. The following outlines the procedures for evaluating precision and accuracy, routine monitoring procedures, and corrective actions to maintain analytical quality control. All data evaluations will be consistent with NYSDEC-ASP procedures (June 2000). Data will be 100 percent compliant with NYSDEC-ASP requirements.

The requirements of QA/QC are both method specific and matrix dependent. The number of duplicate, spiked and blank samples analyzed will be dependent upon the total number of samples of each matrix to be analyzed, but there will be at least one split per matrix. The inclusion and frequency of analysis of field blanks and trip blanks will be on the order of one per each site. Samples to be analyzed for volatile organic compounds will be accompanied by trip and field blanks (water matrix) or field blanks (soil, sediment matrix).

Quality assurance audit samples will be prepared and submitted by the laboratory QA manager for each analytical procedure used. The degree of accuracy and the recovery of analyte to be expected for the analysis of QA samples and spiked samples is dependent upon the matrix, method of analysis, and compound or element being determined. The concentration of the analyte relative to the detection limit is also a major factor in determining the accuracy of the measurement. The lower end of the analytical range for most analyses is generally accepted to be five times the detection limit. At or above this level, the determination and spike recoveries for metals in water samples will be expected to range from 75 to 125 percent. The recovery of organic surrogate compounds and matrix spiking compounds determined by GC/MS will be compared to the guidelines for recovery of individual compounds as established by the United States Environmental Protection Agency Contract Laboratory Program dated 7/85 or as periodically updated.

The quality of results obtained for inorganic ion and demand parameters will be assessed by comparison of QC data with laboratory control charts for each test.

4.0 SAMPLING PROCEDURES

4.1 SAMPLING PROGRAM

The sampling program for this project will include surface water, groundwater, soil, sediment, and soil vapor. Soil samples will be collected from split spoon sampling devices retrieved from soil borings. Groundwater samples will be collected from groundwater monitoring wells. Sediment and surface water samples will be collected as grab samples from pre-determined locations along the Saw Mill River, which bisects the site. Soil vapor samples will be collected from soil vapor monitoring wells.

4.1.1 Drilling/Sampling Procedures

Soil, groundwater, and soil vapor samples will be collected by means of a soil boring program. Soil borings shall be completed using the hollow stem auger drilling methods, direct push methods, or rotary drilling methods, whichever methods are determined to be best suited to site conditions by the SESI project manager and SESI field team leader.

Soil samples will be collected from soil borings and analyzed in accordance with the NYSDEC-approved Work Plan. Monitoring wells for groundwater and soil vapor sample collection will be installed in completed soil borings. Either hollow stem auger (HSA) or direct push drilling methods may be utilized for monitoring well completion.

Samples of the encountered surface materials shall be collected continuously during drilling so that a complete soil profile is examined and described by the SESI field geologist. The sampling method employed shall be ASTM D-1586/Split Barrel Sampling using a standard 2-foot long, 2-inch outside diameter split- spoon sampler with a 140-pound hammer, in cases where HSA methods are used. Upon retrieval of the sampling barrel, the collected sample shall be placed in glass jars and labeled, stored on site (on ice in a cooler if necessary), and transmitted to the appropriate testing laboratory or storage facility. Chain-of-custody procedures will be practiced following Section 15, EPA-600/4-82-029, Handbook for Sampling and Sample Preservation of Water and Waste Waters.

A geologist or engineer will be on site during the drilling operations to fully describe each soil sample, following the New York State Soil Description Procedure, and to retain representative portions of each sample.

The drilling contractor will be responsible for obtaining accurate and representative samples, informing the geologist of changes in drilling pressure, keeping a separate general log of soils encountered including blow counts [i.e., the number of blows from a soil sampling drive weight (140 pounds)] required to drive the split-spoon sampler in 6-inch increments and installing monitoring wells to levels directed by the supervising geologist following specifications further outlined in this protocol.

4.1.2 Monitoring Well Completion

Monitoring wells will be constructed of 10 feet of .010-inch slot size PVC well screen and riser casing. Other materials utilized for completion will be washed silica sand (Q-Rock No. 4 or approved equivalent) bentonite grout, Portland cement, and a protective steel locking well casing and cap with locks.

The monitoring well installation method for wells installed within unconsolidated sediments shall be to place the screen and riser assembly into the casing once the screen interval has been selected. At that time, a washed silica sand pack will be placed around the well screen if required to prevent screen plugging. If a sand pack is not warranted, the auger string will be pulled back to allow the native aquifer material to collapse 2 to 3 feet above the top of the screen. Bentonite pellets will then be added to the annulus between the casing and the inside auger to insure proper sealing. Cement/bentonite grout will continue to be added during the extraction of the augers until the entire aquifer thickness has been sufficiently sealed off from horizontal and/or vertical flow above the screened interval. During placement of sand and bentonite pellets, frequent measurements will be made to check the height of the sand pack and thickness of bentonite layers by a weighted drop tape measure.

A bolt-down protective curb box will be installed, flush with the ground, or steel "stick-up" protective casing and secured by a Portland cement seal. The cement seal shall extend laterally at least 1 foot in all directions from the protective casing and shall slope gently away to drain water away from the well.

4.1.3 Well Development

All monitoring wells will be developed or cleared of all fine-grained materials and sediments that have settled in or around the well during installation so that the screen is transmitting representative portions of the groundwater. The development will be by one of two methods, pumping or bailing groundwater from the well until it yields relatively sediment-free water.

A decontaminated pump or bailer will be used and subsequently decontaminated after each use following procedures outlined in the Decontamination Protocol. Pumping or bailing will cease when the turbidity falls below 50 NTUs or until specific conductivity, pH, and temperature are stable (i.e., consecutive readings are within 10 percent with no overall upward or downward trends in measurements). Well development water will be disposed of on the ground surface at each well location or contained in drums as conditions warrant.

4.1.4 Decontamination

All drilling equipment and associated tools including augers, drill rods, sampling equipment, wrenches and any other equipment or tools that have come in contact with contaminated materials will be decontaminated before any drilling on site begins, between each well, and prior to removing any equipment from the site. The preferred decontamination procedure will be to use a high pressure steam cleaner to remove soils and volatile organics from the equipment. The water used for this procedure will be contained and shall come from a controlled source, preferably a municipal drinking supply. Representative samples of the contained decontamination water and well development water will be screened in the field to determine the proper method of disposal. Every effort will be made to minimize the generation of contaminated water.

4.2 Groundwater Sampling Program.

4.2.1 Well Evacuation

Prior to sampling a monitoring well, the static water level will be recorded and the wells evacuated to assure that the water in the well is truly representative of the groundwater. All well data will be recorded on a field sampling record. For shallow wells or deep wells with a relatively low static water level, evacuation will be accomplished by using a stainless steel or teflon bailer with a ball check valve at its lower end. A bladder may be used to evacuate the

deeper wells at a rate of approximately 1 gpm. Water samples to be analyzed for volatile and/or semi-volatile organics must be sampled by bailer.

4.2.2 Sampling Procedure

Groundwater samples will be collected using either stainless steel, teflon, or disposable polyethylene bailers with a ball check valve at the lower end. Incorporation of a check valve onto the bailers assures that a sample is representative of the depth to which the bailer is lowered. All samples will be removed from a depth just above the well screen to further assure a representative groundwater sample. Before and after sampling, the sampling device will be cleaned inside and out with soapy water, methanol, and then rinsed with distilled deionized water. Sampling procedures are summarized on Table 4.2.

In addition to water samples collected from the monitoring wells, two types of "blanks" will be collected and submitted to the chemical laboratory for analyses. The blanks will consist of 40 ml VOA vials, as follows:

A trip blank will be prepared before the sample bottles are sent by the laboratory. It consists of a sample of distilled, deionized water which accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of samples where sampling and analysis for TCL volatiles is planned (water matrix only). The trip blank will be analyzed for TCL volatile organic compounds as a measure of the internal laboratory procedures and their effect on the results.

4.3 Soil Vapor Sampling

Soil vapor sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Indoor Air Intrusion in New York State (February 2005). Soil vapor samples will be collected in the vadose zone from shallow (5 feet) well points. Each well point will be installed in a shallow boring drilled either by hand-operated equipment (e.g. hand auger or percussion hammer drill), or by a small truck-mounted drill rig. Drilling equipment used shall be based on soil conditions, and the method that provides the most practical approach.

Each well point will consist of an inert sampling tube (polyethylene, stainless steel, or Teflon®) with a 6-inch screened section at the bottom through which soil vapors can be sampled. The screen slot size will be 0.0075 inches. A sampling zone will be created around the screened section by backfilling with 1 to 2 feet of porous coarse sand or glass beads, and at least three feet of bentonite will be placed above the porous sampling zone to form a seal from the surface. Native clean soil will be packed around the remaining annulus to the ground surface.

Each designated soil vapor sampling location will be purged of a minimum of three volumes using a low volume pump, and then attached to a regulator, and secured with a clamp. The regulator will then be attached to a 1-liter summa canister.

The regulator will be set to collect a soil vapor sample at a flow rate of less than 0.2 liters per minute. After the summa canister is filled, the valve will be closed.

Each canister will be listed according to a specific sample I.D. on a chain of custody form. Sample canisters will be delivered to the laboratory within 24 hours, and analyzed for VOCs by method TO-15. The detection limit for VOCs will be 1 µg/m³ or less.

The soil vapor sampling effort will include the use inert helium tracer gas to verify that the soil vapor samples are not diluted by ambient air. The atmosphere around the sampling tube will be enriched with the tracer gas, and the soil vapor sample will be collected in the presence of the enriched tracer atmosphere. This will be accomplished by placing an inverted plastic pail over the sampling point, and filling the pail with the tracer gas via a small tube penetrating the site of the pail. Refer to NYSDOH Guidance for Evaluating Indoor Air Intrusion in New York State (October 2006).

Weather conditions in the 48 hours prior to the test, and during the test, will be noted, including average wind speed, precipitation, temperature, and barometric pressure.

4.4 SAMPLE PRESERVATION AND SHIPMENT

Since all bottles will contain the necessary preservatives as shown in Table 4.1, they need only be filled. The 40 ml VOA vials must be filled brim full with no air bubbles. The other bottles should be filled to within about 1 inch from the top.

The bottles will be sent from the laboratory in coolers which will be organized on a per site basis. Following sample collection, the bottles should be placed on ice in the shipping cooler. The samples will be cooled to 4°C, but not frozen.

Final packing and shipment of coolers will be performed in accordance with guidelines outlined in the "User's Guide to the CLP".

5.0 SAMPLE CUSTODY

The program for sample custody and sample transfer is in compliance with the NYSDEC-ASP, as periodically updated. If samples may be needed for legal purposes, chain-of-custody procedures, as defined by NEIC Policies and Procedures (USEPA-330/9-78-001-R, Revised June 1988) will be used. Sample chain-of-custody is initiated by the laboratory with selection and preparation of the sample containers. To reduce the chance for error, the number of personnel handling the samples should be minimized.

5.1 FIELD SAMPLE CUSTODY

A chain-of-custody record accompanies the sample from initial sample container selection and preparation at the laboratory, shipment to the field for sample containment and preservation, and return to the laboratory. Two copies of this record follow the samples to the laboratory. The laboratory maintains one file copy and the completed original is returned to the site inspection team. Individual sample containers provided by the laboratory are used for shipping samples. The shipping containers are insulated and chemical or ice water is used to maintain samples at approximately 4°C until samples are returned and in the custody of the laboratory. All sample bottles within each shipping container are individually labeled and controlled. Samples are to be shipped to the laboratory within 24-48 hours of the day of collection.

Each sample shipping container is assigned a unique identification number by the laboratory. This number is recorded on the chain-of-custody record and is marked with indelible ink on the outside of the shipping container. The field sampler will indicate the sample designation/location number in the space provided on the appropriate chain-of-custody form for each sample collected. The shipping container is closed and a seal provided by the laboratory is affixed to the latch. This seal must be broken to open the container, and this indicates possible tampering if the seal is broken before receipt at the laboratory. The laboratory will contact the site investigation team leader and the

sample will not be analyzed if tampering is apparent.

5.2 LABORATORY SAMPLE CUSTODY

The site investigation team leader or Project Quality Assurance Officer notifies the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The laboratory sample program meets the following criteria:

1. The laboratory has designated a sample custodian who is responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
2. Upon receipt of the samples, the custodian will check the original chain-of-custody documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian signs the chain-of-custody record and records the date and time received.
3. Care is exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the site investigation team leader as part of the corrective action process. A qualitative assessment of each sample container is performed to note any anomalies, such as broken or leaking bottles. This assessment is recorded as part of the incoming chain-of-custody procedure.
4. The samples are stored in a secured area at a temperature of approximately 4°C until analyses are to commence.
5. A laboratory chain-of-custody record accompanies the sample or sample fraction through final analysis for control.
6. A copy of the chain-of-custody form will accompany the laboratory report and will become a permanent part of the project records.

5.3 FINAL EVIDENCE FILES

Final evidence files include all originals of laboratory reports and are maintained under documented control in a secure area.

A sample or an evidence file is under custody if:

- It is in your possession; it is in your view, after being in your possession.
- It was in your possession and you placed it in a secure area.
- It is in a designated secure area.

6.0 CALIBRATION PROCEDURES

Instruments and equipment used to gather, generate or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the appropriate manufacturer's specifications or project specific requirements. The procedures for instrument calibration, calibration verification, and the frequency of calibrations are described in the NYSDEC-CLP. The calibration of instruments used for the determination of metals will be as described in the appropriate CLP standard operating procedures.

Calibration of other instruments required for measurements associated with these analyses will be in accordance with the manufacturer's recommendations and the standard operating procedures of the laboratory.

7.0 ANALYTICAL PROCEDURES

Analytical procedures shall conform to the most recent revision of the NYSDEC-ASP (June 2000) and are summarized on Table 7.1. In the absence of USEPA or NYSDEC guidelines, appropriate procedures shall be submitted for approval by NYSDEC prior to use.

The procedures for the sample preparation and analysis for organic compounds are as specified in the NYSDEC-ASP. Analytical cleanups are mandatory where matrix interferences are noted. No sample shall be diluted any more than 1 to 5. The sample shall be either re-extracted, re-sonicated, re-stream distilled, etc. or be subjected to any one analytical cleanup noted in SW846 or a combination thereof. The analytical laboratory shall expend such effort and discretion to demonstrate good laboratory practice and demonstrate an attempt to best achieve the method detection limit.

7.1 VOLATILE ORGANICS (VOA)

For the analysis of water samples for Target Compound List (TCL), volatile organic compounds (VOCs), no sample preparation is required. The analytical procedure for volatiles is detailed in NYSDEC-ASP (Volume I, Section D-I). A measured portion of the sample is placed in the purge and trap apparatus and the sample analysis is performed by gas chromatography/mass spectrometry for the first round. USEPA Method 8260 will be used, plus tentatively identified compounds (TICs). USEPA Methods 8010 or 8020 (gas chromatography with different detectors) will be used if subsequent rounds with lower limits of detection are warranted.

7.2 SEMI-VOLATILE ORGANIC COMPOUNDS

The extraction and analytical procedures used for preparation of water, soil and sediment samples for the analysis of the TCL semi-volatile organic compounds are described in NYSDEC-ASP Volume I, Section D-III. USEPA Method 8270 will be used, plus tentatively identified compounds (TICs).

Instrument calibration, compound identification, and quantitation are performed as described in Section 6 of this document and in the NYSDEC-ASP.

7.3 PESTICIDE AND PCB COMPOUNDS

The sample preservation procedures for gas chromatography for pesticides and PCB's will be as described in the NYSDEC-ASP methods (Section D-IV). The analysis of standard mixes, blanks and spiked samples will be performed at the prescribed frequency with adherence to the 72-hour requirement described in the method.

7.4 METALS

Water, soil and waste samples will be analyzed for the metals listed in Table 7.1. The detection limits for these metals are as specified in the NYSDEC-ASP, Section D-V. The instrument detection limits will be determined using calibration standards and procedures specified in the NYSDEC-ASP. The detection limits for individual samples may be higher due to the sample matrix. The procedures for these analyses will be as described in the NYSDEC-ASP.

The digestion procedures for water samples are not recommended for samples requiring analysis for mercury, arsenic or selenium. The aliquot of sample analyzed for As and Se will be prepared

using the modifications described in USEPA Methods 206.2 CLP-M and 270.2 CLP-M, respectively. Analysis for mercury requires a separate digestion procedure (245.1 CLP-M, or 245.2 CLP-M).

The analyses for metals will be performed by atomic absorption spectroscopy (AAS) or inductively-coupled plasma emission spectroscopy (ICPES), as specified in the ASP with regard to AAS flame analysis.

7.5 SITE SPECIFICITY OF ANALYSES

Work plans prepared for remedial investigation waste sites contain recommendations for the chemical parameters to be determined for each site. Thus, some or all of the referenced methods will apply to the analysis of samples collected at the individual waste sites. Analyses of Target Compound List (TCL) analytes will be performed on all samples.

TABLE 4.1 – SAMPLE CONTAINERIZATION

ANALYSIS	NO.	BOTTLE TYPE	PRESERVATIVE(1)	HOLDING TIME(2)
Water Samples				
GC/MS(extractable) and pesticides/PCBs	2	1-liter glass bottle	None	5 days (until extraction, 40 days extracted)
GC/MS (VOA)	2	40 mil, glass vial with septum cap	None	7 days
Metals(3)	1	1 liter, plastic bottle	Nitric acid to pH <2	6 months Mercury: 26 days
Soil, Sediment, Solid Waste				
TCL organics		Wide mouth, plastic or glass	None	7 days (until extraction, 40 days extracted)
TCL inorganics		Wide mouth, plastic or glass	None	6 months Cyanide: 12 days Mercury: 28 days

(1) All samples will be preserved with ice during collection and shipment.

(2) From verified time of sample receipt by the analytical laboratory (within 24 to 48 hours of collection).

(3) Metals refers to the 24 metals and cyanide in the Target Compound List (NYSDEC-CLP 11/87).

TABLE 4.2 – SAMPLING PROCEDURE FOR MONITORING WELLS

1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.
2. Sampling device and electric contact probe decontaminated.
 - a. Sampling device and probe are rinsed with pesticide-grade methanol and distilled water.
 - b. Methanol is collected into a large funnel which empties into a five- gallon container.
3. Sampling device lowered into well.
 - a. Bailer lowered by dedicated PVC or polypropylene line.
4. Sample taken.
 - a. Sample is poured slowly from the open end of the bailer and the sample bottle tilted so that aeration and turbulence are minimized.
 - b. Duplicate sample is collected when appropriate.
5. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.
6. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.
 - a. Dedicated line is disposed of or left at well site.
7. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.
8. Chain-of-custody forms are completed in triplicate.
 - a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler.
9. The original will be returned following sample analysis.
 - a. A second carbon copy is kept on file.
10. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

TABLE 4.3 – SAMPLING PROCEDURE FOR MONITORING WELLS USING LOW-STRESS (LOW-FLOW) METHODS

1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.
2. Sampling device is lowered into well. Slowly lower the pump, safety cable, tubing and electrical lines into the well to the depth specified for that well. Pump intake must be no less than 2 feet from the bottom of the well to prevent disturbance and resuspension of sediments which may be at the bottom of the well.
3. Measure water level again: Before starting the pump, measure the water level again with the pump in the well. Leave the water level measuring device in the well.
4. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level should be monitored approximately every five minutes. Ideally, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 ft or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. As noted above, care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.
5. Monitor Indicator Parameters: During purging of the well, monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, Eh, and DO) approximately every five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows (Puls and Barcelona, 1996):
 - a. 0.1 for pH
 - b. 3% for specific conductance (conductivity)
 - c. 10 mv for redox potential
 - d. 10% for DO and turbidity
6. Dissolved oxygen and turbidity usually require the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.
7. Collect Samples: Collect samples at a flow rate between 100 and 250 ml/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 ft. VOC samples must be collected first and directly into sample containers. All sample containers should be filled with minimal turbulence by allowing the ground water to flow from the tubing gently down the inside of the container.
8. Ground water samples to be analyzed for volatile organic compounds (VOCs) require pH adjustment. The appropriate EPA Program Guidance should be consulted to determine whether pH adjustment is necessary. If pH adjustment is necessary for VOC sample preservation, the amount of acid to be added to each sample vial prior to sampling should be determined, drop by drop, on a separate and equal volume of water (e.g., 40 ml). Groundwater purged from the well prior to sampling can be used for this purpose.

9. Remove Pump and Tubing: After collection of the samples, the tubing, unless permanently installed, must be properly discarded or dedicated to the well for resampling by hanging the tubing inside the well.
10. Measure and record well depth.
11. Close and lock the well.
12. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.
13. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.
 - a. Dedicated line is disposed of or left at well site.
14. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.
15. Chain-of-custody forms are completed in triplicate.
 - a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler. The original will be returned following sample analysis.
 - b. A second carbon copy is kept on file.
16. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

TABLE 7-1 – CONTRACT-REQUIRED QUANTITATION LEVELS AND ANALYTICAL METHODS FOR ASP INORGANICS, ASP VOLATILES, ASP SEMI-VOLATILES, ASP PESTICIDES, AND PCBS

Superfund Target Compound List (TCL) and Contract-Required Quantitation Limit

SECTION 1 - ASP INORGANICS Method: NYSDEC-ASP-91-4			
PARAMETER	CONTRACT-REQUIRED DETECTION LEVEL* (µg/l)	PARAMETER	CONTRACT-REQUIRED DETECTION LEVEL* (µg/l)
1. Aluminum	200	13. Magnesium	5,000
2. Antimony	60	14. Manganese	15
3. Arsenic	10	15. Mercury	0.2
4. Barium	200	16. Nickel	40
5. Beryllium	5	17. Potassium	5,000
6. Cadmium	5	18. Selenium	5
7. Calcium	5,000	19. Silver	10
8. Chromium	10	20. Sodium	5,000
9. Cobalt	50	21. Thallium	10
10. Copper	25	22. Vanadium	50
11. Iron	100	23. Zinc	20
12. Lead	3	24. Cyanide	10

SECTION 2 – ASP ORGANICS (VOLATILES) Method: NYSDEC-ASP-91-1			
VOLATILE	CONTRACT-REQUIRED QUANTITATION LIMIT** (µg/l)	VOLATILE	CONTRACT-REQUIRED QUANTITATION LIMIT** (µg/l)
1. Chloromethane	10	18. 1,2-Dichloropropane	10
2. Bromomethane	10	19. cis-1,3-Dichloropropene	10
3. Vinyl Chloride	10	20. Trichloroethene	10
4. Chloroethane	10	21. Dibromochloromethane	10
5. Methylene Chloride	10	22. 1,1,2-Trichloroethane	10
6. Acetone	10	23. Benzene	10
7. Carbon Disulfide	10	24. Trans-1,3-Dichloropropene	10
8. 1,1-Dichloroethylene	10	25. Bromoform	10
9. 1,1-Dichloroethane	10	26. 2-Hexanone	10
10. 1,2-Dichloroethylene (total)	10	27. 4-Methyl, 1,2-Pentanone	10
11. Chloroform	10	28. Tetrachloroethylene	10
12. 1,2-Dichloroethane	10	29. Toluene	10
13. 2-Butanone	10	30. Chlorobenzene	10
14. 1,1,1-Trichloroethane	10	31. Ethylbenzene	10
15. Carbon Tetrachloride	10	32. Styrene	10
16. Bromodichloromethane	10	33. Total Xylenes	10
17. 1,1,2,2-Tetrachloroethane	10		

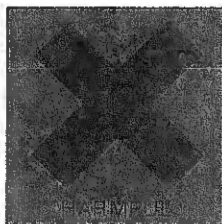
SECTION 3 - ASP ORGANICS (SEMI-VOLATILES) Method: NYSDEC-ASP-91-2			
SEMI-VOLATILE	CONTRACT-REQUIRED QUANTITATION LIMIT (µg/l)	SEMI-VOLATILE	CONTRACT-REQUIRED QUANTITATION LIMIT (µg/l)
1. Phenol	10	33. Acenaphthene	10
2. Bis(2-chloroethyl)ether	10	34. 2,4-Dinitrophenol	25
3. 2-Chlorophenol	10	35. 4-Nitrophenol	25
4. 1,3-Dichlorobenzene	10	36. Dibenzofuran	10
5. 1,4-Dichlorobenzene	10	37. Dinitrotoluene	10
6. 1,2-Dichlorobenzene	10	38. Diethylphthalate	10
7. 2-Methylphenol	10	39. 4-Chlorophenyl phenyl ether	10
8. 2,2'oxybis(1-Chloropropane)	10	40. Fluorene	10
9. 4-Methylphenol	10	41. 4-Nitroanile	25
10. N-Nitroso-dipropylamine	10	42. 4,6-Dinitro-2-methylphenol	25
11. Hexachloroethane	10	43. N-nitrosodiphenyl amine	10
12. Nitrobenzene	10	44. 4-Bromophenyl phenyl ether	10
13. Isophorone	10	45. Hexachlorobenzene	10
14. 2-Nitrophenol	10	46. Pentachlorophenol	25
15. 2,4-Dimethylphenol	10	47. Phenanthrene	10
16. Bis(2-Chloroethoxy) methane	10	48. Anthracene	10
17. 2,4-Dichlorophenol	10	49. Carbazole	10
18. 1,2,4-Trichlorobenzene	10	50. Di-n-butyl phthalate	10
19. Naphthalene	10	51. Fluoranthene	10
20. 4-Chloroaniline	10	52. Pyrene	10
21. Hexachlorobutadiene	10	53. Butyl benzyl phthalate	10
22. 4-Chloro-3-methylphenol	10	54. 3,3'-Dichloro benzidine	10
23. 2-Methylnaphthalene	10	55. Benz(a)anthracene	10
24. Hexachlorocyclopentadiene	10	56. Chrysene	10
25. 2,4,6-Trichlorophenol	10	57. Bis(2-ethylhexyl) phthalate	10
26. 2,4,5-Trichlorophenol	25	58. Di-n-octyl phthalate	10
27. 2-Chloronaphthalene	10	59. Benzo(b)fluoranthene	10
28. 2-Nitroaniline	25	60. Benzo(k)fluoranthene	10
29. Dimethyl phthalate	10	61. Benzo(a)pyrene	10
30. Acenaphthylene	10	62. Indeno(1,2,3-cd) pyrene	10
31. 2,6-Dinitrotoluene	10	63. Dibenz(a,h) anthracene	10
32. 3-Nitroaniline	25	64. Benzo(g,h,i)perylene	10

SECTION 3 - ASP ORGANICS (PESTICIDES/PCBS) Method: NYSDEC-ASP-91-3			
PESTICIDE/PCB	CONTRACT-REQUIRED QUANTITATION LIMIT ($\mu\text{g/l}$)	PESTICIDE/PCB	CONTRACT-REQUIRED QUANTITATION LIMIT ($\mu\text{g/l}$)
1. Alpha-BHC	0.05	15. 4,4'-DDT	0.10
2. Beta-BHC	0.05	16. Methoxychlor	0.5
3. Delta-BHC	0.05	17. Endrin ketone	0.10
4. Gamma-BHC (lindane)	0.05	18. Endrin aldehyde	0.10
5. Heptachlor	0.05	19. Alpha-Chlordane	0.05
6. Aldrin	0.05	20. Gamma-Chlordane	0.05
7. Heptachlor epoxide	0.05	21. Toxaphene	5.0
8. Endosulfan I	0.05	22. AROCHLOR-1016	1.0
9. Dieldrin	0.10	23. AROCHLOR-1221	1.0
10. 4,4'-DDE	0.10	24. AROCHLOR-1232	1.0
11. Endrin	0.10	25. AROCHLOR-1242	1.0
12. Endosulfan II	0.10	26. AROCHLOR-1248	1.0
13. 4,4'-DDD	0.10	27. AROCHLOR-1254	1.0
14. Endosulfan sulfate	0.10	28. AROCHLOR-1260	1.0

*Matrix: groundwater. For soil matrix, multiply CRDL by 100.

**Quantitation limit for medium-level soil is 1,200 $\mu\text{g/kg}$ (wet weight basis).

Safety data for phenanthrene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: coal tar pitch volatiles, ravatite, phenantrin

Use:

Molecular formula: $C_{14}H_{10}$

CAS No: 85-01-8

EC No: 201-581-5

Physical data

Appearance: white crystals

Melting point: 99 - 101 C

Boiling point: 336 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$): 1.063

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Harmful if swallowed. May be harmful if inhaled or absorbed through the skin. Skin, eye and respiratory irritant. Causes photosensitivity.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

ORL-MUS LD50 700 mg kg⁻¹

IPR-MUS LD50 700 mg kg⁻¹

IVN-MUS LD50 56 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R20 R21 R22 R36 R37 R38 R40.

Transport information

Non-hazardous for air, sea and road freight.

Personal protection

Safety glasses, adequate ventilation.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

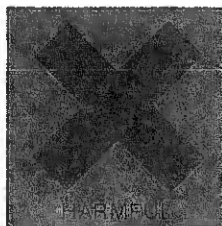
S26 S27 S36 S37 S39 S45.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on January 2, 2004. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for pyrene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: beta-pyrene, coal tar pitch volatiles

Molecular formula: $C_{16}H_{10}$

CAS No: 129-00-0

EC No: 204-927-3

Physical data

Appearance: yellow or white crystals and powder

Melting point: 149 - 151 C

Boiling point: 404 C

Vapour density:

Vapour pressure:

Specific gravity:

Flash point:

Explosion limits:

Autoignition temperature:

Stability

Stable. Incompatible with strong oxidizing agents. Flammable.

Toxicology

Harmful if swallowed. May be harmful by inhalation or through skin contact - readily absorbed through skin. Irritant. Toxicology not fully investigated.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

ORL-RAT LD50 2700 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)

R10 R22 R36 R37 R38.

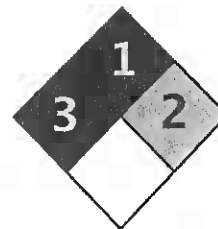
Personal protection

Safety glasses. Adequate ventilation.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on August 24, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.



Health	3
Fire	1
Reactivity	2
Personal Protection	E

Material Safety Data Sheet

Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International **CHEMTREC**, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance is toxic to kidneys, lungs, the nervous system, mucous membranes.

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not

present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 from ACGIH (TLV) [United States] [1995]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH.

Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion, of inhalation.

Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic

Pennsylvania RTK: Arsenic

Massachusetts RTK: Arsenic

TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).

CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R22- Harmful if swallowed.

R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Safety glasses.

Section 16: Other Information**References:**

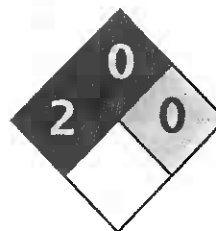
- Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
- Liste des produits purs tératogènes, mutagènes, cancérigènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec.
- Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec.
- SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
- The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
- Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:16 PM

Last Updated: 10/09/2005 04:16 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Barium carbonate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Barium carbonate

Catalog Codes: SLB3556, SLB1225, SLD2545

CAS#: 513-77-9

RTECS: CQ8600000

TSCA: TSCA 8(b) inventory: Barium carbonate

CI#: Not available.

Synonym: Barium monocarbonate; Carbonic acid, barium salt.

Chemical Name: Barium Carbonate

Chemical Formula: BaCO₃

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Barium carbonate	513-77-9	100

Toxicological Data on Ingredients: Barium carbonate: ORAL (LD50): Acute: 200 mg/kg [Mouse]. 418 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at

least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Non combustible.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as acids.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 (mg(Ba)/m) from ACGIH (TLV) [United States]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Powdered solid.)

Odor: Odorless.

Taste: Tasteless.

Molecular Weight: 197.34 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: Decomposition temperature: 1300°C (2372°F)

Melting Point: 811°C (1491.8°F)

Critical Temperature: Not available.

Specific Gravity: 4.43 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Very slightly soluble in cold water.

Solubility in water: 0.024 g/l; 0.0022 g/l @ 18 deg. C. Almost insoluble in water.

Soluble in solution of dilute hydrochloric acid, nitric acid, or acetic acid.

Soluble in solution of ammonium chloride or ammonium nitrate.

Insoluble in sulfuric acid.

Soluble in ethanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Contact with acids causes formation of Carbon dioxide gas that may cause suffocation in enclosed spaces.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 200 mg/kg [Mouse].

Chronic Effects on Humans: CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause adverse reproductive effects based on animal test data

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: May cause skin irritation.

Eyes: May cause eye irritation.

Inhalation: May cause respiratory tract irritation. May cause benign pneumoconiosis (baritosis). This is not incapacitating and is usually reversible with cessation of exposure. Inhalation may have similar systemic effects as ingestion since Barium Carbonate is cleared from the lungs into the blood stream.

Ingestion: Harmful if swallowed. May affect behavior/central nervous system/peripheral nervous system, gastrointestinal system, respiration, cardiovascular system, and kidneys. Symptoms may include: weakness, nausea, vomiting, diarrhea, hypermotility, excessive salivation, colic, convulsive tremors, giddiness, dilated pupils, increased blood pressure, heart palpitations, hemorrhages in the gastrointestinal tract and kidneys, muscular paralysis, dryness of mouth, thirst, sweating, tingling around the mouth and neck, tightness in the throat, respiratory depression, dysarthria, headaches, muscle twitching, urinary retention, testicular tenderness. May also cause hypokalemia with associated electrocardiogram changes. Serious cases may result in convulsions

and death.

Chronic Potential Health Effects:

Inhalation: Prolonged inhalation may cause benign pneumoconiosis (baritosis).

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Barium carbonate

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC):

R22- Harmful if swallowed.

S24/25- Avoid contact with skin and eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Section 16: Other Information

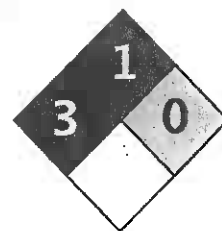
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:14 PM

Last Updated: 10/10/2005 08:14 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

Cl#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.], 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance is toxic to kidneys, lungs, liver.

Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (ppm)

Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation, Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 890 mg/kg [Mouse].

Acute toxicity of the dust (LC50): 229.9 mg/m³ 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.

The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation.

Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute:

Cadmium

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium

Pennsylvania RTK: Cadmium

Massachusetts RTK: Cadmium

TSCA 8(b) inventory: Cadmium

SARA 313 toxic chemical notification and release reporting: Cadmium

CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).

CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R26- Very toxic by inhalation.

R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Safety glasses.

Section 16: Other Information

References:

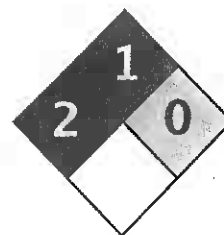
- Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
- Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec.
- Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec.
- SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
- The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
- Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:29 PM

Last Updated: 10/09/2005 04:29 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Chromium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Chromium

Catalog Codes: SLC4711, SLC3709

CAS#: 7440-47-3

RTECS: GB4200000

TSCA: TSCA 8(b) inventory: Chromium

CI#: Not applicable.

Synonym: Chromium metal; Chrome; Chromium Metal Chips 2" and finer

Chemical Name: Chromium

Chemical Formula: Cr

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Chromium	7440-47-3	100

Toxicological Data on Ingredients: Chromium LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to kidneys, lungs, liver, upper respiratory tract.

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 580°C (1076°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame.
Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence.
Pyrophoric chromium unites with nitric oxide with incandescence.
Incandescent reaction with nitrogen oxide or sulfur dioxide.

Special Remarks on Explosion Hazards:

Powdered Chromium metal + fused ammonium nitrate may react violently or explosively.
Powdered Chromium will explode spontaneously in air.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 (mg/m³) from ACGIH (TLV) [United States]

TWA: 1 (mg/m³) from OSHA (PEL) [United States]

TWA: 0.5 (mg/m³) from NIOSH [United States]

TWA: 0.5 (mg/m³) [United Kingdom (UK)]

TWA: 0.5 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 52 g/mole

Color: Silver-white to Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 2642°C (4787.6°F)

Melting Point: 1900°C (3452°F) +/- 10 deg. C

Critical Temperature: Not available.

Specific Gravity: 7.14 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Insoluble in cold water, hot water.

Soluble in acids (except Nitric), and strong alkalis.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Not available.

Special Remarks on Reactivity:

Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalis and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride.

It may react violently or ignite with bromine pentafluoride.

Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate.

Potentially hazardous incompatibility with strong oxidizers.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation, Ingestion.

Toxicity to Animals:

LD50: Not available.

LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for

human.) by IARC.

May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation.

Slightly hazardous in case of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

May cause skin irritation.

Eyes: May cause mechanical eye irritation.

Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract.

Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea.

Chronic Potential Health Effects:

Inhalation: The effects of chronic exposure include irritation, sneezing, redness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconiosis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur.

Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut hazardous material survey.: Chromium
Illinois toxic substances disclosure to employee act: Chromium
Illinois chemical safety act: Chromium
New York release reporting list: Chromium
Rhode Island RTK hazardous substances: Chromium
Pennsylvania RTK: Chromium
Minnesota: Chromium
Michigan critical material: Chromium
Massachusetts RTK: Chromium
Massachusetts spill list: Chromium
New Jersey: Chromium
New Jersey spill list: Chromium
Louisiana spill reporting: Chromium
California Director's List of Hazardous Substances: Chromium
TSCA 8(b) inventory: Chromium
SARA 313 toxic chemical notification and release reporting: Chromium
CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

R40- Limited evidence of carcinogenic effect
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent.

Splash goggles.

Section 16: Other Information

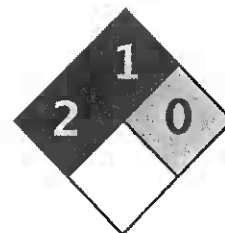
References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:16 PM

Last Updated: 10/10/2005 08:16 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Copper MSDS

Section 1: Chemical Product and Company Identification

Product Name: Copper

Catalog Codes: SLC4939, SLC2152, SLC3943, SLC1150, SLC2941, SLC4729, SLC1936, SLC3727, SLC5515

CAS#: 7440-50-8

RTECS: GL5325000

TSCA: TSCA 8(b) inventory: Copper

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Cu

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Copper	7440-50-8	100

Toxicological Data on Ingredients: Copper LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (irritant).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance is toxic to lungs, mucous membranes.

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 1 (mg/m³) from ACGIH [1990]

Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 63.54 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 2595°C (4703°F)

Melting Point: 1083°C (1981.4°F)

Critical Temperature: Not available.

Specific Gravity: 8.94 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available.

LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion.

Hazardous in case of inhalation.

Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Copper

Massachusetts RTK: Copper

TSCA 8(b) inventory: Copper

CERCLA: Hazardous substances.: Copper

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R36- Irritating to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator

when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

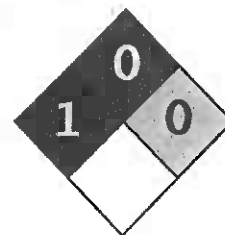
Created: 10/09/2005 04:58 PM

Last Updated: 10/09/2005 04:58 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Science Lab.com
Chemicals & Laboratory Equipment



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (permeator).

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to blood, kidneys, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not

present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.05 (mg/m³) from ACGIH (TLV) [United States]

TWA: 0.05 (mg/m³) from OSHA (PEL) [United States]

TWA: 0.03 (mg/m³) from NIOSH [United States]

TWA: 0.05 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Can react vigorously with oxidizing materials.

Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available.

LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC.
May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential:

Skin:

Lead metal granules or dust: May cause skin irritation by mechanical action.

Lead metal foil, shot or sheets: Not likely to cause skin irritation

Eyes:

Lead metal granules or dust: Can irritate eyes by mechanical action.

Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation.

Inhalation:

In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes.

Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death.

Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms.

Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count.

Ingestion:

Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases.

Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead

California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead

California prop. 65: This product contains the following ingredients for which the State of California has found to

cause reproductive harm (male) which would require a warning under the statute: Lead
California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value)
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead
Connecticut hazardous material survey.: Lead
Illinois toxic substances disclosure to employee act: Lead
Illinois chemical safety act: Lead
New York release reporting list: Lead
Rhode Island RTK hazardous substances: Lead
Pennsylvania RTK: Lead

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R20/22- Harmful by inhalation and if swallowed.
R33- Danger of cumulative effects.
R61- May cause harm to the unborn child.
R62- Possible risk of impaired fertility.
S36/37- Wear suitable protective clothing and gloves.
S44- If you feel unwell, seek medical advice (show the label when possible).
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.
Lab coat.
Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

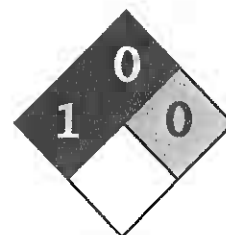
Created: 10/10/2005 08:21 PM

Last Updated: 10/10/2005 08:21 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Science Lab.com
Chemicals & Laboratory Equipment



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Manganese MSDS

Section 1: Chemical Product and Company Identification

Product Name: Manganese

Catalog Codes: SLM2245

CAS#: 7439-96-5

RTECS: OO9275000

TSCA: TSCA 8(b) inventory: Manganese

CI#: Not available.

Synonym:

Chemical Name: Manganese

Chemical Formula: Mn

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Manganese	7439-96-5	100

Toxicological Data on Ingredients: Manganese: ORAL (LD50): Acute: 9000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to blood, lungs, brain, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

Moderate fire potential, in the form of dust or powder, when exposed to flame.

When manganese is heated in the vapor of phosphorus at a very dull red heat, union occurs with incandescence.

Concentrated nitric acid reacts with powdered manganese with incandescence and explosion.

Powdered manganese ignites in chlorine.

Special Remarks on Explosion Hazards: Moderate explosion potential, in the form of dust or powder, when exposed to flame.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water

on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, reducing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.1 (mg/m³) from ACGIH (TLV) [United States]

TWA: 5 (mg/m³) [Canada]

TWA: 1 STEL: 3 (mg/m³) from NIOSH [United States]

TWA: 5 (mg/m³) from OSHA (PEL) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: 54.94 g/mole

Color: Grayish white.

pH (1% soln/water): Not applicable.

Boiling Point: 2095°C (3803°F)

Melting Point: 1244°C (2271.2°F)

Critical Temperature: Not available.

Specific Gravity: 7.44 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Superficially oxidized on exposure to air.

Reacts with aqueous solutions of sodium or potassium bicarbonate.

Reacts with dilute mineral acids with evolution of hydrogen and formation of divalent manganous salts.

Reacts with fluorine and chlorine to produce di or tri fluoride, and di and tri chloride, respectively.

In the form of powder, it reduces most metallic oxides on heating.

On heating, it reacts directly with carbon, phosphorus, antimony, or arsenic.

Also incompatible with hydroxides, cyanides, carbonates.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 9000 mg/kg [Rat].

Chronic Effects on Humans: May cause damage to the following organs: blood, lungs, brain, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of inhalation.

Slightly hazardous in case of skin contact (irritant), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

Manganese can cross the placenta.

May cause cancer (tumorigenic) based on animal data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: May cause skin irritation

Eyes: Dust may cause mechanical irritation.

Inhalation: Dust may cause respiratory tract irritation. May cause "Metal Fume Fever" which may include flu-like symptoms (fever, chills, upset stomach, vomiting, weakness, headache, body aches, muscle pains, dry mouth and throat, coughing, tightness of the chest). May affect behavior/Central Nervous system (change in motor activity, torpor, nervousness, tremor, yawning, mood swings, irritability, restlessness, fatigue, headache, apathy, languor, insomnia than somnolence, hallucinations, delusions, uncontrollable laughter followed by crying, compulsions, aggressiveness, weakness in legs, memory loss, decreased libido, impotence, salivation, hearing loss, slow gait,), and respiration (dyspnea, shallow respiration, cyanosis, alveolar inflammation).

Ingestion: Repeated or prolonged exposure from ingestion may affect brain (degenerative changes), blood and metabolism.

Ingestion: May cause digestive tract irritation. There is a low gastrointestinal absorption of manganese.

Chronic Potential Health Effects:

Inhalation: Repeated or prolonged exposure from inhalation may affect brain (degenerative changes), behavior/Central Nervous system with symptoms to acute exposure. May also affect liver (chronic liver disease, jaundice)

Ingestion: Repeated or prolonged exposure from ingestion may affect brain, blood and metabolism

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Illinois toxic substances disclosure to employee act: Manganese

Rhode Island RTK hazardous substances: Manganese

Pennsylvania RTK: Manganese

Minnesota: Manganese

Massachusetts RTK: Manganese

New Jersey: Manganese

New Jersey spill list: Manganese

Louisiana spill reporting: Manganese

California Director's List of Hazardous Substances: Manganese

TSCA 8(b) inventory: Manganese

SARA 313 toxic chemical notification and release reporting: Manganese

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC): Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Dust respirator. Be sure to use an approved/certified respirator or equivalent.

Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

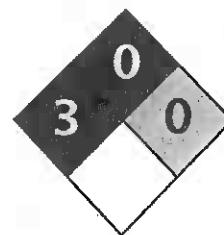
Created: 10/09/2005 06:03 PM

Last Updated: 10/09/2005 06:03 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Science Lab.com
Chemicals & Laboratory Equipment



Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragryum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (permeator).

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

When thrown into mercury vapor, boron phosphodiiodide ignites at once.
Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C.
Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium.

CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY.

Mercury and Ammonia can produce an explosive compound.

A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury.

Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Corrosive liquid. Poisonous liquid.

Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage**Precautions:**

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.025 from ACGIH (TLV) [United States] SKIN

TWA: 0.05 CEIL: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation

TWA: 0.025 (mg/m3) [United Kingdom (UK)]

Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously.

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium.

Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals (aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants (bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonylnickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsilane, calcium,

Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys

(amalgam) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories.
Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available.

LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC.

May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material.

May cause cancer based on animal data.

Passes through the placental barrier in animal.

May cause adverse reproductive effects (paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury
California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury
Connecticut hazardous material survey.: Mercury
Illinois toxic substances disclosure to employee act: Mercury
Illinois chemical safety act: Mercury
New York acutely hazardous substances: Mercury
Rhode Island RTK hazardous substances: Mercury
Pennsylvania RTK: Mercury
Minnesota: Mercury
Massachusetts RTK: Mercury
New Jersey: Mercury
New Jersey spill list: Mercury
Louisiana spill reporting: Mercury
California Director's List of Hazardous Substances.: Mercury
TSCA 8(b) inventory: Mercury
SARA 313 toxic chemical notification and release reporting: Mercury
CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
CLASS E: Corrosive liquid.

DSCL (EEC):

R23- Toxic by inhalation.
R33- Danger of cumulative effects.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S2- Keep out of the reach of children.
S7- Keep container tightly closed.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39- Wear eye/face protection.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S46- If swallowed, seek medical advice immediately and show this container or label.
S60- This material and its container must be disposed of as hazardous waste.

S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Full suit.

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 10/10/2005 08:22 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Safety data for Nickel



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: alcan 756, carbonyl nickel powder, C.I. 77775, EL12, fibrex, fibrex P, NI 270, nickel 2170, nickel sponge, nickel catalyst, NI 0901-s, NI 4303T, NP2, Raney alloy, Raney nickel

Molecular formula: Ni

CAS No: 7440-02-0

EC No: 231-111-4

EC Index No: 028-002-00-7

Physical data

Appearance: silver white, hard, malleable metal chunks or grey powder

Melting point: 1453 C

Boiling point: 2732 C

Vapour density:

Vapour pressure:

Specific gravity: 8.9

Flash point:

Explosion limits:

Autoignition temperature:

Stability

Stable in massive form. Powder is pyrophoric - can ignite spontaneously. May react violently with titanium, ammonium nitrate, potassium perchlorate, hydrazoic acid. Incompatible with acids, oxidizing agents, sulfur.

Toxicology

Carcinogen. Toxic by all routes of entry. May cause sensitization by skin contact. Typical TLV 0.05 mg/m³

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

IPR-RAT LD50 250 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R10 R17 R36 R37 R38 R40 R42 R43.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

UN No 3089. Packing group II. Hazard class 4.1.

Personal protection

Good ventilation. Wear gloves and safety glasses when handling the powder.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

S16 S22 S26 S36.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on October 27, 2004. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for silver

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: Argentum, shell silver, silver shot, C.I. 77820, L-3
Use: in silver plating, jewellery, coinage, catalysts, photography
Molecular formula: Ag
CAS No: 7440-22-4
EC No: 231-131-3

Physical data

Appearance: lustrous soft white metal
Melting point: 961 C
Boiling point: 2212 C
Specific gravity: 10.5
Vapour pressure:
Flash point:
Explosion limits:
Autoignition temperature:
Water solubility: insoluble

Stability

Stable. Substances to be avoided include strong acids and strong bases, tartaric acid, oxalic acid. Blackened by contact with ozone, hydrogen sulfide, sulfur. Powder is highly flammable.

Toxicology

Solid silver presents few health hazards. Repeated long-term exposure to silver dust can cause permanent blue-grey staining of eyes, mouth, throat and skin, (argyria) and may cause eye damage.

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R11 (powder only).

Transport information

Non-hazardous for air, sea and road freight.

Personal protection

Safety glasses if working with silver powder.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on August 15, 2005. Although we have tried to make it as accurate and useful as possible, we can take no responsibility for its use or misuse.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for zinc

Click here for data on zinc in student-friendly format, from the HSci project

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: zinc dust, zinc powder, blue powder, granular zinc, zinc foil, LS 2, LS 6, merrillite, zinc metal

Molecular formula: Zn

CAS No: 7440-66-6

EINECS No: 231-175-3

EC number: 030-001-00-1

Physical data

Appearance: silver or blueish-white foil or powder

Melting point: 420 C

Boiling point: 908 C

Vapour density:

Vapour pressure:

Density (g cm⁻³): 7.14

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Incompatible with amines, cadmium, sulfur, chlorinated solvents, strong acids, strong bases. Air and moisture sensitive. Zinc powder is very flammable.

Toxicology

May be harmful if swallowed or inhaled. May act as an irritant.

Toxicity data

(The meaning of any abbreviations which appear in this section is given here.)

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)

R11 (for the powdered form).

Transport information

Non-hazardous for air, sea and road freight.

Personal protection

Do not breathe dust. Wear safety glasses if handling powdered zinc.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

S7 S8 S43.

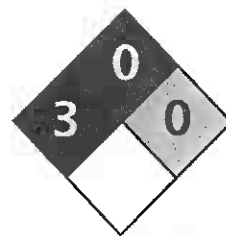
[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on February 21, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.



Science Lab.com
Chemicals & Laboratory Equipment



Health	3
Fire	1
Reactivity	0
Personal Protection	J

Material Safety Data Sheet Sodium Cyanide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Cyanide

Catalog Codes: SLS2314, SLS3736

CAS#: 143-33-9

RTECS: VZ7525000

TSCA: TSCA 8(b) inventory: Sodium Cyanide

CI#: Not available.

Synonym:

Chemical Name: Sodium Cyanide

Chemical Formula: NaCN

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium Cyanide	143-33-9	100

Toxicological Data on Ingredients: Sodium Cyanide: ORAL (LD50): Acute: 6.44 mg/kg [Rat]. DERMAL (LD50): Acute: 10.4 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (permeator). Corrosive to eyes and skin. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to skin, eyes, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of acids, of moisture.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Dangerous on contact with acids, acid fumes, water or stream. It will produce toxic and flammable vapors of CN-H and sodium oxide.

Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas. When heated to decomposition it emits toxic fumes hydrogen cyanide and oxides of nitrogen

Special Remarks on Explosion Hazards: Fusion mixtures of metal cyanides with metal chlorates, perchlorated or nitrates causes a violent explosion

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Corrosive solid. Poisonous solid.

Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 24°C (75.2°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

STEL: 5 (mg/m3) from ACGIH (TLV) [United States] SKIN

CEIL: 4.7 from NIOSH

CEIL: 5 (mg/m3) from NIOSH Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Granular solid. Flakes solid.)

Odor:

Faint almond-like odor.
Odorless when perfectly dry. Emits odor of hydrogen cyanide when damp.

Taste: Not available.

Molecular Weight: 49.01 g/mole

Color: White.

pH (1% soln/water): Not available.

Boiling Point: 1496°C (2724.8°F)

Melting Point: 563°C (1045.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.595 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Vapor Density of Hydrogen Cyanide gas: 0.941

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:

Soluble in cold water.

Slightly soluble in Ethanol

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, moisture, incompatibles.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity:

Corrosive in presence of aluminum.

Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Violent reaction with fluorine gas, magnesium, nitrates, nitric acid.

Dangerous on contact with acids, acid fumes, water or steam. It will produce toxic and flammable vapors of CN-H and sodium oxide.

Cyanide may react with CO₂ in ordinary air to form toxic hydrogen cyanide gas.

Strong oxidizers such as acids, acid salts, chlorates, and nitrates.

Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas.

Special Remarks on Corrosivity: Corrosive to aluminum

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

Acute oral toxicity (LD50): 6.44 mg/kg [Rat].

Acute dermal toxicity (LD50): 10.4 mg/kg [Rabbit].

Chronic Effects on Humans: May cause damage to the following organs: skin, eyes, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May cause adverse reproductive effects (maternal and paternal fertility) based on animal data.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health effects:

Skin: May cause itching and irritation. May be fatal if absorbed through injured skin with symptoms similar to those noted for inhalation and ingestion.

Eyes: May cause eye irritation and eye damage.

Inhalation: May cause respiratory tract irritation. May be fatal if inhaled. The substance inhibits cellular respiration causing metabolic asphyxiation. May cause headache, weakness, dizziness, labored breathing, nausea, vomiting. May be followed by cardiovascular effects, unconsciousness, convulsions, coma, and death.

Ingestion: May be fatal if swallowed. May cause gastrointestinal tract irritation with nausea, vomiting. May affect behavior and nervous systems (seizures, convulsions, change in motor activity, headache, dizziness, confusion, weakness, stupor, anxiety, agitation, tremors), cardiovascular system, respiration (hyperventilation, pulmonary edema, breathing difficulty, respiratory failure), cardiovascular system (palpitations, rapid heart beat, hypertension, hypotension). Massive doses may produce sudden loss of consciousness and prompt death from respiratory arrest. Smaller but still lethal doses

on the breath or vomitus.

Chronic Potential Health Effects:

Central Nervous system effects (headaches, vertigo, insomnia, memory loss, tremors, fatigue), fatigue, metabolic effects (poor appetite), cardiovascular effects (chest discomfort, palpitations), nerve damage to the eyes, or dermatitis, respiratory tract irritation, eye irritation, or death can occur.

may prolong the illness for 1 or more hours. A bitter almond odor may be noted

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Sodium cyanide UNNA: 1689 PG: I

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Connecticut carcinogen reporting list: Sodium Cyanide
Illinois chemical safety act: Sodium Cyanide
New York release reporting list: Sodium Cyanide
Rhode Island RTK hazardous substances: Sodium Cyanide
Pennsylvania RTK: Sodium Cyanide
Minnesota: Sodium Cyanide
Massachusetts RTK: Sodium Cyanide
Massachusetts spill list: Sodium Cyanide
New Jersey: Sodium Cyanide
New Jersey spill list: Sodium Cyanide
Louisiana RTK reporting list: Sodium Cyanide
Louisiana spill reporting: Sodium Cyanide
California Director's List of Hazardous Substances: Sodium Cyanide
TSCA 8(b) inventory: Sodium Cyanide
TSCA 4(a) final test rules: Sodium Cyanide
TSCA 8(a) PAIR: Sodium Cyanide
TSCA 8(d) H and S data reporting: Sodium Cyanide
TSCA 12(b) one time export: Sodium Cyanide
SARA 302/304/311/312 extremely hazardous substances: Sodium Cyanide
CERCLA: Hazardous substances.: Sodium Cyanide: 10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:**WHMIS (Canada):**

CLASS B-6: Reactive and very flammable material.
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS E: Corrosive solid.

DSCL (EEC):

R27/28- Very toxic in contact with skin and if swallowed.
R41- Risk of serious damage to eyes.
S1/2- Keep locked up and out of the reach of children.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S28- After contact with skin, wash immediately

with plenty of water
S36/37- Wear suitable protective clothing and gloves.

S39- Wear eye/face protection.

S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S46- If swallowed, seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: j

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Synthetic apron.

Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/11/2005 01:58 PM

Last Updated: 10/11/2005 01:58 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2321
Gaithersburg, Maryland 20899-2321

SRM Number: 2273
MSDS Number: 2273
SRM Name: Chlorinated Pesticides
(DDTs) and Metabolites in
Isooctane
Date of Issue: 02 July 2001

MSDS Coordinator: Carmen S. Davis
Phone: (301) 975-6776
ChemTrec: 1-800-424-9300

FAX: (301) 926-4751
e-mail: SRMMSDS@nist.gov

SECTION I. MATERIAL IDENTIFICATION

Material Name: Chlorinated Pesticides (DDTs) and Metabolites in Isooctane

Description: This material is a solution of seven DDT and DDT-related compounds in 2,2,4-trimethylpentane (isooctane). SRM 2273 consists of five 2 mL ampoules, each containing approximately 1.2 mL of solution.

Other Designations: DDTs (dichlorodiphenyltrichloroethane; dicophane; chlorophenothane; 1,1,1-trichloro-2,2-bis(chlorophenyl)ethane) and Metabolites in Isooctane (isobutyltrimethylmethane; 2, 2, 4-trimethylpentane)

Name
Isooctane

Chemical Formula
 $(CH_3)_2CHCH_2C(CH_3)_3$

CAS Registry Number*
540-84-1

DOT Classification: N.O.S., (Octane) UN1262

Manufacturer/Supplier: Available from a number of suppliers

*For the CAS Registry Numbers of the DDTs in this material, refer to the corresponding Certificate of Analysis.

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Isooctane	> 99	No occupational exposure limits established
		Rat, Inhalation: LC ₅₀ : 33.52 mg/L/4 h
		Rat, Oral: LD ₅₀ : > 5000 mg/kg
		Rat, Oral: TD _{LO} : 2100 mg/kg/21 days (intermittent)
DDTs** 2,4'-DDT 4,5'-DDT 2,4'-DDE 4,4'-DDE 2,4'-DDD 4,4'-DDD DDMU	< 0.003	Not applicable

**This material contains DDTs, many of which have been reported to have toxic, mutagenic, and/or carcinogenic properties; and thus they should be handled with care. The carcinogens in this material have a total concentration less than < 0.1 % and do not require individual MSDS information under current regulations. For actual concentrations, see the corresponding Certificate of Analysis.

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Isooctane	
Appearance and Odor: clear, colorless liquid with gasoline odor	Vapor Pressure (@ 21 °C): 41 mm Hg
Relative Molecular Mass: 114.23	Evaporation Rate (ether = 1): < 1
Density: 0.6919	Water Solubility: insoluble
Boiling Point: 99 °C	Solvent Solubility: soluble in ether, alcohol, acetone, benzene, toluene, chloroform, xylene, carbon disulfide, and carbon tetrachloride
Freezing Point: -107 °C	

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Isooctane**Flash Point:** -12 °C**Method Used:** Closed Cup**Autoignition Temperature:** 415 °C**Flammability Limits in Air (Volume %):** UPPER: 6.0
LOWER: 1.1

Unusual Fire and Explosion Hazards: The major hazards of DDT fires are associated with the possibility of PCBs being released into the environment, where they and their products of degeneration can pose serious long term health risks. The potential problems are heightened by the resistance of DDT compounds to biological and chemical degradation and by the possibility that they will contaminate underground water systems. Care must be taken to prevent DDT residues from getting into the environment.

Extinguishing Media: Use carbon dioxide, dry chemical, or foam. Water is ineffective in putting out isooctane fires and the water will spread the flames. Use water, however, to cool fire-exposed containers to prevent pressure rupture. Prevent DDT residues from getting into the environment.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: X Stable Unstable

Conditions to Avoid: Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion byproducts. Avoid contact with the skin. **DO NOT** allow the material to contaminate water sources.

Incompatibility (Materials to Avoid): Keep isooctane from contact with oxidizing materials and reducing agents.

See Section IV: *Unusual Fire and Explosion Hazards*

Hazardous Decomposition or Byproducts: Thermal decomposition of isooctane may produce oxides of carbon. Thermal-oxidative degradation of DDT compounds can produce toxic gases such as carbon monoxide, chlorine, chlorinated aromatic fragments, phenolics, aldehydes, and hydrogen chloride.

Hazardous Polymerization: Will Occur X Will Not Occur

SECTION VI. HEALTH HAZARD DATA

Route of Entry: X Inhalation X Skin X Ingestion

Isooctane: Excessive inhalation of isooctane vapors can cause mucous membrane irritation and narcotic effects. Extreme exposure may cause unconsciousness and respiratory arrest. Repeated and/or prolonged exposure to this material may cause polyneuropathy (multiple abnormal and usually degenerative states of the nervous system). This material is a defatting agent. Prolonged or repeated skin contact with the liquid causes drying, cracking, and possible dermatitis. If sufficient amounts are absorbed, systemic toxicity may occur. Eye contact can cause irritation.

DDTs: Repeated or prolonged exposure may cause irritation of the nose, throat, and mucous membranes. A study of occupational exposure to DDT reported a higher frequency of white blood cells with chromosomal irregularities among workers with high DDT levels. Effects of poisoning may be delayed for several hours and are characterized by paresthesias of the tongue, lips, and face followed by tremor, a sense of apprehension, dizziness, confusion, malaise, headache, fatigue, weakness, ataxia, and increased respiration. DDT has been implicated in the development of aplastic anemia, agranulocytosis, and thrombocytopenia. Chronic administration to animals has produced necrosis of the liver and cardiac and skeletal muscles, degeneration of the kidneys, and effects on the immune system. DDTs may cross the placenta and may be excreted in breast milk.

Medical Conditions Generally Aggravated by Exposure: None known

Listed as a Carcinogen/Potential Carcinogen (Isooctane):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens		<u> X </u>
In the International Agency for Research on Cancer (IARC) Monographs		<u> X </u>
By the Occupational Safety and Health Administration (OSHA)		<u> X </u>

Listed as a Carcinogen/Potential Carcinogen (DDTs):

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u> X </u>	
In the International Agency for Research on Cancer (IARC) Monographs	<u> X </u>	
By the Occupational Safety and Health Administration (OSHA)		<u> X </u>

NOTE: DDTs are classified as carcinogens or potential carcinogens.

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration. Obtain medical assistance if necessary.

Ingestion: If ingested, wash out mouth with water. Obtain medical assistance immediately.

TARGET ORGAN(S) OF ATTACK: Isooctane: central nervous system
DDTs: liver

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material Is Released or Spilled: Notify safety personnel of major spills and/or leaks. Evacuate nonessential personnel. Stop the leak if one can do so without risk. Absorb small spills with sand or other absorbent material and place into containers for disposal. **DO NOT** flush into a sewer. Keep material out of watersheds and waterways.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Sealed ampoules, as received, should be stored in the dark at temperatures lower than 30 °C.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *2,2,4-Trimethylpentane*, 02 June 1999.
MDL Information Systems, Inc., MSDS *Dichlorodiphenyltrichloroethane*, 21 March 2000.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.

Search > Detailed View

MSDS Date:	May 30, 1989
Chemical Name:	ALPHA-CHLORDANE
Possible Synonyms:	
Product:	Alpha-Chlordane
Manufacturer Name:	OCCUPATIONAL HEALTH SERVICES, INC.
Trade Number:	
CAS Number:	
Specific to:	
Health:	3
Fire:	0
Reactivity:	0
Other:	
NFPA Hazard Rating:	0 3 0 ALPHA-CHLORDANE
Reactive Notes:	
PDF File:	3495.pdf

[Purdue Homepage](#) | [Purdue Search](#) | [Campus Map](#) | [Purdue Directories](#)

Direct inquiries or comments to: itap@purdue.edu
All content Copyright © 2004, Purdue University, all rights reserved.
An equal access/equal opportunity university.

Safety data for dieldrin



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-2,7:3,6-Dimethanonaphth[2,3-b]oxirene; 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-exo-1,4-endo-5,8-dimethanonaphthalene; 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-2,7:3,6-dimethanonaphth(2,3-b)oxirene, alvit, compound 497, dieldrix, diledrite, HEOD, illoxol, quintox, octalox, numerous further trade names, especially for mixtures containing dieldrin.

Molecular formula: $C_{12}H_8Cl_6O$

CAS No: 60-57-1

EC No:

Physical data

Appearance: white or light brown powder or crystals

Melting point: 176 C

Boiling point: 385 C

Vapour density:

Vapour pressure:

Specific gravity: 1.75

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility: slight

Stability

Stable. Breakdown product of aldrin in the environment. Incompatible with acids, active metals and strong oxidizing agents.

Toxicology

Toxic. May act as a mutagen. Harmful by ingestion or inhalation. Ingestion of large quantities may be fatal. May accumulate in the body. Toxic if absorbed through the skin. Possible risk of irreversible effects. Typical TWA 0.25 mg/m³.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

ORL-MAN LDLO 65 mg kg⁻¹

ORL-RAT LD50 38 mg kg⁻¹

IHL-RAT LC50 13 mg/m³/4h

SKN-RAT LD50 56 mg kg⁻¹

SCU-RAT LD50 49 mg kg⁻¹

IVN-RAT LD50 9 mg kg⁻¹

ORL-MKY LD50 3 mg kg⁻¹

ORL-BWD LD50 13 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R25 R27 R40 R48.

Transport information

Environmental information

Harmful to wildlife. Removed only slowly from the environment by natural processes.

Personal protection

Safety glasses, gloves, good ventilation.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

S22 S36 S37 S45.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on October 13, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for methane



Click here for data on methane in [student-friendly format](#), from the HSci project

[Glossary](#) of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: fire damp, marsh gas, R 50, biogas, natural gas (natural gas is predominantly methane, but contains small quantities of other hydrocarbons. An unpleasant-smelling compound such as [methanethiol](#) is generally added to give it a recognisable smell)

Molecular formula: CH₄

CAS No: 74-82-8

EINECS No: 200-812-7

Annex I Index No: 601-001-00-4

Physical data

Appearance: colourless odourless gas

Melting point: -182 C

Boiling point: -164 C

Vapour density:

Vapour pressure:

Density: 0.717 g/l at 20 C.

Flash point: -221 C

Explosion limits: 5 - 15%

Autoignition temperature: 537 C

Water solubility: slight (35 ml/l at 20 C)

Stability

Stable. Extremely flammable - note low flash point; mixtures with air constitute an explosion hazard. Reacts violently with interhalogens. Incompatible with strong oxidizing agents, halogens, interhalogens, oxygen.

Toxicology

Asphyxiant.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)
R12.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here](#).)

UN No 3167. Hazard class 2.1.

Personal protection

Safety glasses, good ventilation. Remove sources of ignition from the working area. Use a flashback arrester on cylinders of compressed gas.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

S9 S16 S33.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on August 2, 2006. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Appendix F

Quality Assurance Project Plan

Quality Assurance Project Plan

River Park Center Brownfield Cleanup Program Site #C360083 City of Yonkers, Westchester County, New York

1.0 PROJECT DESCRIPTION

This document presents the Quality Assurance Project Plan (QAPP) for the Remedial Action Workplan (RAWP) for multiple contiguous parcels located in the City of Yonkers, New York, which have been combined under the New York State Brownfield Cleanup Program (BCP) into a single BCP site (Site No. C360083).

The BCP site consists of approximately 12.94 acres, within a wedge-shaped area bounded by New Main Street (west), Palisade Avenue and Elm Street (north), and Nepperhan Avenue (south and east). New School Street bisects the site north-to-south, connecting Palisade and Nepperhan Avenues (Sheet RI-1) with the exception of Lot 35, the Church owned parcels consolidated into one lot.

2.0 PROJECT ORGANIZATION

The RAWP will be conducted by Soils Engineering Services, Inc. (SESI), on behalf of the BCP volunteer/developer Struever Fidelco Cappelli, LLC, (SFC). The organization of SESI's key project management and field staff, and respective areas of responsibility, is presented below.

2.1 Project Principal

Michael W. St. Pierre, P.E.

Provide technical and administrative oversight and guidance throughout the project, assist in securing company resources, participate in technical review of deliverables, and attend key meetings as needed.

2.2 Principal Engineer

Christopher F. Zwingle, P.E.

Provide technical guidance and review of reports, analytical data. Will have key involvement in screening and development of remedial alternatives.

2.3 Project Manager

Dean Giovanetti.

Responsible for maintaining the day-to-day schedule for completing the fieldwork and deliverables according to BCP program requirements and client expectations.

2.4 Remedial Investigation Program Manager

Valerie Navib, PhD

Responsible for coordinating and directing field efforts of SESI staff and subcontractors, and for maintaining that work is done according to QAPP specifications.

2.5 Field Team Leader

Robert Fioretti

Responsible for overseeing field work during the RI, including observing subcontractors, maintaining field notes, and collecting samples of various environmental media, in accordance with the NYSDEC-approved Work Plan.

3.0 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA

In cases where NYSDOH ELAP Certification exists for a specific group or category of parameters, the laboratories performing analysis in connection with this project will have appropriate NYSDOH ELAP Certification. For analysis of samples where Analytical Service Protocol (ASP, June 2000) Category B deliverables are required, NYSDOH ELAP CLP certification is required.

Detection limits set by NYSDEC-ASP (June 2000) will be used for all sample analyses unless otherwise noted. If NYSDEC-ASP-dictated detection limits prove insufficient to assess project goals (i.e., comparison to drinking water standards or attainment of ARARs), then ASP Special Analytical Services (SAS) or other appropriate methods will be utilized.

The quality assurance/quality control objectives for all measurement data include completeness, representativeness, comparability, precision and accuracy.

3.1 COMPLETENESS

The analyses performed must be appropriate and inclusive. The parameters selected for analysis are chosen to meet the objectives of the study.

Completeness of the analyses will be assessed by comparing the number of parameters intended to be analyzed with the number of parameters successfully determined and validated. Data must meet QC acceptance criteria for 100 percent or more of requested determinations.

3.2 REPRESENTATIVENESS

Samples must be taken of the population and, where appropriate, the population will be characterized statistically to express the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process, or environmental condition.

Non-dedicated sampling devices will be cleaned between sampling points by washing and rinsing with pesticide-grade methanol, followed by a thorough rinse with distilled water. Specific cleaning techniques are described in the Field Sampling Procedure. Two types of blank samples will accompany each sample set where Target Compound List (TCL) volatiles are to be analyzed (water matrix only). A trip blank, consisting of a 40 ml VOA vial of organic-free water prepared by the laboratory, will accompany each set of sample bottles from the laboratory to the field and back. This bottle will remain sealed throughout the shipment and sampling process. This blank will be analyzed for TCL volatile organic compounds along with the groundwater samples to

ensure that contamination with TCL volatile compounds has not occurred during the bottle preparation, shipment and sampling phase of the project. In order to check for contaminant carryover when non-dedicated sampling equipment is used, a rinsate blank will be submitted to the laboratory. This blank will also be analyzed for TCL volatile organic compounds. The TCL compounds are identified in the United States Environmental Protection Agency (USEPA) Contract Laboratory Program dated 7/85 or as periodically updated.

The analysis results obtained from the determination of identical parameters in field duplicate samples can be used to further assess the representativeness of the sample data.

3.3 COMPARABILITY

Consistency in the acquisition, preparation, handling and analysis of samples is necessary in order for the results to be compared where appropriate. Additionally, the results obtained from analyses of the samples will be compared with the results obtained in previous studies, if available.

To ensure the comparability of analytical results with those obtained in previous or future testing, all samples will be analyzed by NYSDEC-approved methods. The NYSDEC-ASP mandated holding times for various analyses will be strictly adhered to.

3.4 PRECISION AND ACCURACY

The validity of the data produced will be assessed for precision and accuracy. Analytical methods which will be used include gas chromatography/mass spectrometry (GC/MS), gas chromatography (GC), colorimetry, atomic spectroscopy, gravimetric and titrametric techniques. The following outlines the procedures for evaluating precision and accuracy, routine monitoring procedures, and corrective actions to maintain analytical quality control. All data evaluations will be consistent with NYSDEC-ASP procedures (June 2000). Data will be 100 percent compliant with NYSDEC-ASP requirements.

The requirements of QA/QC are both method specific and matrix dependent. The number of duplicate, spiked and blank samples analyzed will be dependent upon the total number of samples of each matrix to be analyzed, but there will be at least one split per matrix. The inclusion and frequency of analysis of field blanks and trip blanks will be on the order of one per each site. Samples to be analyzed for volatile organic compounds will be accompanied by trip and field blanks (water matrix) or field blanks (soil, sediment matrix).

Quality assurance audit samples will be prepared and submitted by the laboratory QA manager for each analytical procedure used. The degree of accuracy and the recovery of analyte to be expected for the analysis of QA samples and spiked samples is dependent upon the matrix, method of analysis, and compound or element being determined. The concentration of the analyte relative to the detection limit is also a major factor in determining the accuracy of the measurement. The lower end of the analytical range for most analyses is generally accepted to be five times the detection limit. At or above this level, the determination and spike recoveries for metals in water samples will be expected to range from 75 to 125 percent. The recovery of organic surrogate compounds and matrix spiking compounds determined by GC/MS will be compared to the guidelines for recovery of individual compounds as established by the United States Environmental Protection Agency Contract Laboratory Program dated 7/85 or as periodically updated.

The quality of results obtained for inorganic ion and demand parameters will be assessed by comparison of QC data with laboratory control charts for each test.

4.0 SAMPLING PROCEDURES

4.1 SAMPLING PROGRAM

The sampling program for this project will include surface water, groundwater, soil, sediment, and soil vapor. Soil samples will be collected from split spoon sampling devices retrieved from soil borings. Groundwater samples will be collected from groundwater monitoring wells. Sediment and surface water samples will be collected as grab samples from pre-determined locations along the Saw Mill River, which bisects the site. Soil vapor samples will be collected from soil vapor monitoring wells.

4.1.1 Drilling/Sampling Procedures

Soil, groundwater, and soil vapor samples will be collected by means of a soil boring program. Soil borings shall be completed using the hollow stem auger drilling methods, direct push methods, or rotary drilling methods, whichever methods are determined to be best suited to site conditions by the SESI project manager and SESI field team leader.

Soil samples will be collected from soil borings and analyzed in accordance with the NYSDEC-approved Work Plan. Monitoring wells for groundwater and soil vapor sample collection will be installed in completed soil borings. Either hollow stem auger (HSA) or direct push drilling methods may be utilized for monitoring well completion.

Samples of the encountered surface materials shall be collected continuously during drilling so that a complete soil profile is examined and described by the SESI field geologist. The sampling method employed shall be ASTM D-1586/Split Barrel Sampling using a standard 2-foot long, 2-inch outside diameter split- spoon sampler with a 140-pound hammer, in cases where HSA methods are used. Upon retrieval of the sampling barrel, the collected sample shall be placed in glass jars and labeled, stored on site (on ice in a cooler if necessary), and transmitted to the appropriate testing laboratory or storage facility. Chain-of-custody procedures will be practiced following Section 15, EPA-600/4-82-029, Handbook for Sampling and Sample Preservation of Water and Waste Waters.

A geologist or engineer will be on site during the drilling operations to fully describe each soil sample, following the New York State Soil Description Procedure, and to retain representative portions of each sample.

The drilling contractor will be responsible for obtaining accurate and representative samples, informing the geologist of changes in drilling pressure, keeping a separate general log of soils encountered including blow counts [i.e., the number of blows from a soil sampling drive weight (140 pounds)] required to drive the split-spoon sampler in 6-inch increments and installing monitoring wells to levels directed by the supervising geologist following specifications further outlined in this protocol.

4.1.2 Monitoring Well Completion

Monitoring wells will be constructed of 10 feet of .010-inch slot size PVC well screen and riser casing. Other materials utilized for completion will be washed silica sand (Q-Rock No. 4 or approved equivalent) bentonite grout, Portland cement, and a protective steel locking well casing and cap with locks.

The monitoring well installation method for wells installed within unconsolidated sediments shall be to place the screen and riser assembly into the casing once the screen interval has been selected. At that time, a washed silica sand pack will be placed around the well screen if required to prevent screen plugging. If a sand pack is not warranted, the auger string will be pulled back to allow the native aquifer material to collapse 2 to 3 feet above the top of the screen. Bentonite pellets will then be added to the annulus between the casing and the inside auger to insure proper sealing. Cement/bentonite grout will continue to be added during the extraction of the augers until the entire aquifer thickness has been sufficiently sealed off from horizontal and/or vertical flow above the screened interval. During placement of sand and bentonite pellets, frequent measurements will be made to check the height of the sand pack and thickness of bentonite layers by a weighted drop tape measure.

A bolt-down protective curb box will be installed, flush with the ground, or steel "stick-up" protective casing and secured by a Portland cement seal. The cement seal shall extend laterally at least 1 foot in all directions from the protective casing and shall slope gently away to drain water away from the well.

4.1.3 Well Development

All monitoring wells will be developed or cleared of all fine-grained materials and sediments that have settled in or around the well during installation so that the screen is transmitting representative portions of the groundwater. The development will be by one of two methods, pumping or bailing groundwater from the well until it yields relatively sediment-free water.

A decontaminated pump or bailer will be used and subsequently decontaminated after each use following procedures outlined in the Decontamination Protocol. Pumping or bailing will cease when the turbidity falls below 50 NTUs or until specific conductivity, pH, and temperature are stable (i.e., consecutive readings are within 10 percent with no overall upward or downward trends in measurements). Well development water will be disposed of on the ground surface at each well location or contained in drums as conditions warrant.

4.1.4 Decontamination

All drilling equipment and associated tools including augers, drill rods, sampling equipment, wrenches and any other equipment or tools that have come in contact with contaminated materials will be decontaminated before any drilling on site begins, between each well, and prior to removing any equipment from the site. The preferred decontamination procedure will be to use a high pressure steam cleaner to remove soils and volatile organics from the equipment. The water used for this procedure will be contained and shall come from a controlled source, preferably a municipal drinking supply. Representative samples of the contained decontamination water and well development water will be screened in the field to determine the proper method of disposal. Every effort will be made to minimize the generation of contaminated water.

4.2 Groundwater Sampling Program.

4.2.1 Well Evacuation

Prior to sampling a monitoring well, the static water level will be recorded and the wells evacuated to assure that the water in the well is truly representative of the groundwater. All well data will be recorded on a field sampling record. For shallow wells or deep wells with a relatively low static water level, evacuation will be accomplished by using a stainless steel or teflon bailer with a ball check valve at its lower end. A bladder may be used to evacuate the

deeper wells at a rate of approximately 1 gpm. Water samples to be analyzed for volatile and/or semi-volatile organics must be sampled by bailer.

4.2.2 Sampling Procedure

Groundwater samples will be collected using either stainless steel, teflon, or disposable polyethylene bailers with a ball check valve at the lower end. Incorporation of a check valve onto the bailers assures that a sample is representative of the depth to which the bailer is lowered. All samples will be removed from a depth just above the well screen to further assure a representative groundwater sample. Before and after sampling, the sampling device will be cleaned inside and out with soapy water, methanol, and then rinsed with distilled deionized water. Sampling procedures are summarized on Table 4.2.

In addition to water samples collected from the monitoring wells, two types of "blanks" will be collected and submitted to the chemical laboratory for analyses. The blanks will consist of 40 ml VOA vials, as follows:

A trip blank will be prepared before the sample bottles are sent by the laboratory. It consists of a sample of distilled, deionized water which accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of samples where sampling and analysis for TCL volatiles is planned (water matrix only). The trip blank will be analyzed for TCL volatile organic compounds as a measure of the internal laboratory procedures and their effect on the results.

4.3 Soil Vapor Sampling

Soil vapor sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Indoor Air Intrusion in New York State (February 2005). Soil vapor samples will be collected in the vadose zone from shallow (5 feet) well points. Each well point will be installed in a shallow boring drilled either by hand-operated equipment (e.g. hand auger or percussion hammer drill), or by a small truck-mounted drill rig. Drilling equipment used shall be based on soil conditions, and the method that provides the most practical approach.

Each well point will consist of an inert sampling tube (polyethylene, stainless steel, or Teflon®) with a 6-inch screened section at the bottom through which soil vapors can be sampled. The screen slot size will be 0.0075 inches. A sampling zone will be created around the screened section by backfilling with 1 to 2 feet of porous coarse sand or glass beads, and at least three feet of bentonite will be placed above the porous sampling zone to form a seal from the surface. Native clean soil will be packed around the remaining annulus to the ground surface.

Each designated soil vapor sampling location will be purged of a minimum of three volumes using a low volume pump, and then attached to a regulator, and secured with a clamp. The regulator will then be attached to a 1-liter summa canister.

The regulator will be set to collect a soil vapor sample at a flow rate of less than 0.2 liters per minute. After the summa canister is filled, the valve will be closed.

Each canister will be listed according to a specific sample I.D. on a chain of custody form. Sample canisters will be delivered to the laboratory within 24 hours, and analyzed for VOCs by method TO-15. The detection limit for VOCs will be 1 µg/m³ or less.

The soil vapor sampling effort will include the use of inert helium tracer gas to verify that the soil vapor samples are not diluted by ambient air. The atmosphere around the sampling tube will be enriched with the tracer gas, and the soil vapor sample will be collected in the presence of the enriched tracer atmosphere. This will be accomplished by placing an inverted plastic pail over the sampling point, and filling the pail with the tracer gas via a small tube penetrating the site of the pail. Refer to NYSDOH Guidance for Evaluating Indoor Air Intrusion in New York State (October 2006).

Weather conditions in the 48 hours prior to the test, and during the test, will be noted, including average wind speed, precipitation, temperature, and barometric pressure.

4.4 SAMPLE PRESERVATION AND SHIPMENT

Since all bottles will contain the necessary preservatives as shown in Table 4.1, they need only be filled. The 40 ml VOA vials must be filled brim full with no air bubbles. The other bottles should be filled to within about 1 inch from the top.

The bottles will be sent from the laboratory in coolers which will be organized on a per site basis. Following sample collection, the bottles should be placed on ice in the shipping cooler. The samples will be cooled to 4°C, but not frozen.

Final packing and shipment of coolers will be performed in accordance with guidelines outlined in the "User's Guide to the CLP".

5.0 SAMPLE CUSTODY

The program for sample custody and sample transfer is in compliance with the NYSDEC-ASP, as periodically updated. If samples may be needed for legal purposes, chain-of-custody procedures, as defined by NEIC Policies and Procedures (USEPA-330/9-78-001-R, Revised June 1988) will be used. Sample chain-of-custody is initiated by the laboratory with selection and preparation of the sample containers. To reduce the chance for error, the number of personnel handling the samples should be minimized.

5.1 FIELD SAMPLE CUSTODY

A chain-of-custody record accompanies the sample from initial sample container selection and preparation at the laboratory, shipment to the field for sample containment and preservation, and return to the laboratory. Two copies of this record follow the samples to the laboratory. The laboratory maintains one file copy and the completed original is returned to the site inspection team. Individual sample containers provided by the laboratory are used for shipping samples. The shipping containers are insulated and chemical or ice water is used to maintain samples at approximately 4°C until samples are returned and in the custody of the laboratory. All sample bottles within each shipping container are individually labeled and controlled. Samples are to be shipped to the laboratory within 24-48 hours of the day of collection.

Each sample shipping container is assigned a unique identification number by the laboratory. This number is recorded on the chain-of-custody record and is marked with indelible ink on the outside of the shipping container. The field sampler will indicate the sample designation/location number in the space provided on the appropriate chain-of-custody form for each sample collected. The shipping container is closed and a seal provided by the laboratory is affixed to the latch. This seal must be broken to open the container, and this indicates possible tampering if the seal is broken before receipt at the laboratory. The laboratory will contact the site investigation team leader and the

sample will not be analyzed if tampering is apparent.

5.2 LABORATORY SAMPLE CUSTODY

The site investigation team leader or Project Quality Assurance Officer notifies the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The laboratory sample program meets the following criteria:

1. The laboratory has designated a sample custodian who is responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
2. Upon receipt of the samples, the custodian will check the original chain-of-custody documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian signs the chain-of-custody record and records the date and time received.
3. Care is exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the site investigation team leader as part of the corrective action process. A qualitative assessment of each sample container is performed to note any anomalies, such as broken or leaking bottles. This assessment is recorded as part of the incoming chain-of-custody procedure.
4. The samples are stored in a secured area at a temperature of approximately 4°C until analyses are to commence.
5. A laboratory chain-of-custody record accompanies the sample or sample fraction through final analysis for control.
6. A copy of the chain-of-custody form will accompany the laboratory report and will become a permanent part of the project records.

5.3 FINAL EVIDENCE FILES

Final evidence files include all originals of laboratory reports and are maintained under documented control in a secure area.

A sample or an evidence file is under custody if:

- It is in your possession; it is in your view, after being in your possession.
- It was in your possession and you placed it in a secure area.
- It is in a designated secure area.

6.0 CALIBRATION PROCEDURES

Instruments and equipment used to gather, generate or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the appropriate manufacturer's specifications or project specific requirements. The procedures for instrument calibration, calibration verification, and the frequency of calibrations are described in the NYSDEC-CLP. The calibration of instruments used for the determination of metals will be as described in the appropriate CLP standard operating procedures.

Calibration of other instruments required for measurements associated with these analyses will be in accordance with the manufacturer's recommendations and the standard operating procedures of the laboratory.

7.0 ANALYTICAL PROCEDURES

Analytical procedures shall conform to the most recent revision of the NYSDEC-ASP (June 2000) and are summarized on Table 7.1. In the absence of USEPA or NYSDEC guidelines, appropriate procedures shall be submitted for approval by NYSDEC prior to use.

The procedures for the sample preparation and analysis for organic compounds are as specified in the NYSDEC-ASP. Analytical cleanups are mandatory where matrix interferences are noted. No sample shall be diluted any more than 1 to 5. The sample shall be either re-extracted, re-sonicated, re-stream distilled, etc. or be subjected to any one analytical cleanup noted in SW846 or a combination thereof. The analytical laboratory shall expend such effort and discretion to demonstrate good laboratory practice and demonstrate an attempt to best achieve the method detection limit.

7.1 VOLATILE ORGANICS (VOA)

For the analysis of water samples for Target Compound List (TCL), volatile organic compounds (VOCs), no sample preparation is required. The analytical procedure for volatiles is detailed in NYSDEC-ASP (Volume I, Section D-I). A measured portion of the sample is placed in the purge and trap apparatus and the sample analysis is performed by gas chromatography/mass spectrometry for the first round. USEPA Method 8260 will be used, plus tentatively identified compounds (TICs). USEPA Methods 8010 or 8020 (gas chromatography with different detectors) will be used if subsequent rounds with lower limits of detection are warranted.

7.2 SEMI-VOLATILE ORGANIC COMPOUNDS

The extraction and analytical procedures used for preparation of water, soil and sediment samples for the analysis of the TCL semi-volatile organic compounds are described in NYSDEC-ASP Volume I, Section D-III. USEPA Method 8270 will be used, plus tentatively identified compounds (TICs).

Instrument calibration, compound identification, and quantitation are performed as described in Section 6 of this document and in the NYSDEC-ASP.

7.3 PESTICIDE AND PCB COMPOUNDS

The sample preservation procedures for gas chromatography for pesticides and PCB's will be as described in the NYSDEC-ASP methods (Section D-IV). The analysis of standard mixes, blanks and spiked samples will be performed at the prescribed frequency with adherence to the 72-hour requirement described in the method.

7.4 METALS

Water, soil and waste samples will be analyzed for the metals listed in Table 7.1. The detection limits for these metals are as specified in the NYSDEC-ASP, Section D-V. The instrument detection limits will be determined using calibration standards and procedures specified in the NYSDEC-ASP. The detection limits for individual samples may be higher due to the sample matrix. The procedures for these analyses will be as described in the NYSDEC-ASP.

The digestion procedures for water samples are not recommended for samples requiring analysis for mercury, arsenic or selenium. The aliquot of sample analyzed for As and Se will be prepared

using the modifications described in USEPA Methods 206.2 CLP-M and 270.2 CLP-M, respectively. Analysis for mercury requires a separate digestion procedure (245.1 CLP-M, or 245.2 CLP-M).

The analyses for metals will be performed by atomic absorption spectroscopy (AAS) or inductively-coupled plasma emission spectroscopy (ICPES), as specified in the ASP with regard to AAS flame analysis.

7.5 SITE SPECIFICITY OF ANALYSES

Work plans prepared for remedial investigation waste sites contain recommendations for the chemical parameters to be determined for each site. Thus, some or all of the referenced methods will apply to the analysis of samples collected at the individual waste sites. Analyses of Target Compound List (TCL) analytes will be performed on all samples.

TABLE 4.1 – SAMPLE CONTAINERIZATION

ANALYSIS	NO.	BOTTLE TYPE	PRESERVATIVE(1)	HOLDING TIME(2)
Water Samples				
GC/MS(extractable) and pesticides/PCBs	2	1-liter glass bottle	None	5 days (until extraction, 40 days extracted)
GC/MS (VOA)	2	40 mil, glass vial with septum cap	None	7 days
Metals(3)	1	1 liter, plastic bottle	Nitric acid to pH <2	6 months Mercury: 26 days
Soil, Sediment, Solid Waste				
TCL organics		Wide mouth, plastic or glass	None	7 days (until extraction, 40 days extracted)
TCL inorganics		Wide mouth, plastic or glass	None	6 months Cyanide: 12 days Mercury: 28 days

(1) All samples will be preserved with ice during collection and shipment.

(2) From verified time of sample receipt by the analytical laboratory (within 24 to 48 hours of collection).

(3) Metals refers to the 24 metals and cyanide in the Target Compound List (NYSDEC-CLP 11/87).

TABLE 4.2 – SAMPLING PROCEDURE FOR MONITORING WELLS

1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.
2. Sampling device and electric contact probe decontaminated.
 - a. Sampling device and probe are rinsed with pesticide-grade methanol and distilled water.
 - b. Methanol is collected into a large funnel which empties into a five- gallon container.
3. Sampling device lowered into well.
 - a. Bailer lowered by dedicated PVC or polypropylene line.
4. Sample taken.
 - a. Sample is poured slowly from the open end of the bailer and the sample bottle tilted so that aeration and turbulence are minimized.
 - b. Duplicate sample is collected when appropriate.
5. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.
6. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.
 - a. Dedicated line is disposed of or left at well site.
7. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.
8. Chain-of-custody forms are completed in triplicate.
 - a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler.
9. The original will be returned following sample analysis.
 - a. A second carbon copy is kept on file.
10. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

**TABLE 4.3 – SAMPLING PROCEDURE FOR MONITORING WELLS USING LOW-
STRESS (LOW-FLOW) METHODS**

1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.
2. Sampling device is lowered into well. Slowly lower the pump, safety cable, tubing and electrical lines into the well to the depth specified for that well. Pump intake must be no less than 2 feet from the bottom of the well to prevent disturbance and resuspension of sediments which may be at the bottom of the well.
3. Measure water level again: Before starting the pump, measure the water level again with the pump in the well. Leave the water level measuring device in the well.
4. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level should be monitored approximately every five minutes. Ideally, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 ft or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. As noted above, care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.
5. Monitor Indicator Parameters: During purging of the well, monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, Eh, and DO) approximately every five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows (Puls and Barcelona, 1996):
 - a. 0.1 for pH
 - b. 3% for specific conductance (conductivity)
 - c. 10 mv for redox potential
 - d. 10% for DO and turbidity
6. Dissolved oxygen and turbidity usually require the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.
7. Collect Samples: Collect samples at a flow rate between 100 and 250 ml/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 ft. VOC samples must be collected first and directly into sample containers. All sample containers should be filled with minimal turbulence by allowing the ground water to flow from the tubing gently down the inside of the container.
8. Ground water samples to be analyzed for volatile organic compounds (VOCs) require pH adjustment. The appropriate EPA Program Guidance should be consulted to determine whether pH adjustment is necessary. If pH adjustment is necessary for VOC sample preservation, the amount of acid to be added to each sample vial prior to sampling should be determined, drop by drop, on a separate and equal volume of water (e.g., 40 ml). Groundwater purged from the well prior to sampling can be used for this purpose.

9. Remove Pump and Tubing: After collection of the samples, the tubing, unless permanently installed, must be properly discarded or dedicated to the well for resampling by hanging the tubing inside the well.
10. Measure and record well depth.
11. Close and lock the well.
12. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.
13. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.
 - a. Dedicated line is disposed of or left at well site.
14. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.
15. Chain-of-custody forms are completed in triplicate.
 - a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler. The original will be returned following sample analysis.
 - b. A second carbon copy is kept on file.
16. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

TABLE 7-1 – CONTRACT-REQUIRED QUANTITATION LEVELS AND ANALYTICAL METHODS FOR ASP INORGANICS, ASP VOLATILES, ASP SEMI-VOLATILES, ASP PESTICIDES, AND PCBS

Superfund Target Compound List (TCL) and Contract-Required Quantitation Limit

SECTION 1 - ASP INORGANICS Method: NYSDEC-ASP-91-4			
PARAMETER	CONTRACT-REQUIRED DETECTION LEVEL* ($\mu\text{g/l}$)	PARAMETER	CONTRACT-REQUIRED DETECTION LEVEL* ($\mu\text{g/l}$)
1. Aluminum	200	13. Magnesium	5,000
2. Antimony	60	14. Manganese	15
3. Arsenic	10	15. Mercury	0.2
4. Barium	200	16. Nickel	40
5. Beryllium	5	17. Potassium	5,000
6. Cadmium	5	18. Selenium	5
7. Calcium	5,000	19. Silver	10
8. Chromium	10	20. Sodium	5,000
9. Cobalt	50	21. Thallium	10
10. Copper	25	22. Vanadium	50
11. Iron	100	23. Zinc	20
12. Lead	3	24. Cyanide	10

SECTION 2 – ASP ORGANICS (VOLATILES) Method: NYSDEC-ASP-91-1			
VOLATILE	CONTRACT-REQUIRED QUANTITATION LIMIT** ($\mu\text{g/l}$)	VOLATILE	CONTRACT-REQUIRED QUANTITATION LIMIT** ($\mu\text{g/l}$)
1. Chloromethane	10	18. 1,2-Dichloropropane	10
2. Bromomethane	10	19. cis-1,3-Dichloropropene	10
3. Vinyl Chloride	10	20. Trichloroethene	10
4. Chloroethane	10	21. Dibromochloromethane	10
5. Methylene Chloride	10	22. 1,1,2-Trichloroethane	10
6. Acetone	10	23. Benzene	10
7. Carbon Disulfide	10	24. Trans-1,3-Dichloropropene	10
8. 1,1-Dichloroethylene	10	25. Bromoform	10
9. 1,1-Dichloroethane	10	26. 2-Hexanone	10
10. 1,2-Dichloroethylene (total)	10	27. 4-Methyl, 1,2-Pentanone	10
11. Chloroform	10	28. Tetrachloroethylene	10
12. 1,2-Dichloroethane	10	29. Toluene	10
13. 2-Butanone	10	30. Chlorobenzene	10
14. 1,1,1-Trichloroethane	10	31. Ethylbenzene	10
15. Carbon Tetrachloride	10	32. Styrene	10
16. Bromodichloromethane	10	33. Total Xylenes	10
17. 1,1,2,2-Tetrachloroethane	10		

SECTION 3 - ASP ORGANICS (SEMI-VOLATILES) Method: NYSDEC-ASP-91-2			
SEMI-VOLATILE	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/l)	SEMI-VOLATILE	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/l)
1. Phenol	10	33. Acenaphthene	10
2. Bis(2-chloroethyl)ether	10	34. 2,4-Dinitrophenol	25
3. 2-Chlorophenol	10	35. 4-Nitrophenol	25
4. 1,3-Dichlorobenzene	10	36. Dibenzofuran	10
5. 1,4-Dichlorobenzene	10	37. Dinitrotoluene	10
6. 1,2-Dichlorobenzene	10	38. Diethylphthalate	10
7. 2-Methylphenol	10	39. 4-Chlorophenyl phenyl ether	10
8. 2,2'-oxybis(1- Chloropropane)	10	40. Fluorene	10
9. 4-Methylphenol	10	41. 4-Nitroaniline	25
10. N-Nitroso-dipropylamine	10	42. 4,6-Dinitro-2- methylphenol	25
11. Hexachloroethane	10	43. N-nitrosodiphenyl amine	10
12. Nitrobenzene	10	44. 4-Bromophenyl phenyl ether	10
13. Isophorane	10	45. Hexachlorobenzene	10
14. 2-Nitrophenol	10	46. Pentachlorophenol	25
15. 2,4-Dimethylphenol	10	47. Phenanthrene	10
16. Bis(2-Chloroethoxy) methane	10	48. Anthracene	10
17. 2,4-Dichlorophenol	10	49. Carbazole	10
18. 1,2,4-Trichlorobenzene	10	50. Di-n-butyl phthalate	10
19. Naphthalene	10	51. Fluoranthene	10
20. 4-Chloroaniline	10	52. Pyrene	10
21. Hexachlorobutadiene	10	53. Butyl benzyl phthalate	10
22. 4-Chloro-3-methylphenol	10	54. 3,3'-Dichloro benzidine	10
23. 2-Methylnaphthalene	10	55. Benz(a)anthracene	10
24. Hexachlorocyclopentadiene	10	56. Chrysene	10
25. 2,4,6-Trichlorophenol	10	57. Bis(2-ethylhexyl) phthalate	10
26. 2,4,5-Trichlorophenol	25	58. Di-n-octyl phthalate	10
27. 2-Chloronaphthalene	10	59. Benzo(b)fluoranthene	10
28. 2-Nitroaniline	25	60. Benzo(k)fluoranthene	10
29. Dimethyl phthalate	10	61. Benzo(a)pyrene	10
30. Acenaphthylene	10	62. Indeno(1,2,3-cd) pyrene	10
31. 2,6-Dinitrotoluene	10	63. Dibenz(a,h) anthracene	10
32. 3-Nitroaniline	25	64. Benzo(g,h,i)perylene	10

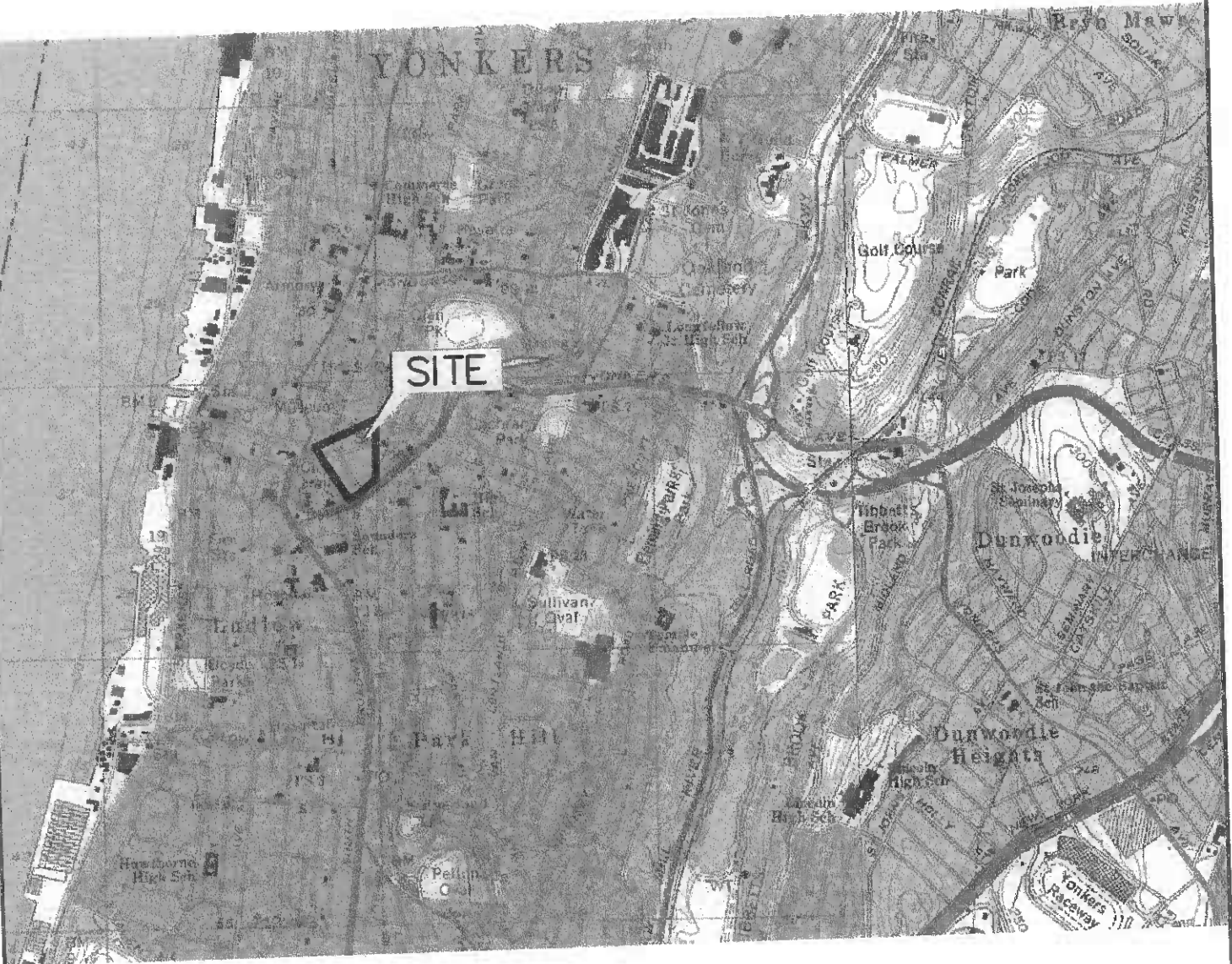
SECTION 3 - ASP ORGANICS (PESTICIDES/PCBS) Method: NYSDEC-ASP-91-3			
PESTICIDE/PCB	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/l)	PESTICIDE/PCB	CONTRACT- REQUIRED QUANTITATION LIMIT (µg/l)
1. Alpha-BHC	0.05	15. 4,4'-DDT	0.10
2. Beta-BHC	0.05	16. Methoxychlor	0.5
3. Delta-BHC	0.05	17. Endrin ketone	0.10
4. Gamma-BHC (lindane)	0.05	18. Endrin aldehyde	0.10
5. Heptachlor	0.05	19. Alpha-Chlordane	0.05
6. Aldrin	0.05	20. Gamma-Chlordane	0.05
7. Heptachlor epoxide	0.05	21. Toxaphene	5.0
8. Endosulfan I	0.05	22. AROCHLOR-1016	1.0
9. Dieldrin	0.10	23. AROCHLOR-1221	1.0
10. 4,4'-DDE	0.10	24. AROCHLOR-1232	1.0
11. Endrin	0.10	25. AROCHLOR-1242	1.0
12. Endosulfan II	0.10	26. AROCHLOR-1248	1.0
13. 4,4'-DDD	0.10	27. AROCHLOR-1254	1.0
14. Endosulfan sulfate	0.10	28. AROCHLOR-1260	1.0

*Matrix: groundwater. For soil matrix, multiply CRDL by 100.

**Quantitation limit for medium-level soil is 1,200 µg/kg (wet weight basis).

FIGURES

N:\ACAD\719071\1 LOCATION.dwg, USGS MAP, 11/13/2007 9:02:56 AM, 1:1



0 2000 FT.
APPROXIMATE SCALE

REFERENCE:

INFORMATION TAKEN FROM YANKERS, NY QUADRANGLE, 1998
7.5 MINUTE SERIES,

STRUEVER, FIDELCO, CAPPELLI, LLC
RIVER PARK CENTER PROJECT
CITY OF YONKERS, WESTCHESTER COUNTY,
NEW YORK

SITE LOCATION MAP



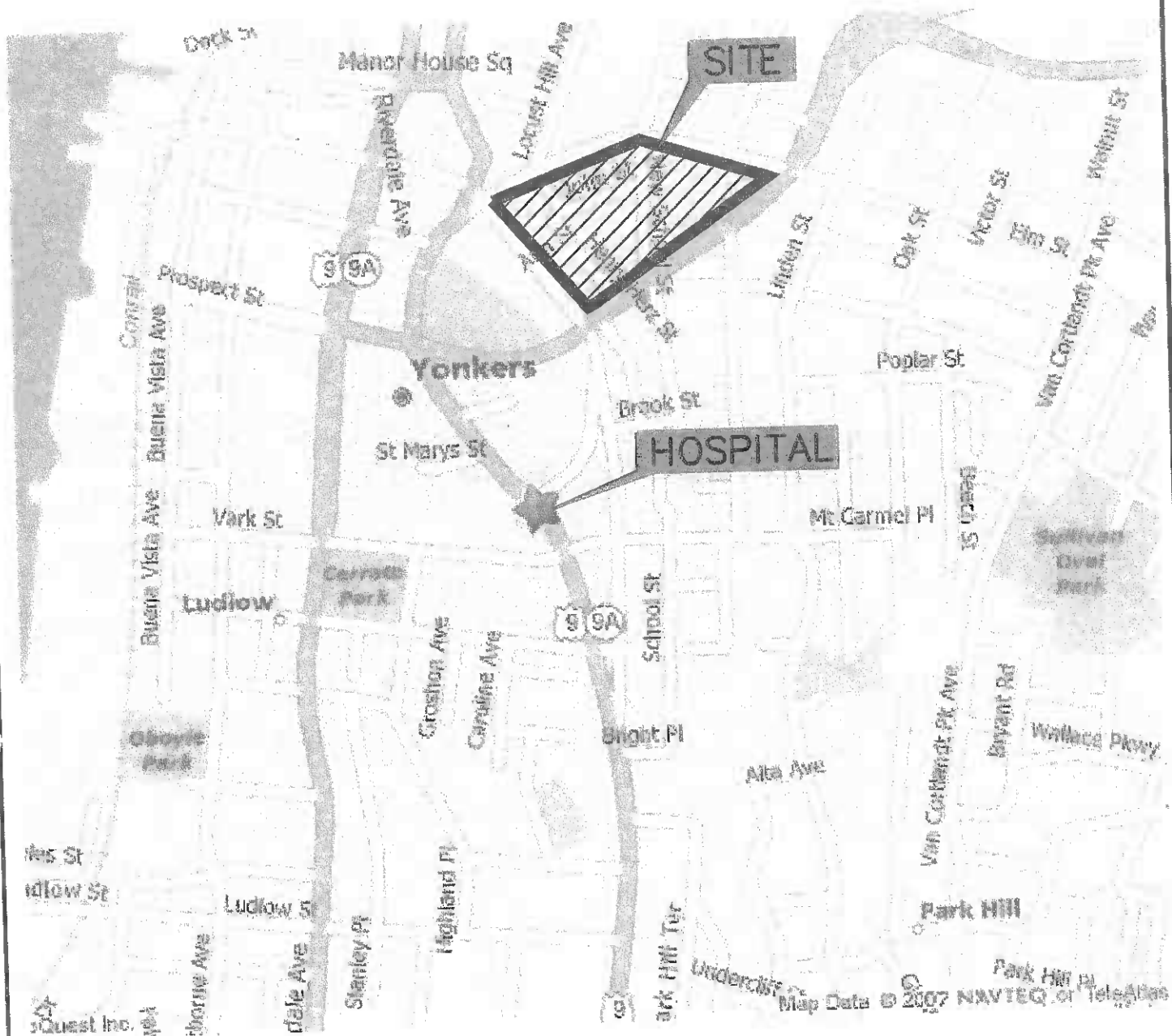
SES
CONSULTING
ENGINEERS, P.C.

SOILS / FOUNDATIONS
SITE DESIGN
ENVIRONMENTAL

12A MAPLE AVE, PINE BROOK, N.J. 07058 PH: 973-808-9050

FIGURE 1

DRAWN BY:	YY
CHECKED BY:	DG
SCALE:	1"=2000±
DATE:	11/7/07
JOB NO.:	7190



STRUEVER, FIDELCO, CAPPELLI, LLC
RIVER PARK CENTER PROJECT
CITY OF YONKERS, WESTCHESTER COUNTY,
NEW YORK

DIRECTIONS TO SAINT JOSEPH'S
MEDICAL CENTER



SES
CONSULTING
ENGINEERS, P.C.

SOILS / FOUNDATIONS
SITE DESIGN
ENVIRONMENTAL

12A MAPLE AVE. PINE BROOK, N.J. 07058 PH: 973-808-9050

FIGURE 2

DRAWN BY: YY

CHECKED BY: VN

SCALE: N.T.S.

DATE: 11/7/07

JOB NO.: 7190

ATTACHMENTS

ATTACHMENT 1

Air Monitoring Log

[illegible]

ATTACHMENT 2

OSHA Poster

HEALTH PROTECTION

The Occupational Safety and Health Act of 1970 provides job safety and health protection for workers by promoting safe and healthful working conditions throughout the Nation. Provisions of the Act include the following:

EMPLOYERS

All employers must furnish to employees employment and a place of employment free from recognized hazards that are causing or are likely to cause death or serious harm to employees. Employers must comply with occupational safety and health standards issued under the Act.

EMPLOYEES

Employees must comply with all occupational safety and health standards, rules, regulations and orders issued under the Act that apply to their own actions and conduct on the job.

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has the primary responsibility for administering the Act. OSHA issues occupational safety and health standards, and its Compliance Safety and Health Officers conduct jobsite inspections to help ensure compliance with the Act.

INSPECTION

The Act requires that a representative of the employer and a representative authorized by the employees be given an opportunity to accompany the OSHA inspector for the purpose of aiding the inspection.

Where there is no authorized employee representative, the OSHA Compliance Officer must consult with a reasonable number of employees concerning safety and health conditions in the workplace.

COMPLAINT

Employees or their representatives have the right to file a complaint with the nearest OSHA office requesting an inspection if they believe unsafe or unhealthful conditions exist in their workplace. OSHA will withhold, on request, names of employees complaining.

The Act provides that employees may not be discharged or discriminated against in any way for filing safety and health complaints or for otherwise exercising their rights under the Act.

Employees who believe they have been discriminated against may file a complaint with the nearest OSHA office within 30 days of the alleged discriminatory action.

CITATION

If upon inspection OSHA believes an employer has violated the Act, a citation alleging such violations will be issued to the employer. Each citation will specify a time period within which the alleged violation must be corrected. The OSHA citation must be prominently displayed at or near the place of alleged violation for three days, or until it is corrected, whichever is later, to warn employees of dangers that may exist there.

PROPOSED PENALTY

The Act provides for mandatory civil penalties against employers of up to \$7,000 for each serious violation and, for optional penalties of up to \$7,000 for each nonserious violation. Penalties of up to \$7,000 per day may be proposed for failure to correct violations within the proposed time period and for each day the violation continues beyond the prescribed abatement date. Also, any employer who willfully or repeatedly violates the Act may be assessed penalties of up to \$70,000 for each such violation. A minimum penalty of \$5,000 may be imposed for each willful violation. A violation of posting requirements can bring a penalty of up to \$7,000.

There are also provisions for criminal penalties. Any willful violation resulting in the death of any employee, upon conviction, is punishable by a fine of up to \$250,000 (or \$500,000 if the employer is a corporation), or by imprisonment for up to six months, or both. A second conviction of an employer doubles the possible term of imprisonment. Falsifying records, reports, or applications is punishable by a fine of \$10,000 or up to six months in jail or both.

VOLUNTARY ACTIVITY

While providing penalties for violations, the Act also encourages efforts by labor and management, before an OSHA inspection, to reduce workplace hazards voluntarily and to develop and improve safety and health programs in all workplaces and industries. OSHA's Voluntary Protection Programs recognize outstanding efforts of this nature.

OSHA has published Safety and Health Program Management Guidelines to assist employers in establishing or perfecting programs to prevent or control employee exposure to workplace hazards. There are many public and private organizations that can provide information and assistance in this effort, if requested. Also, your local OSHA office can provide considerable help and advice on solving safety and health problems or can refer you to other sources for help such as training.

CONSULTATION

Free assistance in identifying and correcting hazards and in improving safety and health management is available to employers, without citation or penalty, through OSHA-supported programs in each State. These programs are usually administered by the State Labor or Health department or a State university.

POSTING INSTRUCTIONS

Employers in States operating OSHA approved State Plans should obtain and post the State's equivalent poster.

Under provisions of Title 29, Code of Federal Regulations, Part 1903.2 (a) (1) employers must post this notice (or facsimile) in a conspicuous place where notices to employees are customarily posted.

More Information

Additional information and copies of the Act, specific OSHA safety and health standards, and other applicable regulations may be obtained from your employer or from the nearest OSHA Regional Office in the following locations:

Atlanta, GA (404) 347-3573	Kansas City, MO (816) 426-5861
Boston, MA (617) 565-7164	New York, NY (212) 337-2378
Chicago, IL (312) 353-2220	Philadelphia, PA (215) 596-1201

Lynn Martin

Lynn Martin, Secretary of Labor

U.S. Department of Labor

Occupational Safety and Health Administration

To report suspected fire hazards, imminent danger exists and health hazards



Washington, O.C.
1991 (Reprinted)
OSHA 2203

ATTACHMENT 3

HASP Field Change Request Form

Health & Safety Plan Change Notice

Page _____ of _____

PROJECT: _____

H&S-CN _____

1) HASP VERSION: _____ SECTION: _____ PAGE(s): _____

RE: _____ Change to existing HASP Anticipated Revision date _____
_____ Addition to existing HASP
_____ Other: _____

CONT. _____

2) PROPOSED CHANGE: _____

CONT. _____

3) REASON FOR PROPOSED CHANGE(s)

_____ Required by SPEC or Change Order
_____ Disposition of Deficiency
_____ Change in Regulatory or Other Requirement
_____ Operational Experience

Other: _____

CONT. _____

4) EXHIBITS ATTACHED _____ NO _____ YES (if YES, describe) _____

CONT. _____

5) PMK APPROVALS PROJECT MANAGER: _____ Date: _____

SITE MANAGER: _____ Date: _____

H&S MANAGER: _____ Date: _____

Client Approval Required _____ NO _____ YES (if YES, date submitted) _____

6) CLIENT APPROVAL _____ APPROVED _____ REMANDED _____ REJECTED

Comments: _____

CONT. _____

Client Representative: _____ Date: _____

7) DISTRIBUTION AFTER APPROVAL

☒ HASP UPDATE LIST
☒ CLIENT
☒ PROJECT FILES

OTHER: _____

8) PREPARED BY: _____ Date: _____

Title: _____

ATTACHMENT 4

Accident/Incident Report

Attachment 4 – Accident / Incident Report
HEALTH AND SAFETY PLAN
River Park Center, Yonkers, NY
November, 2007

PART 1: ADMINISTRATIVE DATA				
Name of Individual Preparing Report:			Date:	
From the list below, select the option that best categorizes the incident. Incident Types <input type="checkbox"/> Injury <input type="checkbox"/> Illness --Severity Level--- <input type="checkbox"/> Fatality <input type="checkbox"/> Lost Time <input type="checkbox"/> Restricted Work <input type="checkbox"/> Medical Treatment <input type="checkbox"/> First Aid			Environmental <input type="checkbox"/> Spill/Release <input type="checkbox"/> Permit Exceedance <input type="checkbox"/> Fine / Penalty <input type="checkbox"/> NOV <input type="checkbox"/> Misdirected Waste <input type="checkbox"/> Consent Order	
Property Damage <input type="checkbox"/> Property Damage			Personnel Involved <input type="checkbox"/> SESI Employee <input type="checkbox"/> Subcontractor <input type="checkbox"/> Third Party Estimated Cost of Property Damage <input type="checkbox"/> <\$50K <input type="checkbox"/> ≥ \$50K Cost of Fine / Penalty <input type="checkbox"/> <\$500 <input type="checkbox"/> ≥ \$500	
Date Occurred	Time <input type="checkbox"/> AM <input type="checkbox"/> PM	Site / Location / Project #		
Date Reported	Time <input type="checkbox"/> AM <input type="checkbox"/> PM	Incident Location (City, State)		
Project Officer Name		Project Manager Name		Project Manger Phone No.
Consultant/Subcontractor Co. Name		Supervisor's Name		Supervisor's Phone No.
List Individuals Involved and Their Occupation		Company Name / Yrs. Experience / Years in Current Position (if third party, list address and phone number)		
Job Task <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"> <input type="checkbox"/> Demolition <input type="checkbox"/> Dewatering <input type="checkbox"/> Drilling <input type="checkbox"/> Excavation / Trenching <input type="checkbox"/> Gauging/Bailing </div> <div style="width: 33%;"> <input type="checkbox"/> Geoprobe <input type="checkbox"/> Heavy Equip. Ops. <input type="checkbox"/> Motor Vehicle <input type="checkbox"/> O&M <input type="checkbox"/> Pavement Cutting </div> <div style="width: 33%;"> <input type="checkbox"/> Pump/Pilot Test <input type="checkbox"/> Rigging/Lifting <input type="checkbox"/> Sampling <input type="checkbox"/> Subsurface Clearance </div> <div style="width: 33%;"> <input type="checkbox"/> System Install <input type="checkbox"/> System Startup <input type="checkbox"/> UST Removal <input type="checkbox"/> Waste Management <input type="checkbox"/> Other: _____ </div> </div>				
Attached Information: (Check all that apply and attach in Part 3: Attachments) <input type="checkbox"/> Photo <input type="checkbox"/> Sketches <input type="checkbox"/> Vehicle Report <input type="checkbox"/> Other: _____				
Witnesses	Name	Address	City/State	Phone

Attachment 4 - Accident / Incident Report (Continued)

Equipment Involved: (Select all that apply)		
Fixed – Piping, General <input type="checkbox"/> Piping <input type="checkbox"/> Piping, Hose Fixed – Storage/Tankage <input type="checkbox"/> Tank, Underground <input type="checkbox"/> Tank, Underground Double Wall Fixed – Vessel <input type="checkbox"/> Drum, Separator Instrumentation – Instrument System <input type="checkbox"/> Local Control Panel Machinery – Drilling Equipment <input type="checkbox"/> Drill Rig Machinery - Pump <input type="checkbox"/> Pump, Submerged Support Equip.–Communication/Computing <input type="checkbox"/> Audio Communication Support Equip. – Maint. / Testing Tools <input type="checkbox"/> Hand Tool, Hammer <input type="checkbox"/> Hand Tool, Knife <input type="checkbox"/> Hand Tool, Non-powered <input type="checkbox"/> Hand Tool, Powered <input type="checkbox"/> Hand Tool, Powered, Drill <input type="checkbox"/> Hand Tool, Powered, Grinder <input type="checkbox"/> Hand Tool, Powered, Hydraulic Torque <input type="checkbox"/> Hand Tool, Powered, Saw <input type="checkbox"/> Hand Tool, Powered, Wrench <input type="checkbox"/> Hand Tool, Saw <input type="checkbox"/> Hand Tool, Screwdriver <input type="checkbox"/> Hand Tool, Shears <input type="checkbox"/> Hand Tool, Shovel <input type="checkbox"/> Hand Tool, Wrench <input type="checkbox"/> Ladder, Extension <input type="checkbox"/> Ladder, Platform <input type="checkbox"/> Ladder, Step <input type="checkbox"/> Maintenance Tool, General <input type="checkbox"/> Space Heater, Electric	Support Equipment – Remediation Equipment <input type="checkbox"/> Blower <input type="checkbox"/> Carbon Drum/Vessel <input type="checkbox"/> Compressor <input type="checkbox"/> Critical Equipment <input type="checkbox"/> Drilling Equipment, Vacuum <input type="checkbox"/> Exclusion Zone Equipment <input type="checkbox"/> Fencing <input type="checkbox"/> Filter <input type="checkbox"/> Fire Extinguisher <input type="checkbox"/> Manifold <input type="checkbox"/> Oxidizer <input type="checkbox"/> PPE – Eye <input type="checkbox"/> PPE – Fall <input type="checkbox"/> PPE – Foot <input type="checkbox"/> PPE – Hand <input type="checkbox"/> PPE – Head <input type="checkbox"/> PPE – Hearing <input type="checkbox"/> PPE – Respiratory <input type="checkbox"/> PPE – Vest/Clothing <input type="checkbox"/> PPE – Other <input type="checkbox"/> Pumps (transfer, electrical) <input type="checkbox"/> Remediation Shed/Trailer <input type="checkbox"/> Separator <input type="checkbox"/> Surge Tanks <input type="checkbox"/> System – Air Sparging <input type="checkbox"/> System – Carbon Treatment <input type="checkbox"/> System – Chemical Oxidation <input type="checkbox"/> System – Dual Phase Recovery <input type="checkbox"/> System – Groundwater P&T <input type="checkbox"/> System – Vapor Extraction <input type="checkbox"/> System – Vapor Phase Trtmt. <input type="checkbox"/> System - Other <input type="checkbox"/> Well – Extraction <input type="checkbox"/> Well – Monitoring <input type="checkbox"/> Well – Recovery	Support Equipment – Sampling Equipment <input type="checkbox"/> Bailer <input type="checkbox"/> Geoprobe <input type="checkbox"/> Hand Auger <input type="checkbox"/> Photo-Ionization Device <input type="checkbox"/> Sample Container <input type="checkbox"/> Split Spoon Sampler <input type="checkbox"/> Snow Plow Work Equipment - Crane <input type="checkbox"/> Crane, Mobile Work Equipment – Earth Moving Equipment <input type="checkbox"/> Bulldozer <input type="checkbox"/> Dump Truck <input type="checkbox"/> Excavator / Power Shovel <input type="checkbox"/> Front End Loader <input type="checkbox"/> Grader Work Equipment – Lifting Equipment <input type="checkbox"/> Chain Block <input type="checkbox"/> Forklift <input type="checkbox"/> Hoist <input type="checkbox"/> Hook/Clamp/Buckle/etc. <input type="checkbox"/> Jack <input type="checkbox"/> Manlift/Basket/Cherry Picker <input type="checkbox"/> Rope <input type="checkbox"/> Sling <input type="checkbox"/> Winch <input type="checkbox"/> Wire Rope Work Equipment –Transportation Equipment <input type="checkbox"/> Automobile <input type="checkbox"/> Tractor Trailer <input type="checkbox"/> Truck, Flatbed <input type="checkbox"/> Truck, Pickup <input type="checkbox"/> Truck, Tank Truck <input type="checkbox"/> Truck, Vacuum <input type="checkbox"/> Other: _____

Type of Injury / Illness	Body Part Affected
<input type="checkbox"/> Amputation / Avulsion <input type="checkbox"/> Bruise/Contusion <input type="checkbox"/> Burn - Chemical <input type="checkbox"/> Burn – Thermal or Electrical <input type="checkbox"/> Concussion/Unconscious <input type="checkbox"/> Crush <input type="checkbox"/> Cut/Scrape/Puncture <input type="checkbox"/> Dislocation <input type="checkbox"/> Foreign Object in Eye <input type="checkbox"/> Fracture <input type="checkbox"/> Hernia/Rupture <input type="checkbox"/> Irritation <input type="checkbox"/> Poisoning <input type="checkbox"/> Sprain/Strain <input type="checkbox"/> Stine/Bite <input type="checkbox"/> Heat Stress/Exhaustion/ Sunstroke <input type="checkbox"/> Hypothermia <input type="checkbox"/> Physical Agents - Radiation, etc. <input type="checkbox"/> Repeat Trauma – CTS <input type="checkbox"/> Repeat Trauma – Other Disorder <input type="checkbox"/> Respiratory – Toxic Agents <input type="checkbox"/> Skin Disease or Disorder <input type="checkbox"/> Other: _____ <input type="checkbox"/> Unknown	<input type="checkbox"/> Abdomen/Groin <input type="checkbox"/> Ankle <input type="checkbox"/> Back/Spine <input type="checkbox"/> Calf/Shin <input type="checkbox"/> Central Nervous <input type="checkbox"/> Chest <input type="checkbox"/> Circulatory/Blood <input type="checkbox"/> Ear <input type="checkbox"/> Elbow <input type="checkbox"/> Eye <input type="checkbox"/> Face <input type="checkbox"/> Fingers <input type="checkbox"/> Foot <input type="checkbox"/> Forearm <input type="checkbox"/> Hand <input type="checkbox"/> Hip <input type="checkbox"/> Internal Organs <input type="checkbox"/> Jaw <input type="checkbox"/> Knee <input type="checkbox"/> Neck <input type="checkbox"/> Nose <input type="checkbox"/> Respiratory <input type="checkbox"/> Ribs <input type="checkbox"/> Scelp <input type="checkbox"/> Shoulder <input type="checkbox"/> Skull <input type="checkbox"/> Thigh <input type="checkbox"/> Toes <input type="checkbox"/> Tongue <input type="checkbox"/> Tooth/Teeth <input type="checkbox"/> Upper Arm <input type="checkbox"/> Urinary <input type="checkbox"/> Wrist

Attachment 4 - Accident / Incident Report (Continued)

Source of Incident Body Position/Force <input type="checkbox"/> Line of Fire <input type="checkbox"/> Overexertion / Strain <input type="checkbox"/> Personal Energy <input type="checkbox"/> Struck Against Object <input type="checkbox"/> Struck By Object <input type="checkbox"/> Buried <input type="checkbox"/> Caught In, Under, Between		Chemical Exposure <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion <input type="checkbox"/> Physical Contact Contact By <input type="checkbox"/> Animal / Insect / Plant <input type="checkbox"/> Blood / Potentially Infection Materials <input type="checkbox"/> Electricity <input type="checkbox"/> Noise <input type="checkbox"/> Other Physical Agents <input type="checkbox"/> Radiation <input type="checkbox"/> Temperature Extremes		<input type="checkbox"/> Drowning Falls <input type="checkbox"/> Fall, From Elevation <input type="checkbox"/> Fall, Same Level <input type="checkbox"/> Slit or Trip Without Fall <input type="checkbox"/> Other <input type="checkbox"/> Suffocate/Asphyxiate <input type="checkbox"/> Transportation Incident	
Lost Time or Restricted Work:	Start Date:	# of Estimated Days	# of Actual Days	<input type="checkbox"/> No Reassignment <input type="checkbox"/> Permanently Reassigned <input type="checkbox"/> Temporarily Reassigned	
If the incident is a spill or release, complete the following as appropriate.					
Materials Involved:		Amount Released: (Specify amount & measurement unit, e.g. Gal, pH, PPM, etc.)		Medium Released To: <input type="checkbox"/> Air <input type="checkbox"/> Subsurface/Groundwater <input type="checkbox"/> Other <input type="checkbox"/> Surface Water - Onshore <input type="checkbox"/> Soil	
Authorities Notified	Name	Agency	Response	Date/Time	
If the incident is a property damage, complete the following as appropriate:					
Property Damaged: <input type="checkbox"/> Company <input type="checkbox"/> Subcontractor <input type="checkbox"/> Local Community <input type="checkbox"/> Personal		Description of Damage		Estimated Cost:	
PART 2: ACCIDENT / INCIDENT DETAILS					
(Explain the sequence of events and all pertinent facts including response actions taken). If an injury or illness occurred, describe the injury and treatment given.					

Attachment 4 - Accident / Incident Report (Continued)

PART 3: ATTACHMENTS (PHOTOS, SKETCHES, ETC.)

Signature of Individual Preparing Report:

Date:

Attachment 5

Signatory Page

Attachment 5 – Site-Specific Health and Safety Orientation Signatory Page
HEALTH AND SAFETY PLAN
River Park Center, Yonkers, NY
November, 2007

Title	Name	Signature
Project Manager:	Dean Giovanetti, P.G.	
Health and Safety Supervisor:	Mark Anderson, C.L.A., P.P.	

I have read the attached Health and Safety Plan (HASP), and have received site-specific information and orientation regarding the identified physical, chemical, and biological hazards anticipated at this site. My signature certifies that I understand the procedures, equipment, and restrictions applicable to this project site and agree to abide by them.

Signature	Printed Name	Company	Date

[illegible]

Attachment 6

Material Safety Data Sheets

Attachment 6

Material Safety Data Sheets

Volatile Organic Compounds:

- Acetone
- Benzene
- Chloroform
- Ethyl Benzene
- Methylene Chloride
- Methyl Tert-Butyl Ether
- Trichloroethylene
- Tetrachloroethylene
- Toluene
- Xylenes

Semi-Volatile Organic Compounds:

- Acenaphthene
- Anthracene
- 1,2-benzanthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Phenanthrene
- Pyrene

Metals:

- Arsenic
- Barium
- Cadmium
- Chromium

- Copper
- Lead
- Manganese
- Mercury
- Nickel
- Silver
- Zinc
- Cyanide

Pesticides/PCBs:

- 4,4'-DDT
- 4,4'-DDE
- 4,4'-DDD
- Alpha-Chlordane
- Dieldrin

Miscellaneous:

- Methane

MSDS Number: A0446 ***** Effective Date: 02/01/07 ***** Supersedes: 05/20/04

MSDS	Material Safety Data Sheet	24 Hour Emergency Telephone: 800-459-2151 CHEMTREC: 1-800-424-6300
		National Response in Canada CANUTEC: 800-955-4644
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865	Mallinckrodt CHEMICALS	Outside U.S. and Canada Chemical: 703-527-5887
All non-emergency questions should be directed to Customer Service (1-800-682-2537) for assistance.		NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

ACETONE

1. Product Identification

Synonyms: Dimethylketone; 2-propanone; dimethylketal

CAS No.: 67-64-1

Molecular Weight: 58.08

Chemical Formula: (CH₃)₂CO

Product Codes:

J.T. Baker: 500E, 501E, 5356, 5580, 5965, 5975, 9001, 9002, 9003, 9004, 9005, 9006, 9007, 9008, 9009, 9010, 9015, 9024, 9036, 9125, 9254, 9271, A134, V655

Mallinckrodt: 001E, 2432, 2435, 2437, 2438, 2440, 2443, 2850, H451, H580, H981

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Acetone	67-64-1	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate

Flammability Rating: 3 - Severe (Flammable)

Reactivity Rating: 0 - None

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Inhalation of vapors irritates the respiratory tract. May cause coughing, dizziness, dullness, and headache. Higher concentrations can produce central nervous system depression, narcosis, and unconsciousness.

Ingestion:

Swallowing small amounts is not likely to produce harmful effects. Ingestion of larger amounts may produce abdominal pain, nausea and vomiting. Aspiration into lungs can produce severe lung damage and is a medical emergency. Other symptoms are expected to parallel inhalation.

Skin Contact:

Irritating due to defatting action on skin. Causes redness, pain, drying and cracking of the skin.

Eye Contact:

Vapors are irritating to the eyes. Splashes may cause severe irritation, with stinging, tearing, redness and pain.

Chronic Exposure:

Prolonged or repeated skin contact may produce severe irritation or dermatitis.

Aggravation of Pre-existing Conditions:

Use of alcoholic beverages enhances toxic effects. Exposure may increase the toxic potential of chlorinated hydrocarbons, such as chloroform, trichloroethane.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but **DO NOT INDUCE**. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.

5. Fire Fighting Measures

Fire:

Flash point: -20C (-4F) CC

Autoignition temperature: 465C (869F)

Flammable limits in air % by volume:

lcl: 2.5; ucl: 12.8

Extremely Flammable Liquid and Vapor! Vapor may cause flash fire.

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. This material may produce a floating fire hazard. Sensitive to static discharge.

Fire Extinguishing Media:

Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Acetone:

-OSHA Permissible Exposure Limit (PEL):

1000 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):

500 ppm (TWA), 750 ppm (STEL) A4 - not classifiable as a human carcinogen

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.

WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless, volatile liquid.
Odor:
Fragrant, mint-like
Solubility:
Miscible in all proportions in water.
Specific Gravity:
0.79 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
56.5C (133F) @ 760 mm Hg
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
2.0
Vapor Pressure (mm Hg):
400 @ 39.5C (104F)
Evaporation Rate (BuAc=1):
ca. 7.7

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Concentrated nitric and sulfuric acid mixtures, oxidizing materials, chloroform, alkalis, chlorine compounds, acids, potassium t-butoxide.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 5800 mg/kg; Inhalation rat LC50: 50,100mg/m3; Irritation eye rabbit, Standard Draize, 20 mg severe; investigated as a tumorigen, mutagen, reproductive effector.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Acetone (67-64-1)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material is expected to readily biodegrade. When released to water, this material is expected to quickly evaporate. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition.

Environmental Toxicity:
This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)**Proper Shipping Name:** ACETONE**Hazard Class:** 3**UN/NA:** UN1090**Packing Group:** II**Information reported for product/size:** 188L**International (Water, I.M.O.)****Proper Shipping Name:** ACETONE**Hazard Class:** 3**UN/NA:** UN1090**Packing Group:** II**Information reported for product/size:** 188L**15. Regulatory Information**

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	RC	Japan	Australia
Acetone (67-64-1)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	DSL	--Canada-- NDSL	Phil.
Acetone (67-64-1)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Acetone (67-64-1)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8 (d)
Acetone (67-64-1)	5000	U002	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
 SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No
 Reactivity: No (Pure / Liquid)

Australian Hazchem Code: 2[Y]E**Poison Schedule:** None allocated.**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information**NFPA Ratings:** Health: 1 Flammability: 3 Reactivity: 0**Label Hazard Warning:**

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

Label Precautions:

Keep away from heat, sparks and flame.
 Keep container closed.
 Use only with adequate ventilation.
 Wash thoroughly after handling.
 Avoid breathing vapor.
 Avoid contact with eyes, skin and clothing.

Label First Aid:

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

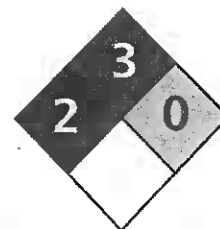
No Changes.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY,

MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	2
Env.	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C₆H₆

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.

MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].

The substance is toxic to blood, bone marrow, central nervous system (CNS).

The substance may be toxic to liver, Urinary System.

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat.

Slightly flammable to flammable in presence of oxidizing materials.

Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water.

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Extremely flammable liquid and vapor. Vapor may cause flash fire.

Reacts on contact with iodine heptafluoride gas.

Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition.
Contact with sodium peroxide with benzene causes ignition.
Benzene ignites in contact with powdered chromic anhydride.
Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:

Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxydisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Flammable liquid.

Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States]
TWA: 1.6 STEL: 8 (mg/m³) from ACGIH (TLV) [United States]
TWA: 0.1 STEL: 1 from NIOSH
TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States]
TWA: 10 (ppm) from OSHA (PEL) [United States]
TWA: 3 (ppm) [United Kingdom (UK)]
TWA: 1.6 (mg/m³) [United Kingdom (UK)]
TWA: 1 (ppm) [Canada]
TWA: 3.2 (mg/m³) [Canada]
TWA: 0.5 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:

Aromatic. Gasoline-like, rather pleasant.
(Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:

Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone.

Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Benzene vapors + chlorine and light causes explosion.

Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.

Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.

Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.

The solution of permanganic acid (or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.

Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion.

Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 930 mg/kg [Rat].

Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit].

Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.

MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.

DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].

Causes damage to the following organs: blood, bone marrow, central nervous system (CNS).

May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:

Very hazardous in case of inhalation.

Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects.

May affect genetic material (mutagenic).

May cause cancer (tumorigenic, leukemia))

Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system.

Eyes: Causes eye irritation.

Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and

other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system.
Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene

California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value)

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene

Connecticut carcinogen reporting list.: Benzene

Connecticut hazardous material survey.: Benzene

Illinois toxic substances disclosure to employee act: Benzene

Illinois chemical safety act: Benzene

New York release reporting list: Benzene

Rhode Island RTK hazardous substances: Benzene

Pennsylvania RTK: Benzene

Minnesota: Benzene

Michigan critical material: Benzene

Massachusetts RTK: Benzene

Massachusetts spill list: Benzene

New Jersey: Benzene

New Jersey spill list: Benzene

Louisiana spill reporting: Benzene

California Director's list of Hazardous Substances: Benzene

TSCA 8(b) inventory: Benzene
SARA 313 toxic chemical notification and release reporting: Benzene
CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable.
R22- Harmful if swallowed.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R45- May cause cancer.
R62- Possible risk of impaired fertility.
S2- Keep out of the reach of children.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39- Wear eye/face protection.
S46- If swallowed, seek medical advice immediately and show this container or label.
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 10/10/2005 08:35 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Safety data for chloroform



Click here for data on chloroform in student-friendly format, from the HSci project

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: trichloromethane, methyl trichloride, formyl trichloride, methane trichloride, trichloroform, methenyl trichloride, trichlormethan

Molecular formula: CHCl_3

CAS No: 67-66-3

EC No: 200-663-8

EC Index No: 602-006-00-4

Physical data

Appearance: clear colourless liquid with a sweet odour

Melting point: -63 C

Boiling point: 61 C

Vapour density: 4.1

Vapour pressure: 159 mm Hg at 20 C

Specific gravity: 1.48 g/cm³

Flash point: none

Explosion limits:

Autoignition temperature:

Water solubility: 8 g/l at 20 C

Refractive index: 1.4459 at 20 C, 589 nm

Stability

Stable. May decompose on exposure to light. Incompatible with a wide variety of materials, including peroxy compounds, alkali amides, strong bases, alkali metals, magnesium, aluminium, strong oxidizing agents.

Toxicology

This material causes cancer in laboratory animals, and is IARC listed as a probable human carcinogen. Inhalation and ingestion are harmful and may be fatal. May cause reproductive damage. Irritant. Exposure to alcohol may increase toxic effects. Prolonged or repeated skin contact may cause dermatitis. Typical TLV 50 ppm.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

ORL-RAT LD50 1194 mg kg⁻¹

ORL-MAN LDLO 2514 mg kg⁻¹

SCU-MUS LD50 704 mg kg⁻¹

IHL-RAT LC50 47 g m⁻³ / 4h

IPR-MUS LD50 623 mg kg⁻¹

ORL-GPG LD50 820 mg kg⁻¹

SKN-RBT LD50 > 20000 mg kg⁻¹

Irritation data

(The meaning of any abbreviations which appear in this section is given [here](#).)

SKN-RBT 10 mg/24h open mld

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R20 R22 R38 R40 R48.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here](#).)

UN No 1888. Packing group III. Hazard class 6.1.

Personal protection

Safety glasses and gloves. Good ventilation.

Safety phrases

(The meaning of any safety phrases which appear in this section is given

here.)

S36 S37.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on January 19, 2007. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

MSDS Number: E3050 ***** Effective Date: 01/31/05 ***** Supersedes: 11/04/04

MSDS <i>Material Safety Data Sheet</i>		24 Hour Emergency Telephone: 800-455-2151 CHEMTREC: 1-800-424-9309
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		National Response in Canada CANUTEC: 1-877-966-4664
		Outside U.S. and Canada Chemtrec: 703-527-3887
NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.		
All non-emergency questions should be directed to Customer Service (1-800-532-2537) for assistance.		

ETHYL BENZENE

1. Product Identification

Synonyms: Benzene, ethyl; ethylbenzen 99%; ethyl benzol
CAS No.: 100-41-4
Molecular Weight: 106.17
Chemical Formula: C₆H₅C₂H₅
Product Codes:
J.T. Baker: 5156, 5166
Mallinckrodt: 2427

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethyl Benzene	100-41-4	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION. AFFECTS CENTRAL NERVOUS SYSTEM.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
 Flammability Rating: 3 - Severe (Flammable)
 Reactivity Rating: 1 - Slight
 Contact Rating: 2 - Moderate
 Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
 Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Vapors irritate the mucous membranes and respiratory tract. May cause coughing, headache, labored breathing, dizziness and unconsciousness. May affect blood circulation.

Ingestion:

Harmful if swallowed. Aspiration into the lungs may cause pneumonia. Abdominal pain, nausea, vomiting may occur. May affect central nervous system.

Skin Contact:

Causes irritation with redness and pain. Prolonged contact may cause dermatitis.

Eye Contact:

Vapors irritate the eyes, causing redness, pain, blurred vision.

Chronic Exposure:

Chronic exposure may cause fatigue, sleepiness, headache, and irritation of the eyes, respiratory tract and skin.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin Contact:

Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Flash point: 21C (70F) CC

Autoignition temperature: 432C (810F)

Flammable limits in air % by volume:

lcl: 0.8; ucl: 6.7

Flammable Liquid and Vapor! Liquid floats on water and may travel to a source of ignition and spread the fire.

Explosion:

Sealed containers may rupture when heated. Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.

Fire Extinguishing Media:

Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

For Ethyl Benzene:

- OSHA Permissible Exposure Limit (PEL) -

100 ppm (TWA)

- ACGIH Threshold Limit Value (TLV) -

100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.

WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Aromatic odor.
Solubility:
Insoluble in water.
Specific Gravity:
0.867 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
No information found.
Boiling Point:
136C (277F)
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
3.66
Vapor Pressure (mm Hg):
10 @ 25.9C (79F)
Evaporation Rate (BuAc=1):
< 1

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Contact with strong oxidizing agents may cause fires and explosions. Attacks many plastics.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

For Ethyl Benzene - Oral rat LD50: 3500 mg/Kg; Skin rabbit LD50:15430 mg/Kg. Investigated as a tumorigen, mutagen, reproductive effector.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Ethyl Benzene (100-41-4)	No	No	2B

12. Ecological Information

Environmental Fate:
When released into water, this material is expected to readily biodegrade. When released to water, this material is expected to quickly evaporate. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is not expected to be degraded by photolysis.
Environmental Toxicity:
96 Hr LC50 bluegill:150.0 mg/L (Static);
96 Hr LC50 fathead minnow :9.09 mg/L, (flow-through);
96 Hr LC50 rainbow trout: 14.0 mg/L (Static).

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)
Proper Shipping Name: ETHYLBENZENE
Hazard Class: 3

UN/NA: UN1175
 Packing Group: II
 Information reported for product/size: 52L

International (Water, I.M.O.)

Proper Shipping Name: ETHYLBENZENE
 Hazard Class: 3
 UN/NA: UN1175
 Packing Group: II
 Information reported for product/size: 52L

International (Air, I.C.A.O.)

Proper Shipping Name: ETHYLBENZENE
 Hazard Class: 3
 UN/NA: UN1175
 Packing Group: II
 Information reported for product/size: 52L

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	Australia
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

Ingredient	Korea	DSL	NDSL	Phil.
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-	TPQ	List	-SARA 313-	Chemical Catg.
Ethyl Benzene (100-41-4)	No	No	Yes	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
 Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 3[Y]E

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 3 Reactivity: 0

Label Hazard Warning:

WARNING! FLAMMABLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED OR INHALED. VAPOR OR MIST IS IRRITATING TO THE EYES AND UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION. AFFECTS CENTRAL NERVOUS SYSTEM.

Label Precautions:

Keep away from heat, sparks and flame.

Keep container closed.

Use only with adequate ventilation.

Avoid contact with eyes, skin and clothing.

Avoid breathing vapor or mist.

Wash thoroughly after handling.

Label First Aid:

If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

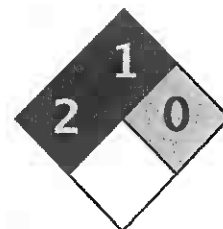
MSDS Section(s) changed since last revision of document include: 3, 11, 12.

Disclaimer:

 Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy.

This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)



Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet

Methylene chloride MSDS

Section 1: Chemical Product and Company Identification

Product Name: Methylene chloride

Catalog Cudas: SLM2398, SLM3772, SLM1297, SLM2677, SLM4054

CAS#: 75-09-2

RTECS: PA8050000

TSCA: TSCA 8(b) inventory: Methylene chloride

CI#: Not available.

Synonym: Dichloromethane

Chemical Name: Methylene Chloride

Chemical Formula: C-H₂-Cl₂

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Methylene chloride	75-09-2	100

Toxicological Data on Ingredients: Methylene chloride: ORAL (LD50): Acute: 1600 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (irritant, permeator). Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects: CARCINOGENIC EFFECTS: Classified + (Proven.) by OSHA. Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, the nervous system, liver, mucous membranes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact: In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact: Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation: Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 556°C (1032.8°F)

Flash Points: Not available.

Flammable Limits: LOWER: 12% UPPER: 19%

Products of Combustion: These products are carbon oxides (CO, CO₂), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances: Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

Large Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions: Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill: Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: TWA: 50 from ACGIH (TLV) [United States] TWA: 174 from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 84.93g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: 39.75°C (103.5°F)

Melting Point: -96.7°C (-142.1°F)

Critical Temperature: Not available.

Specific Gravity: 1.3266 (Water = 1)

Vapor Pressure: 46.5 kPa (@ 20°C)

Vapor Density: 2.93 (Air = 1)

Volatility: Not available.

Odor Threshold: 214 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, n-octanol, acetone.

Solubility: Easily soluble in methanol, diethyl ether, n-octanol, acetone. Partially soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 1600 mg/kg [Rat]. Acute toxicity of the vapor (LC50): 52000 1 hours [Rat].

Chronic Effects on Humans: CARCINOGENIC EFFECTS: Classified + (Proven.) by OSHA. Classified 2B (Possible for human.) by IARC. Causes damage to the following organs: lungs, the nervous system, liver, mucous membranes, central nervous system (CNS).

Other Toxic Effects on Humans: Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (irritant, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Dichloromethane UNNA: 1593 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations: California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Methylene chloride California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Methylene chloride Pennsylvania RTK: Methylene chloride Massachusetts RTK: Methylene chloride TSCA 8(b) inventory: Methylene chloride SARA 313 toxic chemical notification and release reporting: Methylene chloride CERCLA: Hazardous substances.: Methylene chloride

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC): R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment: Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 10:43 AM

Last Updated: 12/02/2005 11:49 AM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the

information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

MSDS Number: B7222 ***** Effective Date: 07/06/06 ***** Supersedes: 02/16/06

MSDS Material Safety Data Sheet		24 Hour Emergency Telephone: 909-859-0151 CHEMTREC: 1-800-424-9300
		National Response in Canada CANUTEC: 616-968-6666
From: Mallinckrodt Baker, Inc. 222 Red School Lane Phillipsburg, NJ 08865		Outside U.S. and Canada Chemtrec: 703-529-3887
Mallinckrodt CHEMICALS J.T. Baker		NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers, to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.
All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.		

METHYL TERT-BUTYL ETHER

1. Product Identification

Synonyms: 2-Methoxy-2-methylpropane; tert-Butyl methyl ether; Methyl 1,1-dimethyl ethyl ether; MTBE
 CAS No.: 1634-04-4
 Molecular Weight: 88.15
 Chemical Formula: C₅H₁₂O
 Product Codes:
 J.T. Baker: 9034, 9042, 9043
 Mallinckrodt: 5398

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methyl tert-butyl Ether	1634-04-4	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT CENTRAL NERVOUS SYSTEM, BLOOD, AND KIDNEYS. A CENTRAL NERVOUS SYSTEM DEPRESSANT. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)
 Flammability Rating: 3 - Severe (Flammable)
 Reactivity Rating: 1 - Slight
 Contact Rating: 2 - Moderate (Life)
 Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
 Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Inhalation of vapor can irritate respiratory tract. Causes central nervous system effects. Breathing high concentrations in air can cause lightheadedness, dizziness, weakness, nausea, headache.

Ingestion:

May cause nausea, vomiting. Other symptoms similar to inhalation may occur. Laryngeal, ocular, and respiratory muscles are affected in severe poisoning.

Skin Contact:

A mild skin irritant which causes loss of natural oils. May be a route of absorption into the body.

Eye Contact:

Vapors can irritate eyes; splashes may cause damage to eye tissue.

Chronic Exposure:

Symptoms noted above may be produced by cumulative exposure.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Flash point: -27C (-17F)

Autoignition temperature: 435C (815F)

Flammable limits in air % by volume:

lcl: 1.6; ucl: 8.4

Extremely Flammable Liquid and Vapor! Vapor may cause flash fire.

Explosion:

Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated. Sensitive to static discharge.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide. Water spray may be used to keep fire exposed containers cool.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-ACGIH Threshold Limit Value (TLV): 50 ppm (TWA), A3 - Confirmed animal carcinogen with unknown relevance to humans

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.

WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Clear, colorless liquid.

Odor:
Characteristic ethereal odor.
Solubility:
4.8 g/100g of water.
Specific Gravity:
0.74
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
55C (131F)
Melting Point:
-110C (-166F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
245 @ 25C (77F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Unstable in acid solutions.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Oxidizers, acids.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Methyl tert butyl ether: Oral rat LD50: 4 gm/kg; inhalation rat LC50: 23576 ppm/4H.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		
	Known	Anticipated	IARC Category
Methyl tert-butyl Ether (1634-04-4)	No	No	3

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the air, this material is expected to adversely affect the ozone layer. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material has an estimated bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is not expected to be degraded by photolysis. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: METHYL TERT-BUTYL ETHER
Hazard Class: 3
UN/NA: UN2398
Packing Group: II
Information reported for product/size: 215L

International (Water, I.M.O.)

Proper Shipping Name: METHYL BUTYL ETHER

Hazard Class: 3

UN/NA: UN2398

Packing Group: II

Information reported for product/size: 215L

15. Regulatory Information

```

-----\Chemical Inventory Status - Part 1\-----
Ingredient                                     TSCA  BC   Japan  Australia
-----
Methyl tert-butyl Ether (1634-04-4)           Yes  Yes   Yes    Yes

```

```

-----\Chemical Inventory Status - Part 2\-----
Ingredient                                     --Canada--
                                     Korea  DSL   NDSL   Phil.
-----
Methyl tert-butyl Ether (1634-04-4)           Yes   Yes   No     Yes

```

```

-----\Federal, State & International Regulations - Part 1\-----
Ingredient                                     -SARA 302-  -SARA 313-
                                     RQ   TPQ    List  Chemical Catg.
-----
Methyl tert-butyl Ether (1634-04-4)           No    No     Yes    No

```

```

-----\Federal, State & International Regulations - Part 2\-----
Ingredient                                     -RCRA-      -TSCA-
                                     CERCLA      261.33     8(d)
-----
Methyl tert-butyl Ether (1634-04-4)           1000        No        No

```

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
 Reactivity: No (Pure / Liquid)

Australian Hazchem Code: 3(Y)E

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 3 Reactivity: 0

Label Hazard Warning:

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. MAY AFFECT CENTRAL NERVOUS SYSTEM, BLOOD, AND KIDNEYS. A CENTRAL NERVOUS SYSTEM DEPRESSANT. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Label Precautions:

Keep away from heat, sparks and flame.

Avoid contact with eyes, skin and clothing.

Avoid breathing vapor.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 14.

Disclaimer:

 Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety

Phone Number: (314) 654-1600 (U.S.A.)

MSDS for : TRICHLOROETHYLENEPage 1

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: TRICHLOROETHYLENE
FORMULA: C2HCL3
FORMULA WT: 131.40
CAS NO.: 79-01-6
NIOSH/RTECS NO.: KX4550000
COMMON SYNONYMS: TRICHLOROETHENE; ETHINYL TRICHLORIDE; ACETYLENE TRICHLORIDE;
TCE
PRODUCT CODES: 5376,9458,9454,9455,9464,9473
EFFECTIVE: 01/22/87
REVISION #03

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 3 SEVERE (CANCER CAUSING)
FLAMMABILITY - 1 SLIGHT
REACTIVITY - 1 SLIGHT
CONTACT - 1 SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

WARNING

HARMFUL IF SWALLOWED OR INHALED
CAUSES IRRITATIONNOTE: THIS MATERIAL OR ITS VAPORS IN CONTACT WITH FLAMES OR HOT GLOWING
SURFACES MAY FORM CORROSIVE ACID FUMES.

NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE
VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
TRICHLOROETHYLENE	90-100	79-01-6

3 - PHYSICAL DATA

BOILING POINT: 87 C (189 F) VAPOR PRESSURE (MM HG): 58

□

MSDS for TRICHLOROETHYLENEPage 2

MELTING POINT: -73 C (-99 F) VAPOR DENSITY(AIR=1): 4.53
SPECIFIC GRAVITY: 1.47 EVAPORATION RATE: N/A
(H2O=1) (BUTYL ACETATE=1)
SOLUBILITY(H2O): SLIGHT (0.1 TO 1 %) % VOLATILES BY VOLUME: 100
APPEARANCE & ODOR: COLORLESS LIQUID WITH CHLOROFORM ODOR.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A NFPA 704M RATING: 2-1-0
FLAMMABLE LIMITS: UPPER - 10.5 % LOWER - 8.0 %

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED
BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.
MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER
TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

GIVES OFF FLAMMABLE VAPORS. VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR.
CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG
OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE

5 - HEALTH HAZARD DATA

SOME EXPERIMENTS WITH TEST ANIMALS INDICATED THAT THIS SUBSTANCE MAY BE
ANTICIPATED TO BE A CARCINOGEN.

THRESHOLD LIMIT VALUE (TLV/TWA): 270 MG/M3 (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1080 MG/M3 (200 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): MG/M3 (100 PPM)

TOXICITY: LD50 (ORAL-RAT) (MG/KG) - 7193
LD50 (IPR-MOUSE) (MG/KG) - 3000
LD50 (IV-MOUSE) (MG/KG) - 34

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE

INHALATION OF VAPORS MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS,

□

MSDS for TRICHLOROETHYLENE

Page 3

DROWSINESS, IRRITATION OF RESPIRATORY TRACT, AND LOSS OF CONSCIOUSNESS.
INHALATION OF VAPORS MAY CAUSE PULMONARY EDEMA.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
PROLONGED EXPOSURE MAY CAUSE DERMATITIS.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS,
GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION AND
HEARING LOSS.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE DAMAGE TO KIDNEYS, LIVER,
LUNGS, BLOOD, OR CENTRAL NERVOUS SYSTEM.

TARGET ORGANS

RESPIRATORY SYSTEM, HEART, LIVER, KIDNEYS, CENTRAL NERVOUS SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NONE IDENTIFIED

ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

CALL A PHYSICIAN.

IF SWALLOWED, DO NOT INDUCE VOMITING.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT
LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

ACCEPTABLE MAXIMUM PEAK ABOVE THE ACCEPTANCE CEILING CONCENTRATION FOR AN
EIGHT-HOUR SHIFT = 300 PPM FOR 5 MINUTES IN ANY 2 HOURS. (PEL)
CEILING = 200 PPM.

6 - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, LIGHT

INCOMPATIBLES: CHEMICALLY ACTIVE METALS, STRONG BASES,
STRONG OXIDIZING AGENTSDECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CHLORINE,
CARBON MONOXIDE, CARBON DIOXIDE

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.

TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE

INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

□

MSDS for TRICHLOROETHYLENE

Page 4

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U228 (TOXIC WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

SPECIAL PRECAUTIONS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

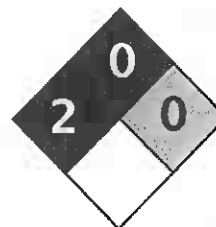
PROPER SHIPPING NAME	TRICHLOROETHYLENE (AIR ONLY)
HAZARD CLASS	ORM-A
UN/NA	UN1710
LABELS	NONE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	TRICHLOROETHYLENE
HAZARD CLASS	6.1
UN/NA	UN1710
LABELS	HAZARDOUS - STOW AWAY FROM FOOD STUFFS



Science Lab.com
Chemicals & Laboratory Equipment



Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolve; Tetrachloroethene; Tetraleno; Tetralox; Tetravec; Tetrogue; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C₂Cl₄

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: 1-800-901-7247
International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of eye contact (irritant), of ingestion.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP.

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, central nervous system (CNS).

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 25 (ppm) from OSHA (PEL) [United States]

TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States]

TWA: 170 (mg/m³) from OSHA (PEL) [United States]

Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; $\log(\text{oil/water}) = 3.4$

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:

Miscible with alcohol, ether, chloroform, benzene, hexane.

It dissolves in most of the fixed and volatile oils.

Solubility in water: 0.015 g/100 ml @ 25 deg. C

It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Oxidized by strong oxidizing agents.

Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium, barium.

Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 2629 mg/kg [Rat].

Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit].

Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP.

MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.

May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract,

skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation.

Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Lethal Dose/Conc:

LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg

LDL [Dog] - Route: Oral; Dose: 4000 mg/kg

LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:

May cause adverse reproductive effects and birth defects(teratogenic).

May affect genetic material (mutagenic).

May cause cancer.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects:

Skin: Causes skin irritation with possible dermal blistering or burns. Symptoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects.

A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.

Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain.

Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorientation, seizures, emotional instability, stupor, coma). It may cause pulmonary edema

Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation.

Chronic Potential Health Effects:

Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation.

Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremities, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:

Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fathead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute:

Tetrachloroethylene

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Tetrachloroethylene

Connecticut hazardous material survey.: Tetrachloroethylene

Illinois toxic substances disclosure to employee act: Tetrachloroethylene

Illinois chemical safety act: Tetrachloroethylene

New York release reporting list: Tetrachloroethylene

Rhode Island RTK hazardous substances: Tetrachloroethylene

Pennsylvania RTK: Tetrachloroethylene

Minnesota: Tetrachloroethylene

Michigan critical material: Tetrachloroethylene

Massachusetts RTK: Tetrachloroethylene

Massachusetts spill list: Tetrachloroethylene

New Jersey: Tetrachloroethylene

New Jersey spill list: Tetrachloroethylene

Louisiana spill reporting: Tetrachloroethylene

California Director's List of Hazardous Substances: Tetrachloroethylene

TSCA 8(b) inventory: Tetrachloroethylene

TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97

SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene

CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R40- Possible risks of irreversible effects.

R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S23- Do not breathe gas/fumes/vapour/spray

S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S37- Wear suitable gloves.

S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:29 PM

Last Updated: 10/10/2005 08:29 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Safety data for toluene



Click [here](#) for data on toluene in student-friendly format, from the HSci project

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: methylbenzene, phenylmethane, toluol, antisal 1A, CP 25, methacide, methylbenzol, NCI-C07272, RCRA waste number U220, tolu-sol

Uses: Solvent

Molecular formula: C_7H_8

CAS No: 108-88-3

EC No: 203-625-9

Annex I Index No: 601-021-00-3

Physical data

Appearance: Colourless liquid with a benzene-like odour (odour threshold 0.17 ppm)

Melting point: -93 C

Boiling point: 110.6 C

Specific gravity: 0.865

Vapour pressure: 22 mm Hg at 20 C (vapour density 3.2)

Flash point: 4 C

Explosion limits: 1% - 7%

Autoignition temperature: 536 C

Stability

Stable. Substances to be avoided: oxidizing agents, oxygen, moisture. Highly

flammable. Hygroscopic.

Toxicology

Toxic by inhalation, ingestion or by absorption through skin. Serious irritant. Experimental teratogen.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

ORL-RAT LD50 636 mg kg⁻¹

IPR-RAT LD50 1332 mg kg⁻¹

ORL-HMN LDLO 50 mg kg⁻¹

IPR-MUS LD50 59 mg kg⁻¹

IHL-MAM LC50 30 g m⁻³

Irritation data

(The meaning of any abbreviations which appear in this section is given [here](#).)

EYE-HMN 300 ppm.

SKN-RBT 435 mg mild.

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R11 R23 R24 R25.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here](#).)

Hazard class 3.0 Packing group II. UN No 1294. IMDG class 3.

Personal protection

Safety glasses. Good ventilation.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

S16 S25 S29 S33.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on September 5, 2005. Although we have tried to make it as accurate and useful as possible, we can take no responsibility for its use or misuse.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL **begins** "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

MSDS Number: X2000 ***** Effective Date: 02/16/06 ***** Supersedes: 04/01/03

MSDS**Material Safety Data Sheet**From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865Mallinckrodt
CHEMICALS

J.T. Baker

24 Hour Emergency Telephone: 800-459-2151
CHEMTREC: 1-800-424-9399National Response in Canada
CANUTEC: 416-594-6866Outside U.S. and Canada
Chemtrec: 703-527-0887NOTE: CHEMTREC, CANUTEC and National
Response Center emergency numbers to be
used only in the event of chemical emergencies
involving a spill, leak, fire, exposure or accident
involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-552-2537) for assistance.

XYLENES

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene

CAS No.: 1330-20-7

Molecular Weight: 106.17

Chemical Formula: C₆H₄(CH₃)₂

Product Codes:

J.T. Baker: 5377, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516

Mallinckrodt: 8664, 8668, 8671, 8672, 8802, V052

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Xylene	108-38-3	40 - 65%	Yes
o-Xylene	95-47-6	15 - 20%	Yes
p-Xylene	106-42-3	< 20%	Yes
Ethyl Benzene	100-41-4	15 - 25%	Yes

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Life)

Flammability Rating: 2 - Moderate

Reactivity Rating: 1 - Slight

Contact Rating: 3 - Severe

Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:

Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.

Ingestion:

Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.

Skin Contact:

Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.

Eye Contact:

Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.

Chronic Exposure:

Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May

damage the liver and kidneys.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

Ingestion:

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but **DO NOT INDUCE**. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:

Flash point: 29C (84F) CC

Autoignition temperature: 464C (867F)

Flammable limits in air % by volume:

lcl: 1.0; ucl: 7.0

Explosion:

Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.

Fire Extinguishing Media:

Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

100 ppm (TWA) xylene

100 ppm (TWA) ethylbenzene

-ACGIH Threshold Limit Value (TLV):

xylene: 100 ppm (TWA) 150 ppm (STEL), A4 - Not classifiable as a human carcinogen.

ethyl benzene: 100 ppm (TWA) 125 ppm (STEL), A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, a half-face organic vapor respirator may be worn for up to ten times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor

respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.
WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

The following physical data is for xylene.

Appearance:

Clear, colorless liquid.

Odor:

Characteristic odor.

Solubility:

Insoluble in water.

Specific Gravity:

0.86 @ 20C/4C

pH:

Not applicable.

% Volatiles by volume @ 21C (70F):

100

Boiling Point:

137 - 140C (279 - 284F)

Melting Point:

-25C (-13F)

Vapor Density (Air=1):

3.7

Vapor Pressure (mm Hg):

8 @ 20C (68F)

Evaporation Rate (BuAc=1):

0.7

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:

Involvement in a fire causes formation of carbon monoxide and unidentified organic components.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong oxidizing agents and strong acids.

Conditions to Avoid:

Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:

Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector.

Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

May cause teratogenic effects.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
m-Xylene (108-38-3)	No	No	3
o-Xylene (95-47-6)	No	No	3
p-Xylene (106-42-3)	No	No	3
Ethyl Benzene (100-41-4)	No	No	2B

12. Ecological Information

Environmental Fate:

Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)

Environmental Toxicity:

For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
m-Xylene (108-38-3)	Yes	Yes	Yes	Yes
o-Xylene (95-47-6)	Yes	Yes	Yes	Yes
p-Xylene (106-42-3)	Yes	Yes	Yes	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----				
Ingredient	Korea	DSL	NDSL	Phil.
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-SARA 313-	
	RQ	TPQ	List	Chemical Catg.
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
Ethyl Benzene (100-41-4)	No	No	Yes	No

-----\Federal, State & International Regulations - Part 2\-----			
Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): Yes CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 3[Y]

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NEPA Ratings: Health: 2 Flammability: 3 Reactivity: 0

Label Hazard Warning:

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.

Label Precautions:

Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use only with adequate ventilation.
Avoid breathing vapor.
Wash thoroughly after handling.

Label First Aid:

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

MATERIAL SAFETY DATA SHEET



VARIAN

MANUFACTURER ADDRESS
Varian Instruments – Middelburg
Herculesweg 8
4338 PL Middelburg, Netherlands

PHONE 31.118.67100
EMERGENCY PHONE 1.800.424.9300 – CHEMTREC USA
FAX 31.118.633118

MSDS Number: 1002-032 Rev. 0
Date: May 2, 2002
Prepared by: Corporate EH&S

SECTION 1: MATERIAL IDENTIFICATION

Product Name: Testmix CP0032
Synonyms: Acenaphthene, Fluorene, Phenanthrene, and Fluoranthene in Methanol. Methanol is also known as Methyl Alcohol, Methyl hydroxide, and Wood Alcohol.

SECTION 2: COMPOSITION

An ampoule/vial containing the following:

<u>Component</u>	<u>CAS Number</u>	<u>Approximate Concentration</u>	<u>NTP Carcinogen Status</u>	<u>IARC Carcinogen Status</u>
Acenaphthene	83-32-9	0.10%	not listed	not listed
Fluorene	86-73-7	0.10%	not listed	not listed
Phenanthrene	85-01-8	0.10%	not listed	not listed
Fluoranthene	206-44-0	0.10%	not listed	not listed
Methanol	67-56-1	Balance	not listed	not listed

NOTE: Unless otherwise noted, the information below pertains only to the Methanol solvent in the ampoule/vial.

SECTION 3: HAZARD IDENTIFICATION

Emergency Overview: Colorless liquid. Flash Point: 11 deg C. Poison! Cannot be made non-poisonous. Causes eye and skin irritation. May be absorbed through intact skin. This substance has caused adverse reproductive and fetal effects in animals. Flammable liquid and vapor. Harmful if inhaled. May be fatal or cause blindness if swallowed. May cause central nervous system depression. May cause digestive tract irritation with nausea, vomiting, and diarrhea. Causes respiratory tract irritation. May cause liver, kidney and heart damage. Target Organs: Kidneys, heart, central nervous system, liver, eyes.

Potential Health Effects

Inhalation: Harmful if inhaled. May cause adverse central nervous system effects including headache, convulsions, and possible death. May cause visual impairment and possible permanent blindness. Causes irritation of the mucous membrane.

Ingestion: May be fatal or cause blindness if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systemic toxicity with acidosis. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause cardiopulmonary system effects. Usual fatal dose: 100-125 milliliters.

Skin Contact: Causes moderate skin irritation. May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.

Eye Contact: Produces irritation, characterized by a burning sensation, redness, tearing, inflammation, and possible corneal injury.

Carcinogen Status: NTP: Not listed IARC: Not listed

SECTION 4: FIRST AID INFORMATION

Inhalation: Get medical attention immediately. Remove to fresh air. If breathing is difficult, give oxygen. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. Do NOT use mouth-to-mouth resuscitation.

Ingestion: If swallowed, get medical attention immediately. Induce vomiting immediately as directed by medical personnel. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person.

Skin Contact: In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention if irritation develops or persists. Wash clothing before reuse.

Eye Contact: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately. Do NOT allow victim to rub or keep eyes closed.

SECTION 5: FIRE-FIGHTING INFORMATION

Fire: Flash point (closed cup): 12C (54F)
Autoignition temperature: 464C (867F)

Flammable limits in air % by volume: Lower = 6.0 Upper = 36.5

NFPA Rating: health-1; flammability-3; reactivity-0

Explosion: Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Moderate explosion hazard and dangerous fire hazard when exposed to heat, sparks or flames. Sensitive to static discharge.

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Use proper personal protective equipment as indicated in Section 8. Ventilate area of leak or spill. Remove all sources of ignition. Absorb spill with inert material (e.g. vermiculite, sand or earth), scoop up with a nonsparking tool, then place into a suitable container for disposal. Do not flush to sewer!

SECTION 7: HANDLING AND STORAGE

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Keep container tightly closed. Avoid contact with heat, sparks and flame. Do not get on skin or in eyes. Avoid ingestion and inhalation.

Storage: Keep away from heat, sparks, flame and sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTIVE EQUIPMENT

Airborne Exposure Limits: United States - OSHA Permissible Exposure Limit (PEL): 200 ppm (TWA)
United States - ACGIH Threshold Limit Value (TLV): 200 ppm (TWA) ; 250 ppm (STEL)
Australia: Time-weighted average 200 ppm (260 mg/m³), short term exposure limit 250 ppm, Skin JAN1993
The Netherlands: MAC-TGG 200 ppm (260 mg/m³), Skin, JAN1999

Personal Protective Equipment

Eye Protection: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Maintain eye wash fountain and quick-drain facilities in work area.

Skin Protection: Wear impervious gloves, apron, and/or clothing.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Use a NIOSH or European Standard EN 149 approved respirator when necessary.

Ventilation System: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid

Odor: Characteristic, Alcohol-like

Solubility: Miscible in water

Specific Gravity: 0.79 (Water = 1)

pH: Not available.

Molecular Formula: CH₃OH

Molecular Weight: 32.05

Boiling Point: 64.5 (148F)

Melting Point: -98 (-44F)

Vapor Density: 1.11 (Air=1)

Vapor Pressure (mm Hg): 97 @ 20C (68F)

Evaporation Rate: 5.9 (Butyl Acetate = 1)

% Volatiles by Volume: 100

SECTION 10: STABILITY AND REACTIVITY DATA

Stability: Stable at room temperature in sealed containers.

Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide, formaldehyde.

Hazardous Polymerization: Will not occur.

Incompatibilities: Highly reactive with oxidizing agents, reducing agents, acids, alkalis, peroxides, nitrides, active metals, and water reactive substances.

Conditions to Avoid: Incompatible materials, ignition sources, and excess heat.

SECTION 11: TOXICOLOGICAL INFORMATION

RTECS#: PC1400000 for CAS# 67-56-1:

LD50/LC50:

Oral, mouse: LD50 = 7300 mg/kg

Inhalation, rat: LC50 = 64000 ppm 4/H

Oral, rabbit: LD50 = 14200 mg/kg

Skin, rabbit: LD50 = 15800 mg/kg

Carcinogenicity: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.

Toxicity to Reproductive System: Tests on laboratory animals for reproductive effects are cited in Registry of Toxic Effects on Chemical Substances (RTECS).

Teratogenic Effects: Not available.

Mutagenicity: Tests on laboratory animals for mutagenic effects are cited in Registry of Toxic Effects of Chemical Substances (RTECS).

SECTION 12: ECOLOGICAL INFORMATION

Environmental Fate: When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into the air, this material is expected to exist in the aerosol phase with a short half-life. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into air, this material is expected to have a half-life between 10 and 30 days. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition.

Environmental Toxicity: This material is expected to be slightly toxic to aquatic life.

SECTION 13: DISPOSAL GUIDELINES

Dispose in compliance with federal, state, and local regulations. Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

USEPA RCRA waste numbers U154 and D001.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

SECTION 14: TRANSPORT INFORMATION

Ship in accordance with all applicable local, State, Federal, and International transportation regulations.

The following is a summary only. Check regulations for complete information:

United States (Land, D.O.T.)

Proper Shipping Name: Methanol

Hazard Class: 3

UN/NA: UN1230

Packing Group: II

International (Air, I.C.A.O.)

Proper Shipping Name: Methanol

Hazard Class: 3, 6.1

UN/NA: UN1230

Packing Group: II

SECTION 15: REGULATORY INFORMATION

US Federal

TSCA: CAS# 67-56-1 is listed on the TSCA inventory.

OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No Reactivity: No

US State

CAS# 75-05-8 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

California Proposition 65: Not regulated.

Other Regulations

EC Hazard Symbols: F – Highly Flammable and T - Toxic

EC Risk and Safety Phrases:

Risk Phrases:

R 11 Highly flammable

R23/24/25 Toxic by inhalation, in contact with skin, and if swallowed.

R 39/23/24/25 Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 36/37 Wear suitable protective clothing and gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7 Keep container tightly closed.

Australian Hazchem Code: 2PE

SECTION 16: OTHER INFORMATION

NOTE: Unless otherwise noted, the information above pertains only to the Methanol solvent in the ampoule/vial.

This MSDS was prepared in accordance with ANSI Z400.1-1993 and 91/155/EEC recommended formats.

The information contained herein is believed to be accurate, but does not purport to be all-inclusive and shall be used only as a guide. Varian, Inc., does not guarantee said information is accurate or complete, nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. It is the user's responsibility to determine the suitability of this information and to assure the adoption of necessary precautions. Varian, Inc. shall not be held liable for any damage resulting from handling or from contact with the above product, nor for the results obtained, or for incidental or consequential damage arising from the use of these data. No freedom from infringement of any patent, copyright or trademark is to be inferred.

MSDS Number: A7020 ***** Effective Date: 08/03/07 ***** Supersedes: 02/16/06



From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08855



24 Hour Emergency Telephone: 800-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-956-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-562-2537) for assistance.

ANTHRACENE

1. Product Identification

Synonyms: Paranaphthalene; Green Oil; Anthracene 90-95%
CAS No.: 120-12-7
Molecular Weight: 178.23
Chemical Formula: (C₆H₄CH)₂
Product Codes: B490

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Anthracene	120-12-7	99 - 100+	Yes

3. Hazards Identification

Emergency Overview

WARNING! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION.

SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate (Cancer)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

OSHA's definition for coal tar pitch volatiles includes anthracene. Coal tar pitch volatiles (in general) are considered to be carcinogens by NTP, IARC, and ACGIH. However, anthracene has been specifically evaluated by IARC and designated as Class 3 (unclassifiable as to carcinogenicity with no human evidence and limited animal evidence).

Inhalation:

May cause irritation to the respiratory tract.

Ingestion:

May cause irritation to the gastro-intestinal tract.

Skin Contact:

May cause irritation. Photosensitizer.

Eye Contact:

May cause irritation, redness and pain. Photosensitizer.

Chronic Exposure:

Photosensitizer. Skin pigment changes.

Aggravation of Pre-existing Conditions:

Individuals with dermatitis or hypersensitivity to material may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:

Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Call a physician if irritation persists.

5. Fire Fighting Measures

Fire:

Flash point: 121C (250F) CC

Low fire hazard when exposed to heat or flames.

Explosion:

Above the flash point, explosive vapor-air mixtures may be formed. Will burst into flame on contact with chromic acid.

Fire Extinguishing Media:

Water spray, dry chemical, alcohol foam, or carbon dioxide.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL):

0.2 mg/m3 (TWA) for coal tar pitch volatiles

ACGIH Threshold Limit Value (TLV):

0.2 mg/m3(TWA) for coal tar pitch volatiles

A1: Confirmed human carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. Respirator manufacturer may have other specific cartridge recommendations.

Skin Protection:

Gloves and lab coat, apron or coveralls.

Eye Protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:

Yellow crystals with green fluorescence.

Odor:

Faint aromatic odor.

Solubility:

Insoluble in water.

Density:

1.24

pH:

No information found.

% Volatiles by volume @ 21C (70F):

0
 Boiling Point:
 340C (644F)
 Melting Point:
 217C (423F)
 Vapor Density (Air=1):
 6.15
 Vapor Pressure (mm Hg):
 1 @ 145C (293F) (sublimes)
 Evaporation Rate (BuAc=1):
 No information found.

10. Stability and Reactivity

Stability:
 Stable under ordinary conditions of use and storage. Darkens on exposure to light.
Hazardous Decomposition Products:
 Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
 Will not occur.
Incompatibilities:
 Fluorine, chromic acid, oxidizing agents.
Conditions to Avoid:
 No information found.

11. Toxicological Information

Oral mouse LD: > 17,000 mg/kg. Irritation skin, Draize mouse: 118 ug mild. Investigated as a tumorigen and mutagen. IARC 3.

-----\Cancer Lists\-----			
Ingredient	---NTP Carcinogen---		IARC Category
	Known	Anticipated	
Anthracene (120-12-7)	No	No	3

12. Ecological Information

Environmental Fate:
 When released into the soil, this material is not expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may biodegrade to a moderate extent. This material has an experimentally-determined bioconcentration factor (BCF) of greater than 100. This material may bioaccumulate to some extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
 The LC50/96-hour values for fish are between 10 and 100 mg/l. This material may be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----				
Ingredient	TSCA	EC	Japan	Australia
Anthracene (120-12-7)	Yes	Yes	Yes	Yes
-----\Chemical Inventory Status - Part 2\-----				
Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Anthracene (120-12-7)	Yes	Yes	No	Yes
-----\Federal, State & International Regulations - Part 1\-----				
Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.

Anthracene (120-12-7)	No	No	Yes	No
-----\Federal, State & International Regulations - Part 2\-----				
Ingredient	CERCLA	261.33	-RCRA-	-TSCA-
Anthracene (120-12-7)	5000	No		8 (d)
		No		No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
 SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
 Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 1 Flammability: 1 Reactivity: 0

Label Hazard Warning:

WARNING! MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION.

Label Precautions:

Keep container closed.

Use with adequate ventilation.

Avoid breathing dust.

Wash thoroughly after handling.

Avoid contact with eyes, skin and clothing.

Label First Aid:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician if irritation develops or persists.

Product Use:

Laboratory Reagent.

Revision Information:

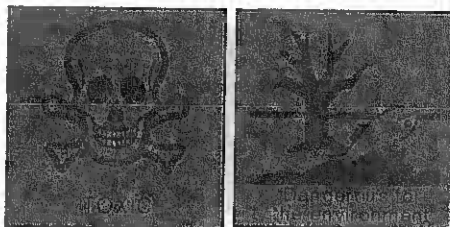
MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

 Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Environmental Health & Safety
 Phone Number: (314) 654-1600 (U.S.A.)

Safety data for 1,2-benzanthracene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,2-benz(a)anthracene, benzanthrene, benzo(a)anthracene, benzo(b)phenanthrene, 2,3-benzophenanthrene, naphthanthracene, tetraphene

Use:

Molecular formula: $C_{18}H_{12}$

CAS No: 56-55-3

EINECS No: 200-280-6

Physical data

Appearance: solid

Melting point: 158 C

Boiling point: 438 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$):

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

IARC group 2A carcinogen. Mutagen.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given [here](#).)

IVN-RAT LD50 > 200 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R45 R50 R53.

Environmental information

Very toxic to aquatic organisms. May cause long-term damage in the environment.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here](#).)

UN No 2811. Packing group I. Hazard class 6.1. EmS No: 6.1-04.

Personal protection

Restricted material. This material must not be used by untrained workers. A full risk assessment must be prepared before use. Use safety glasses, gloves and containment suitable for a carcinogen.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

S45 S53 S60 S61.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on September 1, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for benzo(a)pyrene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,2-benzopyrene, 6,7-benzopyrene, benzo[a]pyrene, B(a)P, BP, 3,4-benzopyrene, benzo[d,e,f]chrysene, 3,4-benzpyrene, benzpyrene, 3,4-benzylpyrene, 3,4-benz[a]pyrene, 3,4-BP, 3,4-benzopyrene

Molecular formula: $C_{20}H_{12}$

CAS No: 50-32-8

EINECS No: 200-028-5

EU Index No: 601-032-00-3

Physical data

Appearance: yellow crystals or powder [found in cigarette smoke, coal tar, fuel exhaust gas and in many other sources]

Melting point: 176 C

Boiling point: 495 C

Vapour density: 8.7 (air = 1)

Vapour pressure:

Density ($g\ cm^{-3}$): 1.351

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility: slight

Stability

Stable. Incompatible with strong oxidizing agents.

Toxicology

POISON. This material is an experimental carcinogen, mutagen, tumorigen, neoplastigen and teratogen. It is a probable carcinogen in humans and a known human mutagen. IARC Group 2A carcinogen. It is believed to cause bladder, skin and lung cancer. Exposure to it may damage the developing fetus. May cause reproductive damage. May be transferred to nursing infants through mother's milk. Skin, respiratory and eye irritant. May cause changes to the colour and properties of skin. Exposure to sunlight can increase the skin damage caused by this chemical.

Toxicity data

(The meaning of any abbreviations which appear in this section is given here.)

SCU-RAT LD50 50 mg kg⁻¹

IPR-MUS LDLO 500 mg kg⁻¹

IRN-FRG LDLO 11 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)

R45 R46 R50 R53 R60 R61.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

Un No 2811. Packing group III. Hazard class 6.1.

Environmental information

Very toxic in the environment - may cause long-term damage.

Personal protection

Restricted material. Only to be used by trained workers. Prepare a full risk assessment before starting work. Safety glasses, gloves, good ventilation. Handle as a carcinogen. Do not dry sweep spills because of the risk of increasing the amount of airborne material.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

S45 S53 S60 S61.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on December 20, 2004. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for benzo[b]fluoranthene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 3,4-benzofluoranthene, benz[e]acenaphthanthrylene, 3,4-benz[e]acenaphthanthrylane, 2,3-benzofluoranthene, benzofluoranthrene, benzo[e]fluoranthene

Use:

Molecular formula: $C_{20}H_{12}$

CAS No: 205-99-2

EINECS No: 205-911-9

EC Index No: 601-024-00-4

Physical data

Appearance: off-white to tan powder

Melting point: 163 - 165 C

Boiling point:

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$):

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Incompatible with strong oxidizing agents.

Toxicology

Toxic. Probable human carcinogen. May act as an irritant.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R45 R50 R53.

Environmental information

Very harmful to aquatic organisms - may cause long-term damage to the environment.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

Personal protection

Safety glasses, good ventilation, disposable gloves. Treat as a possible carcinogen.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)
S45 S53 S60 S61.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on September 2, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for benzo[ghi]perylene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,12-benzoperylene, 1,12-benzperylene, benzo(g,h,i)perylene

Use:

Molecular formula: $C_{22}H_{12}$

CAS No: 191-24-2

EINECS No: 205-883-8

Physical data

Appearance: solid

Melting point: 278 C

Boiling point: 500 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$):

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility: insoluble

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

May be harmful or act as an irritant - toxicology not fully investigated.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R50 R53.

Environmental information

Very toxic to aquatic organisms - may cause long-term damage in the aquatic environment.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

UN No 3077. Hazard class 9. Packing group III.

Personal protection

Safety glasses.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

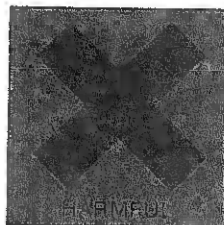
S22 S24 S25 S60 S61.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on August 18, 2006. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for benzo[k]fluoranthene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 8,9-benzofluorathene, 11,12-benzo[k]fluoranthene, benzo(k) fluoranthene, 2,3,1',8'-binaphthylene, B(K)F, BKF

Use:

Molecular formula: $C_{20}H_{12}$

CAS No: 207-08-9

EC No:

Physical data

Appearance: yellow crystals

Melting point: 215 - 217 C

Boiling point: ca. 480 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$):

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility: negligible

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Anticipated human carcinogen. Harmful if swallowed, inhaled or absorbed through the skin.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R20 R21 R22 R45.

Transport information

Personal protection

Safety glasses, gloves, good ventilation. Handle as a carcinogen.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

S45 S53.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on February 22, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for chrysene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,2-benzophenanthrene, benzo(a)phenanthrene, 1,2-benzphenanthrene, coal tar pitch, benz(a)phenanthrene, 1,2,5,6-dibenzonaphthalene

Molecular formula: $C_{18}H_{12}$

CAS No: 218-01-9

EC No: 205-923-4

Physical data

Appearance: crystalline powder

Melting point: 253 C

Boiling point: 448 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$): 1.27

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility: insoluble

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Toxic. Confirmed animal carcinogen, possible human carcinogen. Harmful if swallowed, inhaled or absorbed through the skin.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

IPR-MUS LD50 >320 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R20 R21 R22 R45 R46.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here](#).)

UN No 2811. Packing group I. Hazard class 6.1. CDG UK Transport category 1. EMS No 6.1-04.

Personal protection

Safety glasses, good ventilation, gloves. Handle as a carcinogen. A COSHH assessment is required.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

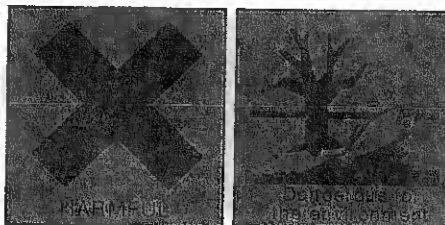
S3 S7 S9 S36 S37 S39 S45.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on April 1, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for dibenz(a,h)anthracene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,2:5,6-benzanthracene, 1,2:5,6-dibenzanthracene, dibenzo(a,h)anthracene, DBA, 1,2,5,6-DBA

Use: a common pollutant in smoke and used oils

Molecular formula: $C_{22}H_{14}$

CAS No: 53-70-3

EINECS No: 200-181-8

Annex I Index. No: 601-041-00-2

Physical data

Appearance: white to light yellow crystalline solid

Melting point: 266 - 267 C

Boiling point: 524 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$): 1.28

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Harmful if swallowed or inhaled. Experimental carcinogen, tumorigen and neoplastigen. IARC probable human carcinogen.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given [here](#).)

IVN-MUS LDLO 10 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R45 R50 R53.

Environmental information

Harmful in the environment - may cause long-term damage.

Transport information

(The meaning of any UN hazard codes which appear in this section is given [here](#).)

Non-hazardous for air, sea and road freight.

Personal protection

Safety glasses, gloves, good ventilation. Handle as a possible carcinogen.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

S45 S53 S60 S61.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on October 8, 2006. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date. Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for fluoranthene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,2-(1,8-naphthylene)benzene, idryl, benzo[jk]fluorene, 1,2-(1,8-naphthalenediyl)benzene, 1,2-benzacenaphthene

Use:

Molecular formula: $C_{16}H_{10}$

CAS No: 206-44-0

EINECS No: 205-912-4

Physical data

Appearance: solid

Melting point: 105 - 110 C

Boiling point: 375 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$):

Flash point: 198 C

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Incompatible with strong oxidizing agents.

Toxicology

Harmful if swallowed. Limited evidence that this may act as a carcinogen. Skin, eye and respiratory irritant.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

ORL-RAT LD50 2000 mg kg⁻¹

IVN-MUS LD50 100 mg kg⁻¹

SKN-RBT LD50 3180 mg kg⁻¹

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R22 R36 R37 R38 R40.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

Personal protection

Safety glasses, good ventilation. Rubber gloves.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on November 21, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for fluorene

(Note: This is NOT the data sheet for the gaseous halogen fluorine! If you want data on that instead, follow [this link](#).)

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 9H-fluorene, o-biphenylmethane, diphenylmethane, 2,3-benzindene

Molecular formula: $C_{13}H_{10}$

CAS No: 86-73-7

EINECS: 201-695-5

Physical data

Appearance: white crystals

Melting point: 116 C

Boiling point: 295 C

Vapour density:

Vapour pressure:

Specific gravity: 1.203

Flash point: 151 C

Explosion limits:

Autoignition temperature:

Stability

Stable. Combustible. Incompatible with strong oxidizing agents.

Toxicology

Skin, eye and respiratory irritant. Shows evidence in laboratory animals of mutagenic properties. ATSDR minimal risk level ORL 0.4 mg/kg/day. Toxicological properties not fully investigated.

Transport information

Personal protection

Safety glasses, adequate ventilation.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on April 19, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for indeno[1,2,3-cd]pyrene

Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: 1,10-(1,2-phenylene)pyrene, 1,10-(o-phenylene)pyrene, o-phenylenepyrene, 2,3-phenylenepyrene, 2,3,o-phenylenepyrene, IP
Use:

Molecular formula: $C_{22}H_{12}$

CAS No: 193-39-5

EINECS No: 205-893-2

Physical data

Appearance: solid

Melting point: 161 - 163 C

Boiling point: 536 C

Vapour density:

Vapour pressure:

Density ($g\ cm^{-3}$):

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility:

Stability

Stable. Incompatible with strong oxidizing agents.

Toxicology

Limited evidence that this material may be carcinogenic.

Toxicity data

(The meaning of any toxicological abbreviations which appear in this section is given here.)

Risk phrases

(The meaning of any risk phrases which appear in this section is given here.)
R40.

Transport information

(The meaning of any UN hazard codes which appear in this section is given here.)

Non-hazardous for air, sea and road freight.

Personal protection

Treat as potentially hazardous - many multi-ring aromatic compounds are suspected carcinogens.

Safety phrases

(The meaning of any safety phrases which appear in this section is given here.)

S36 S37 S45.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on May 10, 2005. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "<http://ptcl.chem.ox.ac.uk/>" or "<http://physchem.ox.ac.uk/>" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Safety data for naphthalene



Glossary of terms on this data sheet.

The information on this web page is provided to help you to work safely, but it is intended to be an overview of hazards, not a replacement for a full Material Safety Data Sheet (MSDS). MSDS forms can be downloaded from the web sites of many chemical suppliers.

General

Synonyms: albocarbon, mighty 150, mighty rd1, moth flakes, NCI-C52904, white tar, naphthalin, naphthene, camphor tar, tar camphor, moth balls

Molecular formula: $C_{10}H_8$

CAS No: 91-20-3

EC No: 202-049-5

Physical data

Appearance: white crystals

Melting point: 77 C

Boiling point: 218 C

Specific gravity: 1.14

Vapour pressure: 1 mm Hg at 20 C

Vapour density: 4.4 g/l

Flash point: 88 C

Explosion limits: 0.9 - 5.9%

Autoignition temperature:

Stability

Stable. Flammable - avoid sources of ignition. Incompatible with oxidizing agents. Heat-sensitive. Sublimes slowly at room temperature.

Toxicology

May cause irritation. Toxic by inhalation or ingestion. TLV 10 ppm. Sensitizer.
Possible carcinogen.

Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

ORL-CHD LDLO 100 mg kg⁻¹

UNR-HMN LDLO 29 mg kg⁻¹

ORL-MUS LD50 533 mg kg⁻¹

IVN-MUS LD50 100 mg kg⁻¹

ORL-RBT LD50 3000 mg kg⁻¹

Irritation data

EYE-RBT 100 mg/ml

SKN-RBT 495 mg open mld

Risk phrases

(The meaning of any risk phrases which appear in this section is given [here](#).)

R20 R21 R22 R36 R37 R38 R43 R45.

Personal protection

Safety glasses. Use efficient ventilation.

Safety phrases

(The meaning of any safety phrases which appear in this section is given [here](#).)

S16 S26 S36 S37 S39 S45.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page](#).]

This information was last updated on September 4, 2003. Although we have tried to make it as accurate and useful as possible, we can take no responsibility for its use or misuse.

Note also that the information on the PTCL Safety web site, where this page was hosted, has been copied onto many other sites, often without permission. If you have any doubts about the veracity of the information that you are viewing, or have any queries, please check the URL that your web browser displays for this page. If the URL begins "http://ptcl.chem.ox.ac.uk/" or "http://physchem.ox.ac.uk/" the page is maintained by the Safety Officer in Physical Chemistry at Oxford University. If not, this page is a copy made by some other person and we have no responsibility for it.

Appendix E

Health and Safety Plan



SITE-SPECIFIC HEALTH AND SAFETY PLAN

**River Park Center
City of Yonkers, Westchester County, New York**

Prepared For:

**STRUEVER, FILDECO, CAPPELLI, LLC
115 Stevens Avenue
Valhalla, New York 10595**

Prepared By:

**SESI CONSULTING ENGINEERS
12A Maple Avenue
Pine Brook, NJ 07058**

Project No.: N-7190

November 12, 2007

***Disclaimer:** This Health and Safety Plan (HASP) is based upon information provided [and, if applicable, conditions discovered during a site visit], and is limited by the project scope.*

The HASP should be periodically reviewed and updated based on a number of factors, including but not limited to: (1) changes in applicable governmental requirements; (2) changes in procedures at the site; and (3) site conditions which were unknown to SESI Consulting Engineers (SESI) as of the time the HASP was prepared.

This HASP has been prepared for the sole and exclusive use of PA-PDC Perth Amboy, LLC., and may not be relied upon by any other person without the express written consent and authorization of SESI.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

for

**RIVER PARK CENTER
CITY OF YONKERS, NEW YORK**

Prepared by: _____

Date:

Valerie Navab, PhD
SESI- Engineer

Approved by: _____

Date:

Dean Giovanetti, P. G.
SESI-Project Manager

Approved by: _____

Date:

Suresh Puppala, Ph.D, P.E.
SESI – Senior Project Engineer (SPE)

Approved by: _____

Date:

Mark B. Anderson, CLA, PP
SESI - Project Health and Safety Officer (HSO)

Approved by: _____

Date:

Christopher F. Zwingle, P.E.
Principal

Table of Contents

HEALTH AND SAFETY PLAN SUMMARY	1
1.0 INTRODUCTION	2
1.1 OBJECTIVE	2
1.2 SITE AND FACILITY DESCRIPTION	2
1.3 POLICY STATEMENT	2
1.4 REFERENCES	3
1.5 DEFINITIONS	3
2.0 PROJECT SCOPE OF WORK	4
3.0 ROLES AND RESPONSIBILITIES	4
3.1 ALL PERSONNEL	4
3.2 KEY SAFETY PERSONNEL	5
3.2.1 <i>Project Officer (PO)</i>	5
3.2.2 <i>Project Manager (PM)</i>	5
3.2.3 <i>Health and Safety Manager (HSM)</i>	5
3.2.4 <i>Site Safety Officer (SSO)</i>	5
3.2.5 <i>Field Supervisor (FS)</i>	6
3.2.6 <i>Field Personnel (FP)</i>	6
3.3 SUBCONTRACTORS	6
3.4 STOP WORK AUTHORITY	7
3.5 ALL ON-SITE PERSONNEL	7
3.6 VISITORS	7
4.0 PERSONAL PROTECTIVE EQUIPMENT	8
4.1 LEVELS OF PROTECTION	8
4.1.1 <i>Level D Protection</i>	8
4.1.2 <i>Modified Level D Protection</i>	8
4.1.3 <i>Level C Protection</i>	9
4.2 SELECTION OF PPE	9
4.3 SITE RESPIRATORY PROTECTION PROGRAM	9
4.4 USING PPE	10
4.4.1 <i>Donning Procedures</i>	10
4.4.2 <i>Doffing Procedures</i>	10
4.5 SELECTION MATRIX	11
5.0 AIR AND NOISE MONITORING	11
5.1 AIR MONITORING	11
5.2 NOISE MONITORING	12
5.3 MONITORING EQUIPMENT MAINTENANCE AND CALIBRATION	12
5.4 ACTION LEVELS	12
6.0 WORK ZONES AND DECONTAMINATION	13
6.1 WORK ZONES	13

6.1.1	<i>Authorization to Enter</i>	13
6.1.2	<i>Site Orientation and Hazard Briefing</i>	13
6.1.3	<i>Certification Documents</i>	13
6.1.4	<i>Entry Log</i>	14
6.1.5	<i>Entry Requirements</i>	14
6.1.6	<i>Emergency Entry and Exit</i>	14
6.1.7	<i>Contamination Control Zones</i>	14
6.1.8	<i>Exclusion Zone (EZ)</i>	14
6.1.9	<i>Contamination Reduction Zone</i>	14
6.1.10	<i>Support Zone (SZ)</i>	14
6.1.11	<i>Posting</i>	15
6.1.12	<i>Site Inspections</i>	15
6.2	DECONTAMINATION	15
6.2.1	<i>Personnel Decontamination</i>	15
6.2.2	<i>Equipment Decontamination</i>	15
6.2.3	<i>Personal Protective Equipment Decontamination</i>	15
7.0	TRAINING AND MEDICAL SURVEILLANCE	16
7.1	TRAINING	16
7.1.1	<i>General</i>	16
7.1.2	<i>Basic 40-Hour Course</i>	16
7.1.3	<i>Supervisor Course</i>	16
7.1.4	<i>Site-Specific Training</i>	16
7.1.5	<i>Daily Safety Meetings</i>	17
7.1.6	<i>First Aid and CPR</i>	17
7.2	MEDICAL SURVEILLANCE	17
7.2.1	<i>Medical Examination</i>	17
7.2.2	<i>Pre-placement Medical Examination</i>	17
7.2.3	<i>Other Medical Examinations</i>	18
7.2.4	<i>Periodic Exam</i>	18
7.2.5	<i>Medical Restriction</i>	18
8.0	GENERAL SAFETY PRACTICES	18
8.1	GENERAL SAFETY RULES	18
8.2	BUDDY SYSTEM	19
8.3	HEAT STRESS	20
8.4	HEAT STRESS SAFETY PRECAUTIONS	21
	<i>Table 4 – Work/Rest Schedule</i>	22
8.5	COLD STRESS	23
8.6	SAFETY PRECAUTIONS FOR COLD STRESS PREVENTION	24
8.7	SAFE WORK PRACTICES	24
8.8	BIOLOGICAL HAZARDS	24
8.8.1	<i>Tick Borne Diseases</i>	25
8.8.2	<i>Poisonous Plants</i>	25
8.8.3	<i>Snakes</i>	26
8.8.4	<i>Spiders</i>	26
8.9	NOISE	26

8.10	SPILL CONTROL.....	27
8.11	SANITATION.....	27
8.11.1	Break Area.....	27
8.11.2	Potable Water.....	27
8.11.3	Sanitary Facilities.....	27
8.11.4	Lavatory.....	28
8.12	EMERGENCY EQUIPMENT.....	28
8.13	LOCKOUT/TAGOUT PROCEDURES.....	28
8.14	ELECTRICAL SAFETY.....	28
8.15	LIFTING SAFETY.....	29
8.16	LADDER SAFETY.....	29
8.17	TRAFFIC SAFETY.....	31
9.0	SITE-SPECIFIC HAZARDS AND CONTROL MEASURES.....	31
9.1	EVALUATION OF HAZARDS.....	31
9.1.1	Hazard Characteristics.....	31
9.1.2	Potential Health and Safety Hazards.....	32
9.2	FIELD ACTIVITIES, HAZARDS, AND CONTROL PROCEDURES.....	32
9.2.1	Mobilization/Construction Stakeout.....	32
9.2.2	Demolition/Site Clearing.....	33
9.2.3	Excavation and Cut/Fill Operations.....	34
9.2.4	Drilling/Subsurface Intrusion Activities.....	37
9.2.5	Subsurface Chemical Sample Collection/Analysis.....	40
9.2.6	UST Closure.....	41
9.2.7	Site Capping System Construction.....	42
9.2.8	Creek Relocation.....	42
9.2.9	Decontamination.....	42
9.2.10	Demobilization.....	42
9.3	CHEMICAL HAZARDS.....	42
10.0	EMERGENCY PROCEDURES.....	49
10.1	GENERAL.....	49
10.2	EMERGENCY RESPONSE.....	49
10.2.1	Fire.....	49
10.2.2	Contaminant Release.....	49
10.3	MEDICAL EMERGENCY.....	49
10.3.1	Emergency Care Steps.....	50
10.4	FIRST AID - GENERAL.....	50
10.4.1	First Aid - Inhalation.....	50
10.4.2	First Aid - Ingestion.....	50
10.4.3	First Aid - Skin Contact.....	50
10.4.4	First Aid - Eye Contact.....	51
10.5	REPORTING INJURIES, ILLNESSES, AND SAFETY INCIDENTS.....	51
10.6	EMERGENCY INFORMATION.....	51
10.6.1	Directions to Hospital.....	51
11.0	LOGS, REPORTS, AND RECORD KEEPING.....	52

11.1	HASP FIELD CHANGE REQUEST	52
11.2	MEDICAL AND TRAINING RECORDS	52
11.3	EXPOSURE RECORDS.....	52
11.4	ACCIDENT/INCIDENT REPORT.....	52
11.5	OSHA FORM 200	52
11.6	ON-SITE HEALTH AND SAFETY FIELD LOGBOOKS.....	53
11.7	MATERIAL SAFETY DATA SHEETS	53

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>
-------------------	--------------

Fig-1	Site Location Map
-------	-------------------

Fig-2	Directions to Saint Joseph's Medical Center
-------	---

LIST OF EMBEDDED TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
1.	Key Safety Personnel	8
2.	PPE Selection Matrix	11
3.	Airborne Contaminant Action Levels	12
4.	Work/Rest Schedule	22
5.	Wind Chill Temperature Chart	23
6	List of Primary Contaminants	44
7	Emergency Contacts	51

LIST OF ATTACHMENTS

Attachment 1	Air Monitoring Log
Attachment 2	OSHA Poster
Attachment 3	HASP Field Change Request Form
Attachment 4	Accident/Incident Report
Attachment 5	Signatory Page
Attachment 6	Material Safety Data Sheets

LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
COC	Constituent(s) of Concern
CRZ	Contamination Reduction Zone
EZ	Exclusion Zone
FS	Field Supervisor
GFCI	Ground Fault Circuit Interrupter
HASP	Health and Safety Plan
HSM	Health and Safety Manager
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PM	Project Manager
PO	Project Officer
PPE	Personal Protective Equipment
SESI	SESI Consulting Engineers
SSO	Site Safety Officer
SVOC	Semi-Volatile Organic Compound
SZ	Support Zone
TLV	Threshold Limit Value
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

HEALTH AND SAFETY PLAN SUMMARY

The chemical hazards associated with site operations are related to inhalation, ingestion, and skin exposure to site Chemicals of Concern (COCs). COCs at the site include heavy metals, some VOC compounds, some SVOC compounds and potentially other industrial chemicals including PCBs and pesticides. Concentrations of airborne COCs during site tasks may be measurable, and will require air monitoring during certain operations.

The potential for inhalation of site COCs is low. The potential for dermal contact with soils containing site COCs during remedial operations is moderate.

The following table summarizes airborne contaminant action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the site.

Parameter	Reading	Action
Dust	0 to .5 mg/m3	Normal operations
	0.5 to 1 mg/m3	Begin soil wetting procedure (Level C protection would be needed beyond this point)
	> 1 mg/m3	Stop work, fully implement dust control plan
Oxygen	≤ 19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
	> 19.5% to < 23.5%	Normal operations
	≥ 23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Carbon Monoxide	0 ppm to ≤ 20 ppm	Normal operations
	> 20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area

The level of personal protection selected will be based on air monitoring of the work environment and an assessment by the Field Supervisor and Site Safety Officer. The following table presents a selection matrix to determine appropriate Personal Protective Equipment.

Task	Anticipated Level of Protection
Mobilization	Level D
Subsurface Intrusive Activities (Mass Excavation, Drilling, Soil Grouting)	Modified Level D/Level C
Earthwork/Grading	Level D
Additional Chemical Sampling / Delineation	Modified Level D/Level C
Site Cap Construction	Level D
Creek Relocation	Modified Level D
Decontamination	Modified Level D
Demobilization	Level D

1.0 INTRODUCTION

1.1 Objective

The objective of this Health and Safety Plan (HASP) is to provide a mechanism for establishing safe working conditions during activities at the River Park Center in Yonkers, NY (the Site). The safety organization, procedures, and protective equipment have been established based on an analysis of potential physical, chemical, and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of injury, illness, or other hazardous incident.

The HASP was written to meet the requirements of all applicable Federal, State, and local health and safety regulations, including 29 CFR 1910.120. The HASP is based on current knowledge regarding the specific chemical and physical hazards that are known or anticipated at the Site. This HASP is a dynamic document, for which changes and/or revisions may be realized as changes in scope and/or site conditions are encountered. Should revised documents be produced, said revised documents will refer to the specific changes and why they were made.

1.2 Site and Facility Description

The River Park Center Project (the Site) is located in Yonkers, Westchester County, New Jersey. Figure 1 provides a location of the Site and surrounding properties. The Site consists of approximately 12 acres, within a wedge-shaped area bounded by New Main Street (west), Palisade Avenue (north), and Nepperhan Avenue (south and east). New School Street bisects the site north-to-south, connecting Palisade and Nepperhan Avenues.

The site has a long history of industrial use that spans over 150 years. Historic industrial use within the site boundary includes several hat factories, leather factories, and chemical dye manufacturers. Smaller interspersed facilities, some still present, include auto repair, dry cleaners, and gasoline service stations.

One- and two-story buildings, occupied by various retail businesses, restaurants, and offices, line New Main Street and Palisade Avenue, west of School Street. Behind these buildings, toward the interior of the site, is primarily open paved space used for parking. East of School Street are several commercial/industrial buildings, which include an automotive repair facility, a gasoline service station, construction equipment/vehicle storage, and the city's Engine No.1 Fire Department Headquarters. The Sawmill River bisects the site east of School Street, and is channeled below the portion of the site west of School Street.

1.3 Policy Statement

The policy of SESI Consulting Engineers (SESI) is to provide a safe and healthful work environment. No aspect of operations is of greater importance than injury and illness prevention. A fundamental principle of safety management is that all injuries, illnesses, and incidents are preventable. SESI will take every reasonable step to eliminate or control hazards in order to minimize the possibility of injury, illness, or incident.

This HASP prescribes the procedures that must be followed by SESI personnel during activities at the site. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Health and Safety Manager (HSM). This document will be reviewed periodically by the HSM to ensure that it is current and technically correct. Any changes in site conditions and/or the scope of work will require a review and modification to this HASP. Such changes will be completed in the form of an addendum or a revision to the plan.

The provisions of this plan are mandatory for all SESI personnel and are advisory for all contractors, and subcontractors assigned to the project. ***Subcontractors will be responsible for preparing their own site-specific HASPs that meet the basic requirements outlined in this HASP.*** All visitors to SESI work areas at the site must abide by the requirements of this plan.

1.4 References

This HASP complies with applicable Occupational Safety and Health Administration (OSHA) regulations, United States Environmental Protection Agency (USEPA) regulations, and SESI health and safety policies and procedures. This plan follows the guidelines established in the following:

- *Standard Operating Safety Guides*, USEPA (Publication 9285.1-03, June 1992).
- *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH, OSHA, USCG, USEPA (86116, October 1985).
- *Title 29 of the Code of Federal Regulations (CFR)*, Part 1910.
- *Title 29 of the Code of Federal Regulations (CFR)*, Part 1926.
- *Pocket Guide to Chemical Hazards*, DHHS, PHS, CDC, NIOSH (2004).
- *Threshold Limit Values*, ACGIH (2005).
- *Guide to Occupational Exposure Values*, ACGIH (2005).
- *Quick Selection Guide to Chemical Protective Clothing*, Forsberg, K. and S.Z. Mansdorf, 2nd Ed. (1993).

1.5 Definitions

The following definitions (listed alphabetically) are applicable to this HASP:

- *Contamination Reduction Zone (CRZ)* - Area between the exclusion zone and support zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.
- *Exclusion Zone (EZ)* - Any portions of the site where hazardous substances are, or are reasonably suspected to be present, and pose an exposure hazard to on-site personnel.
- *Incident* - All losses, including first aid cases, injuries, illnesses, spills/leaks, equipment and property damage, motor vehicle accidents, regulatory violations, fires, and business interruptions.
- *On-Site Personnel* - All SESI and subcontractors involved with the project.
- *Project* - All on-site work performed under the scope of work.
- *Site* - The area described in Section 1.2, Site and Facility Description, where the work is to be performed by SESI personnel and subcontractors.

- *Support Zone (SZ)* - All areas of the site except the EZ and CRZ. The SZ surrounds the CRZ and EZ. Support equipment and break areas are located in this zone.
- *Subcontractor* - Includes contractor personnel hired by SESI.
- *Visitor* - All other personnel, except the on-site personnel.
- *Work Area* - The portion of the site where work activities are actively being performed. This area may change daily as work progresses and includes the SZ, CRZ, and EZ. If the work area is located in an area on the site that is not contaminated, or suspected of being contaminated, the entire work area may be a SZ.

2.0 PROJECT SCOPE OF WORK

This HASP contains information for the following tasks that SESI is anticipated to conduct at the Site. Should additional and/or different tasks be identified, amendments to this HASP will be required to address these changed items.

- Mobilization/construction stakeout;
- Installation of soil erosion and sediment control measures;
- Excavation and relocation of contaminated soil "hot spots";
- Deep soil in-situ stabilization;
- Underground Storage Tank (UST) closure;
- Creek Relocation;
- Earthwork and grading;
- Fill construction;
- Construction of a site-wide capping system including building foundations, paved areas, impervious landscaped areas, and clean soil capping.
- Additional monitoring well installation;
- Additional chemical sampling of soil and groundwater; and
- Decontamination and demobilization/site restoration.

3.0 ROLES AND RESPONSIBILITIES

3.1 All Personnel

All SESI project personnel must adhere to the procedures outlined in this HASP during the performance of their work. Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner that conflicts with these procedures. After due warnings, the PM will dismiss from the site any SESI employee or subcontractor who violates safety procedures.

All SESI project personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. In addition, all SESI personnel will attend an initial hazard briefing prior to beginning work at the site.

The roles of key safety personnel and subcontractors are outlined in the following sections. Key project personnel and contacts are summarized in Table 1.

3.2 Key Safety Personnel

3.2.1 Project Officer (PO)

The PO is responsible for providing resources to assure project activities are completed in accordance with this HASP, and for meeting all regulatory and contractual requirements.

3.2.2 Project Manager (PM)

The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The PM is responsible for confirming that the Field Supervisor (FS) has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project meet the requirements established by SESI. It is also the responsibility of the PM to:

- Consult with the HSM on site health and safety issues;
- Verify that subcontractors meet health and safety requirements prior to commencing work;
- Verify that all incidents are thoroughly investigated;
- Approve, in writing, addenda or modifications of this HASP; and
- Suspend work or modify work practices, as necessary, for personal safety, protection of property, and regulatory compliance.

3.2.3 Health and Safety Manager (HSM)

The HSM or his designee, the health and safety manager (HSM), has overall responsibility for the technical health and safety aspects of the project, including review and approval of this HASP. Inquiries regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The HSM or his designee must approve changes or addenda to this HASP.

3.2.4 Site Safety Officer (SSO)

The SSO is responsible for field health and safety issues, including the execution of this HASP. Questions in the field regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The SSO will advise the PM on health and safety issues, and will establish and coordinate the project air-monitoring program if one is deemed necessary (see Section 5.1, Air Monitoring). The SSO is the primary site contact on health and safety matters. It is the responsibility of the SSO to:

- Provide on-site technical assistance, if necessary;
- Participate in all accident/incident reports and ensure that they are reported to the HSM, client, and PM within 24 hours;
- Coordinate site and personal air monitoring as required, including equipment maintenance and calibration;
- Conduct site safety orientation training and safety meetings;
- Verify that project personnel have received the required physical examinations and medical certifications;
- Review site activities with respect to compliance with this HASP;
- Maintain required health and safety documents and records; and

- Assist the FS in instructing field personnel on project hazards and protective procedures.

3.2.5 Field Supervisor (FS)

The FS is responsible for implementing this HASP, including communicating requirements to on-site personnel and subcontractors. The FS will be responsible for informing the PM of changes in the work plan, procedures, or site conditions so that those changes may be addressed in this HASP. Other responsibilities are to:

- Consult with the SSO on site health and safety issues;
- Stop work, as necessary, for personal safety, protection of property, and regulatory compliance;
- Obtain a site map and determine and post routes to medical facilities and emergency telephone numbers;
- Notify local public emergency representatives (as appropriate) of the nature of the site operations, and post their telephone numbers (i.e., local fire department personnel who would respond for a confined space rescue);
- Observe on-site project personnel for signs of ill health effects;
- Investigate and report any incidents to the SSO;
- Verify that all on-site personnel have had applicable training;
- Verify that on-site personnel are informed of the physical, chemical, and biological hazards associated with the site activities, and the procedures and protective equipment necessary to control the hazards; and
- Issue/obtain any required work permits (hot work, confined space, etc.).

3.2.6 Field Personnel (FP)

All SESI field personnel are responsible for following the Health and Safety procedures specified in this HASP and work practices specified in applicable operation procedures. Some specific responsibilities include, but are not limited to:

- Reading and understanding the HASP;
- Reporting all accidents, incidents, injuries, or illnesses to the FS;
- Complying with the requests of the SSO;
- Immediately communicating newly identified hazards or noncompliance issues to the FS or SSO; and
- Stopping work in cases of immediate danger.

3.3 Subcontractors

Subcontractors and their personnel must understand and comply with applicable regulations and site requirements established in this HASP. Subcontractors will prepare their own site-specific HASP that must be consistent with the requirements of this HASP.

All subcontractor personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. All subcontractor personnel will attend an initial hazard briefing prior to beginning work at the site. Additionally, on-site subcontractor personnel must conduct daily site safety meetings.

Subcontractors must designate individuals to function as the PM, HSM, SSO, and FS. In some firms the HSM to be carried out by the PM. This is acceptable provided the PM has the required knowledge, training, and experience to properly address all hazards associated with the work, and to prepare, approve, and oversee the execution of the site-specific HASP. A subcontractor may designate the same person to perform the duties of both the SSO and the FS. However, depending on the level of complexity of a contractor's scope of work, it may be infeasible for one person to perform both functions satisfactorily.

3.4 Stop Work Authority

Every SESI employee and subcontractor is empowered, expected, and has the responsibility to stop the work of another co-worker if the working conditions or behaviors are considered unsafe.

3.5 All On-Site Personnel

All on-site SESI personnel (including SESI subcontractors) must read and acknowledge their understanding of their respective HASPs before commencing work, and abide by the requirements of the plans. All on-site SESI personnel shall sign their HASP Acknowledgement Form following their review of their HASP.

All SESI project personnel will receive training in accordance with applicable regulations, and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. In addition, all on-site personnel will attend an initial hazard briefing provided by the SSO prior to beginning work at the site, and conduct daily safety meetings thereafter.

On-site personnel will immediately report the following to the FS or SSO:

- Personal injuries and illnesses no matter how minor;
- Unexpected or uncontrolled release of chemical substances;
- Symptoms of chemical exposure;
- Unsafe or hazardous situations;
- Unsafe or malfunctioning equipment;
- Changes in site conditions that may affect the health and safety of project personnel;
- Damage to equipment or property; and
- Situations or activities for which they are not properly trained.

3.6 Visitors

All SESI personnel and subcontractors visiting the Site must check in with the FS. Visitors will be cautioned to avoid skin contact with surfaces, soils, groundwater, or other materials that may impacted or be suspected to be impacted by constituents of concern (COCs).

Visitors requesting to observe work at the site must don appropriate personal protective equipment (PPE) prior to entry to the work area and must have the appropriate training and medical clearances to do so. If respiratory protective devices are necessary, visitors who wish to enter the work area must have been respirator-trained and fit tested for a respirator within the past 12 months.

Table 1 – Key Safety Personnel

SESI Personnel		
Role	Name	Address/Telephone No.
Project Officer (PO)	Christopher Zwingle, P.E.	973-808-9050 ext. 232
Project Manager (PM)	Dean Giovanetti, P.G.	973-808-9050 ext. 237
SeniorProject Engineer (SPE)	Suresh Puppala, Ph.D, P.E.	973-808-9050 ext. 251
Health and Safety Manager (HSM)	Mark Anderson, C.L.A., P.P.	973-808-9050 ext. 234
Site Safety Officer (SSO)	Christopher Mazur	973-808-9050 ext. 239
Field Supervisor (FS)	Christopher Mazur	973-808-9050 ext. 239
Field Personnel	Robert Fioretti	973-808-9050 ext. 275
Field Personnel	Deodat Persaud	973-808-9050 ext. 273
Subcontractors		
Company/Role	Name	Address/Telephone No.
TBD	TBD	TBD

4.0 PERSONAL PROTECTIVE EQUIPMENT

4.1 Levels of Protection

PPE is required to safeguard site personnel from various hazards. Varying levels of protection may be required depending on the levels of COCs and the degree of physical hazard. This section presents the various levels of protection and defines the conditions of use for each level. A summary of the levels is presented in Table 2 in this section.

4.1.1 Level D Protection

The minimum level of protection that will be required of project personnel at the site will be Level D, which will be worn when site conditions or air monitoring indicates no inhalation hazard exists. The following equipment will be used:

- Work clothing as prescribed by weather;
- Steel toe work boots, meeting American National Standards Institute (ANSI) Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Leather work gloves and/or nitrile surgical gloves;
- Hard hat, meeting ANSI Z89, when falling object hazards are present;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- PFD if working on or near the water.

4.1.2 Modified Level D Protection

Modified Level D will be used when airborne contaminants are not present at levels of concern, but site activities present an increased potential for skin contact with contaminated materials. Modified Level D consists of:

- Nitrile gloves worn over nitrile surgical gloves;
- Latex/polyvinyl chloride (PVC) overboots when contact with COC-impacted media is anticipated;
- Steel toe work boots, meeting ANSI Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Face shield in addition to safety glasses or goggles when projectiles or splash hazards exist (e.g. during Power Washing activities);

- Hard hat, meeting ANSI Z89, when falling object hazards are present;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used);
- Tyvek® suit (polyethylene coated Tyvek® suits for handling liquids) when body contact with COC-impacted media is anticipated; and
- PFD if working on or near the water.

4.1.3 Level C Protection

Level C protection will be required when the airborne concentration of COC reaches one-half of the OSHA Permissible Exposure Limit or ACGIH TLV. The following equipment will be used for Level C protection:

- Full-face, air-purifying respirator with combination organic vapor/HEPA cartridges;
- Polyethylene-coated Tyvek® suit, with ankles and cuffs taped to boots and gloves;
- Nitrile gloves worn over nitrile surgical gloves;
- Steel toe work boots, meeting ANSI Z41;
- Chemical-resistant boots with steel toes or latex/PVC overboots over steel toe boots;
- Hard hat, meeting ANSI Z89;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- PFD if working on or near the water.

4.2 Selection of PPE

Equipment for personal protection will be selected based on the potential for contact, site conditions, ambient air quality, and the judgment of supervising site personnel and health and safety professionals. The PPE used will be chosen to be effective against the COCs present on the site.

4.3 Site Respiratory Protection Program

Respiratory protection is an integral part of employee health and safety at the site due to potentially hazardous concentrations of airborne COCs. The site respiratory protection program will consist of the following (as a minimum):

- All on-site personnel who may use respiratory protection will have an assigned respirator.
- All on-site personnel who may use respiratory protection will have been fit tested and trained in the use of a full-face air-purifying respirator within the past 12 months. Documentation of the fit test must be provided to the SSO prior to commencement of work.
- All on-site personnel who may use respiratory protection must within the past year have been medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the SSO, prior to commencement of site work.
- Only cleaned, maintained, NIOSH-approved respirators will be used.
- If respirators are used, the respirator cartridge is to be properly disposed of at the end of each work shift, or when load-up or breakthrough occurs.

- Contact lenses are not to be worn when a respirator is worn.
- All on-site personnel who may use respiratory protection must be clean-shaven. Mustaches and sideburns are permitted, but they must not touch the sealing surface of the respirator.
- Respirators will be inspected, and a negative pressure test performed prior to each use.
- After each use, the respirator will be wiped with a disinfectant, cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location, in a manner that will not distort the face piece.

4.4 Using PPE

Depending upon the level of protection selected, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Modified Level D or Level C PPE is used. All personnel entering the EZ must put on the required PPE in accordance with the requirements of this HASP. When leaving the EZ, PPE will be removed in accordance with the procedures listed, to minimize the spread of COCs.

4.4.1 Donning Procedures

These procedures are mandatory only if Modified Level D or Level C PPE is used on the site:

- Remove bulky outerwear. Remove street clothes and store in clean location;
- Put on work clothes or coveralls;
- Put on the required chemical protective coveralls;
- Put on the required chemical protective boots or boot covers;
- Tape the legs of the coveralls to the boots with duct tape;
- Put on the required chemical protective gloves;
- Tape the wrists of the protective coveralls to the gloves;
- Don the required respirator and perform appropriate fit check (Level C);
- Put hood or head covering over head and respirator straps and tape hood to facepiece (Level C); and
- Don remaining PPE, such as safety glasses or goggles and hard hat.

When these procedures are instituted, one person must remain outside the work area to ensure that each person entering has the proper protective equipment.

4.4.2 Doffing Procedures

The following procedures are only mandatory if Modified Level D or Level C PPE is required for the site. Whenever a person leaves the work area, the following decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers;
- Clean reusable protective equipment;
- Remove protective garments, equipment, and respirator (Level C). All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels;

- Wash hands, face, and neck (or shower if necessary);
- Proceed to clean area and dress in clean clothing; and
- Clean and disinfect respirator for next use.

All disposable equipment, garments, and PPE must be bagged in plastic bags, labeled for disposal. See Section 7, Decontamination, for detailed information on decontamination stations.

4.5 Selection Matrix

The level of personal protection selected will be based on air monitoring of the work environment and an assessment by the FS and SSO of the potential for skin contact with COCs. The PPE selection matrix is presented in Table 2. This matrix is based on information available at the time this plan was written. The Airborne Contaminant Action Levels in Table 3, Airborne Contaminant Action Levels, should be used to verify that the PPE prescribed in these matrices is appropriate.

Table 2 – PPE Selection Matrix

Task	Anticipated Level of Protection
Mobilization	Level D
Subsurface Intrusive Activities (Mass Excavation, Drilling, Soil Grouting)	Modified Level D/Level C
Earthwork/Grading	Level D
Additional chemical Sampling / Delineation	Modified Level D/Level C
Site Cap Construction	Level D
Creek Relocation	Modified Level D
Decontamination	Modified Level D
Demobilization	Level D

5.0 AIR AND NOISE MONITORING

5.1 Air Monitoring

Air monitoring, sampling, and testing will be conducted to determine employee exposure to airborne constituents. The monitoring results will dictate work procedures and the selection of PPE. The SESI SSO will be responsible for defining appropriate air monitoring procedures and for utilizing the air monitoring results to determine appropriate procedures and PPE for project personnel. Air monitoring results should be recorded in field notebooks or on an air monitoring log (see Attachment 1 for a copy of the Air Monitoring Log). Any deviations from the procedures listed here should be documented and explained in the Air Monitoring Log.

The monitoring devices to be used are a PDR1000 particulate monitor (or equivalent) and a Rae Systems MultiRAE detector (PID with a 11.7 eV lamp/oxygen/LEL/hydrogen sulfide sensors). Colorimetric detector tubes may be utilized to estimate airborne concentrations of benzene and should be onsite during any activities that may result in elevated PID readings including drilling, excavating, and groundwater sampling.

Air monitoring will be conducted continuously with the LEL/Oxygen meter during drilling in areas where flammable vapors or gases are suspect. All work activity must stop where tests indicate the concentration of flammable vapors exceeds 10% of the LEL at a

location with a potential ignition source. Such an area must be ventilated to reduce the concentration to an acceptable level.

5.2 Noise Monitoring

Noise monitoring may be conducted as required. Hearing protection is mandatory for all employees in noise hazardous areas, such as around heavy equipment. As a general rule, sound levels that cause speech interference at normal conversation distance should require the use of hearing protection.

5.3 Monitoring Equipment Maintenance and Calibration

All direct-reading instrumentation calibrations should be conducted under the approximate environmental conditions the instrument will be used. Instruments must be calibrated before and after use, noting the reading(s) and any adjustments that are necessary. All air monitoring equipment calibrations, including the standard used for calibration, must be documented on a calibration log or in the field notebook. All completed health and safety documentation/forms must be reviewed by the SSO and maintained by the FS.

All air monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the SSO must be responsible for immediately removing the instrument from service and obtaining a replacement unit. If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained. The SSO will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

5.4 Action Levels

Table 3 presents airborne contaminant action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the site.

Table 3 – Airborne Contaminant Action Levels

Parameter	Reading	Action
Total Hydrocarbons	0 ppm to \leq 1 ppm	Normal operations; continue hourly breathing zone monitoring
	> 1 ppm to 5 ppm	Increase monitoring frequency to every 15 minutes and use benzene detector tube to screen for the presence of benzene
	\geq 5 ppm to \leq 50 ppm	Upgrade to Level C PPE; continue screening for benzene
	> 50 ppm	Stop work; investigate cause of reading
Benzene	\geq 1 ppm to 5 ppm	Upgrade to Level C PPE
	> 5 ppm	Stop work; investigate cause of reading

Parameter	Reading	Action
Dust	0 to .5 mg/m ³	Normal operations
	0.5 to 1 mg/m ³	Begin soil wetting procedure (Level C protection would be needed beyond this point)
	> 1 mg/m ³	Stop work, fully implement dust control plan
Oxygen	≤ 19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
	> 19.5% to < 23.5%	Normal operations
	≥ 23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Carbon Monoxide	0 ppm to ≤ 20 ppm	Normal operations
	> 20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Hydrogen Sulfide	0 ppm to ≤ 5 ppm	Normal operations
	> 5 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Flammable Vapors (LEL)	< 10% LEL	Normal operations
	≥ 10% LEL	Stop work, ventilate area, investigate source of vapors

6.0 WORK ZONES AND DECONTAMINATION

6.1 Work Zones

6.1.1 Authorization to Enter

Only personnel with the appropriate training and medical certifications (if respirators are required) will be allowed to work at the project site. The FS will maintain a list of authorized persons; only personnel on the authorized persons list will be allowed to enter the site work areas.

6.1.2 Site Orientation and Hazard Briefing

No person will be allowed in the work area during site operations without first being given a site orientation and hazard briefing. This orientation will be presented by the FS or SSO, and will consist of a review of this HASP. This review must cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. Following this initial meeting, daily safety meetings will be held each day before work begins.

All people entering the site work areas, including visitors, must document their attendance at this briefing, as well as the daily safety meetings on the forms included with this plan.

6.1.3 Certification Documents

A training and medical file may be established for the project and kept on site during all site operations. Specialty training, such as first aid/cardiopulmonary resuscitation (CPR) certificates, as well as current medical clearances for all project field personnel required

to wear respirators, will be maintained within that file. All project personnel must provide their training and medical documentation to the SSO prior to starting work.

6.1.4 Entry Log

A log-in/log-out sheet will be maintained at the site by the FS. Personnel must sign in and out on a log sheet as they enter and leave the work area, and the FS may document entry and exit in the field notebook.

6.1.5 Entry Requirements

In addition to the authorization, hazard briefing, and certification requirements listed above, no person will be allowed in any SESI work area unless they are wearing the minimum PPE as described in Section 4.0.

6.1.6 Emergency Entry and Exit

People who must enter the work area on an emergency basis will be briefed of the hazards by the FS or SSO. All activities will cease in the event of an emergency. People exiting the work area because of an emergency will gather in a designated safe area for a head count. The FS is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

6.1.7 Contamination Control Zones

Contamination control zones are maintained to prevent the spread of contamination and to prevent unauthorized people from entering hazardous areas.

6.1.8 Exclusion Zone (EZ)

An EZ may consist of a specific work area, or may be the entire area of potential contamination. All employees entering an EZ must use the required PPE, and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. Cones, caution tape, or a posted site diagram will identify the location of each EZ.

6.1.9 Contamination Reduction Zone

The CRZ or transition area will be established, if necessary, to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the support zone (SZ) discussed below.

6.1.10 Support Zone (SZ)

The SZ is a clean area outside the CRZ located to prevent employee exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination. Smoking may be permitted in the SZ, subject to site requirements.

6.1.11 Posting

Work areas will be prominently marked and delineated using cones, caution tape, or a posted site diagram.

6.1.12 Site Inspections

The FS will conduct a daily inspection of site activities, equipment, and procedures to verify that the required elements are in place.

6.2 Decontamination

6.2.1 Personnel Decontamination

All personnel wearing Modified Level D or Level C protective equipment in the EZ must undergo personal decontamination prior to entering the SZ. The personnel decontamination area will consist of the following stations at a minimum:

- *Station 1:* Personnel leaving the contaminated zone will remove the gross contamination from their outer clothing and boots.
- *Station 2:* Personnel will remove their outer garment and gloves and dispose of it in properly labeled containers. Personnel will then decontaminate their hard hats, and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items are then hand carried to the next station.
- *Station 3:* Personnel will thoroughly wash their hands and face before leaving the CRZ. Respirators will be sanitized and then placed in a clean plastic bag.

6.2.2 Equipment Decontamination

All vehicles that have entered the EZ will be decontaminated at the decontamination pad prior to leaving the zone. If the level of vehicle contamination is low, decontamination may be limited to rinsing of tires and wheel wells with water. If the vehicle is significantly contaminated, steam cleaning or pressure washing of vehicles and equipment may be required.

6.2.3 Personal Protective Equipment Decontamination

Where and whenever possible, single-use, external protective clothing must be used for work within the EZ or CRZ. This protective clothing must be disposed of in properly labeled containers. Reusable protective clothing will be rinsed at the site with detergent and water. The rinsate will be collected for disposal.

When removed from the CRZ, the respirator will be thoroughly cleaned with soap and water. The respirator face piece, straps, valves, and covers must be thoroughly cleaned at the end of each work shift, and ready for use prior to the next shift. Respirator parts may be disinfected with a solution of bleach and water (mixed at 2% bleach by volume), or by using a spray disinfectant.

7.0 TRAINING AND MEDICAL SURVEILLANCE

7.1 Training

7.1.1 General

All on-site project personnel who work in areas where they may be exposed to site contaminants must be trained as required by OSHA Regulation 29 CFR 1910.120 (HAZWOPER). Field employees also must receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their initial training more than 12 months prior to the start of the project must have completed an eight-hour refresher course within the past 12 months. The FS must have completed an additional eight hours of supervisory training, and must have a current first-aid/CPR certificate (See Attachment 2).

7.1.2 Basic 40-Hour Course

The following is a list of the topics typically covered in a 40-hour HAZWOPER training course:

- General safety procedures;
- Physical hazards (fall protection, noise, heat stress, cold stress);
- Names and job descriptions of key personnel responsible for site health and safety;
- Safety, health, and other hazards typically present at hazardous waste sites;
- Use, application, and limitations of PPE;
- Work practices by which employees can minimize risks from hazards;
- Safe use of engineering controls and equipment on site;
- Medical surveillance requirements;
- Recognition of symptoms and signs which might indicate overexposure to hazards;
- Worker right-to-know (Hazard Communication OSHA 1910.1200);
- Routes of exposure to contaminants;
- Engineering controls and safe work practices;
- Components of a health and safety program and a site-specific HASP;
- Decontamination practices for personnel and equipment;
- Confined-space entry procedures; and
- General emergency response procedures.

7.1.3 Supervisor Course

Management and supervisors must receive an additional eight hours of training, which typically includes:

- General site safety and health procedures;
- PPE programs; and
- Air monitoring techniques.

7.1.4 Site-Specific Training

Site-specific training will be accomplished by on-site personnel reading this HASP, and through a thorough site briefing by the PM, FS, or SSO on the contents of this HASP before work begins. The review must include a discussion of the chemical, physical, and

biological hazards; the protective equipment and safety procedures; and emergency procedures.

7.1.5 Daily Safety Meetings

Daily safety meetings will be held to cover the work to be accomplished, the hazards anticipated, the PPE and procedures required to minimize site hazards, and emergency procedures. The FS or SSO should present these meetings prior to beginning the day's fieldwork. No work will be performed in an EZ before a daily safety meeting has been held. An additional safety meeting must also be held prior to new tasks, or if new hazards are encountered. The daily safety meetings will be logged in the field notebook.

7.1.6 First Aid and CPR

At least one employee current in first aid/CPR will be assigned to the work crew and will be on the site during operations. Site records will document the presence of this individual. Refresher training in first aid (triennially) and CPR (annually) is required to keep the certificate current. These individuals must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens.

7.2 Medical Surveillance

7.2.1 Medical Examination

All personnel who are potentially exposed to site contaminants must participate in a medical surveillance program as defined by OSHA at 29 CFR 1910.120 (f).

7.2.2 Pre-placement Medical Examination

All potentially exposed personnel must have completed a comprehensive medical examination prior to assignment, and periodically thereafter as defined by applicable regulations. The pre-placement and periodic medical examinations typically include the following elements:

- Medical and occupational history questionnaire;
- Physical examination;
- Complete blood count, with differential;
- Liver enzyme profile;
- Chest X-ray, at a frequency determined by the physician;
- Pulmonary function test;
- Audiogram;
- Electrocardiogram for persons older than 45 years of age, or if indicated during the physical examination;
- Drug and alcohol screening, as required by job assignment;
- Visual acuity; and
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

The examining physician provides the employee with a letter summarizing his findings and recommendations, confirming the worker's fitness for work and ability to wear a respirator. Documentation of medical clearance will be available for each employee during all project site work.

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician. The physical examinations must meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134. Subcontractors will supply copies of the medical examination certificate for each on-site employee.

7.2.3 Other Medical Examinations

In addition to pre-employment, annual, and exit physicals, personnel may be examined:

- At employee request after known or suspected exposure to toxic or hazardous materials; and
- At the discretion of the SSO, HSM, or occupational physician in anticipation of, or after known or suspected exposure to toxic or hazardous materials.

7.2.4 Periodic Exam

Following the placement examination, all employees must undergo a periodic examination, similar in scope to the placement examination. For employees potentially exposed over 30 days per year, the frequency of periodic examinations will be annual. For employees potentially exposed less than 30 days per year, the frequency for periodic examinations will be 24 months.

7.2.5 Medical Restriction

When the examining physician identifies a need to restrict work activity, the employee's supervisor must communicate the restriction to the employee and the SSO. The terms of the restriction will be discussed with the employee and the supervisor.

8.0 GENERAL SAFETY PRACTICES

8.1 General Safety Rules

General safety rules for site activities include, but are not limited to, the following:

- At least one copy of this HASP must be in a location at the site that is readily available to personnel, and all project personnel shall review the plan prior to starting work.
- Consume or use food, beverages, chewing gum, and tobacco products only in the SZ or other designated area outside the EZ and CRZ. Cosmetics shall not be applied in the EZ or CRZ.
- Wash hands before eating, drinking, smoking, or using toilet facilities.
- Wear all PPE as required, and stop work and replace damaged PPE immediately.
- Secure disposable coveralls, boots, and gloves at the wrists and legs and ensure closure of the suit around the neck.
- Upon skin contact with materials that may be impacted by COCs, remove contaminated clothing and wash the affected area immediately. Contaminated clothing must be changed. Any skin contact with materials potentially impacted by COCs must be reported to the FS or SSO immediately. If needed, medical attention should be sought.

- Practice contamination avoidance. Avoid contact with surfaces either suspected or known to be impacted by COCs, such as standing water, mud, or discolored soil. Equipment must be stored on elevated or protected surfaces to reduce the potential for incidental contamination.
- Remove PPE as required in the CRZ to limit the spread of COC-containing materials.
- At the end of each shift or as required, dispose of all single-use coveralls, soiled gloves, and respirator cartridges in designated receptacles designated for this purpose.
- Removing soil containing site COCs from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited.
- Inspect all non-disposable PPE for contamination in the CRZ. Any PPE found to be contaminated must be decontaminated or disposed of appropriately.
- Recognize emergency signals used for evacuation, injury, fire, etc.
- Report all injuries, illnesses, and unsafe conditions or work practices to the FS or SSO.
- Use the “buddy system” during all operations requiring Level C PPE, and when appropriate, during Modified Level D operations.
- Obey all warning signs, tags, and barriers. Do not remove any warnings unless authorized to do so.
- Use, adjust, alter, and repair equipment only if trained and authorized to do so, and in accordance with the manufacturer’s directions.
- Personnel are to perform only tasks for which they have been properly trained and will advise their supervisor if they have been assigned a task for which they are not trained.
- The presence or consumption of alcoholic beverages or illicit drugs during the workday, including breaks, is strictly prohibited. Notify your supervisor if you must take prescription or over-the-counter drugs that indicate they may cause drowsiness or, that you should not operate heavy equipment.
- Remain upwind during site activities whenever possible.

8.2 Buddy System

On-site personnel must use the buddy system as required by operations. Use of the “buddy system” is required during all operations requiring Level C to Level A PPE, and when appropriate, during Level D operations. Crewmembers must observe each other for signs of chemical exposure, and heat or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration;
- Changes in coordination;
- Changes in demeanor;
- Excessive salivation and pupillary response; and
- Changes in speech pattern.

Crewmembers must also be aware of the potential exposure to possible safety hazards, unsafe acts, or non-compliance with safety procedures.

Field personnel must inform their partners or fellow crewmembers of non-visible effects of exposure to toxic materials that they may be experiencing. The symptoms of such exposure may include, but are not limited to:

- Headaches;
- Dizziness;
- Nausea;
- Blurred vision;
- Cramps; and
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

8.3 Heat Stress

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted with direct solar load and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat rashes are one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much or too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat exhaustion occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms

include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat stroke is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

8.4 Heat Stress Safety Precautions

Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described in Table 4.

Table 4 – Work/Rest Schedule

Adjusted Temperature^b	Work/Rest Regimen Normal Work Ensemble^c	Work/Rest Regimen Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5° - 90°F (30.8°-32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F (28.1° - 30.8°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° - 82.5°F (25.3° - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°F (30.8° - 32.2°C)	After each 150 minutes of work	After each 120 minutes of work

- For work levels of 250 kilocalories/hour (Light-Moderate Type of Work)
- Calculate the adjusted air temperature ($t_{a\ adj}$) by using this equation: $t_{a\ adj} \text{ } ^\circ\text{F} = t_a \text{ } ^\circ\text{F} + (13 \times \% \text{ sunshine})$. Measure air temperature (t_a) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)
- A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.
- The information presented above was generated using the information provided in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) Handbook.

In order to determine if the work rest cycles are adequate for the personnel and specific site conditions, additional monitoring of individual heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one third and maintain the same rest period.

Additionally, one or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute:

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-site drinking water will be kept cool (50 to 60°F).
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices, such as vortex tubes or cooling vests, should be used when personnel must wear impermeable clothing in conditions of extreme heat.
- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Employees must not be assigned to other tasks during breaks.
- Employees must remove impermeable garments during rest periods. This includes white Tyvek-type garments.

All employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

8.5 Cold Stress

Cold stress normally occurs in temperatures at or below freezing, or under certain circumstances, in temperatures of 40°F. Extreme cold for a short time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body that have high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at 18°F. An equivalent chill temperature chart relating the actual dry bulb temperature and wind velocity is presented in Table 5.

Table 5 – Wind Chill Temperature Chart

Wind Chill Temperature Chart												
Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
Equivalent Chill Temperature (°F)												
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trench foot and immersion foot may occur at any point on this chart.											

[This chart was developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA (Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents)].

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of tissue damage associated with frostbite. Frostbite of the extremities can be categorized into:

- *Frost Nip or Incipient Frostbite* - characterized by sudden blanching or whitening of skin.
- *Superficial Frostbite* - skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- *Deep Frostbite* - tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. It can be fatal. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and 5) death. Trauma sustained in freezing or sub-zero conditions requires special attention because an injured worker is predisposed to secondary cold injury. Special provisions must be made to prevent hypothermia and secondary freezing of damaged tissues in addition to providing for first aid treatment. To avoid cold stress, site personnel must wear protective clothing appropriate for the level of cold and physical activity. In addition to protective clothing, preventive safe work

practices, additional training, and warming regimens may be utilized to prevent cold stress.

8.6 Safety Precautions for Cold Stress Prevention

For air temperature of 0°F or less, mittens should be used to protect the hands. For exposed skin, continuous exposure should not be permitted when air speed and temperature results in a wind chill temperature of -25°F.

At air temperatures of 36°F or less, field personnel who become immersed in water or whose clothing becomes wet must be immediately provided with a change of clothing and be treated for hypothermia.

If work is done at normal temperature or in a hot environment before entering the cold, the field personnel must ensure that their clothing is not wet as a consequence of sweating. Wet field personnel must change into dry clothes prior to entering the cold area.

If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work must be modified or suspended until adequate clothing is made available or until weather conditions improve.

Field personnel handling evaporative liquid (e.g., gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F must take special precaution to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.

8.7 Safe Work Practices

Direct contact between bare skin and cold surfaces (< 20°F) should be avoided. Metal tool handles and/or equipment controls should be covered by thermal insulating material.

For work performed in a wind chill temperature at or below 10°F, workers should be under constant protective observation (buddy system). The work rate should be established to prevent heavy sweating that will result in wet clothing. For heavy work, rest periods must be taken in heated shelters and workers should be provided with an opportunity to change into dry clothing if needed.

Field personnel should be provided the opportunity to become accustomed to cold-weather working conditions and required protective clothing. Work should be arranged in such a way that sitting or standing still for long periods is minimized.

During the warming regimen (rest period), field personnel should be encouraged to remove outer clothing to permit sweat evaporation or to change into dry work clothing. Dehydration, or loss of body fluids, occurs insidiously in the cold environment and may increase susceptibility to cold injury due to a significant change in blood flow to the extremities. Fluid replacement with warm, sweet drinks and soups is recommended. The intake of coffee should be limited because of diuretic and circulatory effects.

8.8 Biological Hazards

Biological hazards may include poison ivy, snakes, thorny bushes and trees, ticks, mosquitoes, spiders, and other pests.

8.8.1 Tick Borne Diseases

Lyme Disease - The disease commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin.

Erlchiosis - The disease also commonly occurs in summer and is transmitted by the bite of infected ticks. "Hot spots" in the United States include New York, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin.

These diseases are transmitted primarily by the deer tick, which is smaller and redder than the common wood tick. The disease may be transmitted by immature ticks, which are small and hard to see. The tick may be as small as a period on this page.

Symptoms of Lyme disease include a rash or a peculiar red spot, like a bull's eye, which expands outward in a circular manner. The victim may have headache, weakness, fever, a stiff neck, and swelling and pain in the joints, and eventually, arthritis. Symptoms of erlichiosis include muscle and joint aches, flu-like symptoms, but there is typically no skin rash.

Rocky Mountain Spotted Fever (RMSF) - This disease is transmitted via the bite of an infected tick. The tick must be attached 4 to 6 hours before the disease-causing organism (*Rickettsia rickettsii*) becomes reactivated and can infect humans. The primary symptom of RMSF is the sudden appearance of a moderate-to-high fever. The fever may persist for two to three weeks. The victim may also have a headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, RMSF may be confused with measles or meningitis. The disease may cause death, if untreated, but if identified and treated promptly, death is uncommon.

Control - Tick repellent containing diethyltoluamide (DEET) should be used when working in tick-infested areas, and pant legs should be tucked into boots. In addition, workers should search the entire body every three or four hours for attached ticks. Ticks should be removed promptly and carefully without crushing, since crushing can squeeze the disease-causing organism into the skin. A gentle and steady pulling action should be used to avoid leaving the head or mouth parts in the skin. Hands should be protected with surgical gloves when removing ticks.

8.8.2 Poisonous Plants

Poisonous plants may be present in the work area. Personnel should be alerted to its presence, and instructed on methods to prevent exposure.

Control - The main control is to avoid contact with the plant, cover arms and hands, and frequently wash potentially exposed skin. Particular attention must be given to avoiding skin contact with objects or protective clothing that have touched the plants. Treat every surface that may have touched the plant as contaminated, and practice contamination avoidance. If skin contact is made, the area should be washed immediately with soap and water, and observed for signs of reddening.

8.8.3 Snakes

The possibility of encountering snakes exists, specifically for personnel working in wooded/vegetated areas. Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snakebites include swelling, edema, and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

Control - To minimize the threat of snakebites, all personnel walking through vegetated areas must be aware of the potential for encountering snakes, and the need to avoid actions potentiating encounters, such as turning over logs, etc. If a snakebite occurs, an attempt should be made to safely identify the snake via size and markings. The victim must be transported to the nearest hospital within 30 minutes; first aid consists of applying a constriction band, and washing the area around the wound to remove any unabsorbed venom.

8.8.4 Spiders

Personnel may encounter spiders during work activities.

Two spiders are of concern, the black widow and the brown recluse. Both prefer dark sheltered areas such as basements, equipment sheds and enclosures, and around woodpiles or other scattered debris. The black widow is shiny black, approximately one inch long, and found throughout the United States. There is a distinctive red hourglass marking on the underside of the black widows body. The bite of a black widow is seldom fatal to healthy adults, but effects include respiratory distress, nausea, vomiting, and muscle spasms. The brown recluse is smaller than the black widow and gets its name from its brown coloring and behavior. The brown recluse is more prevalent in the southern United States. The brown recluse has a distinctive violin shape on the top of its body. The bite of the brown recluse is painful and the bite site ulcerates and takes many weeks to heal completely.

Control - To minimize the threat of spider bites, all personnel walking through vegetated areas must be aware of the potential for encountering these arachnids. Personnel need to avoid actions that may result in encounters, such as turning over logs, and placing hands in dark places such as behind equipment or in corners of equipment sheds or enclosures. If a spider bite occurs, the victim must be transported to the nearest hospital as soon as possible; first aid consists of applying ice packs and washing the area around the wound to remove any unabsorbed venom.

8.9 Noise

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on site.

Control - All personnel must wear hearing protection, with a Noise Reduction Rating (NRR) of at least 20, when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Noise monitoring is discussed in Section 5.2, Noise Monitoring.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.

8.10 Spill Control

All personnel must take every precaution to minimize the potential for spills during site operations. All on-site personnel shall immediately report any discharge, no matter how small, to the FS.

Spill control equipment and materials will be located on the site at locations that present the potential for discharge. All sorbent materials used for the cleanup of spills will be containerized and labeled appropriately. In the event of a spill, the FS will follow the provisions in Section 10.0, Emergency Procedures, to contain and control released materials and to prevent their spread to off-site areas.

8.11 Sanitation

Site sanitation will be maintained according to OSHA requirements.

8.11.1 Break Area

Breaks must be taken in the SZ, away from the active work area after site personnel go through decontamination procedures. There will be no smoking, eating, drinking, or chewing gum or tobacco in any area other than the SZ.

8.11.2 Potable Water

The following rules apply to all field operations:

- An adequate supply of potable water will be provided at each project site. Potable water must be kept away from hazardous materials or media, and contaminated clothing or equipment.
- Portable containers used to dispense drinking water must be capable of being tightly closed, and must be equipped with a tap dispenser. Water must not be consumed directly from the container (drinking from the tap is prohibited) nor may it be removed from the container by dipping.
- Containers used for drinking water must be clearly marked and shall not be used for any other purpose.
- Disposable drinking cups must be provided. A sanitary container for dispensing cups and a receptacle for disposing of used cups is required.

8.11.3 Sanitary Facilities

Access to facilities for washing before eating, drinking, or smoking, or alternate methods such as waterless hand-cleaner and paper towels will be provided.

8.11.4 Lavatory

If permanent toilet facilities are not available, an appropriate number of portable chemical toilets will be provided. This requirement does not apply to mobile crews or to normally unattended site locations so long as employees at these locations have transportation immediately available to nearby toilet facilities.

8.12 Emergency Equipment

Adequate emergency equipment for the activities being conducted on site and as required by applicable sections of 29 CFR 1910 and 29 CFR 1926 will be on site prior to the commencement of project activities. Personnel will be provided with access to emergency equipment, including, but not limited to, the following:

- Fire extinguishers of adequate size, class, number, and location as required by applicable sections of 29 CFR 1910 and 1926;
- Industrial first aid kits of adequate size for the number of personnel on site; and
- Emergency eyewash and/or shower if required by operations being conducted on site.

8.13 Lockout/Tagout Procedures

Only fully qualified and trained personnel will perform maintenance procedures. Before maintenance begins, lockout/tagout procedures per OSHA 29 CFR 1910.147 will be followed.

Lockout is the placement of a device that uses a positive means, such as lock, to hold an energy or material-isolating device such that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system shall be used. Tagout is the placement of a warning tag on an energy or material isolating device indicating that the equipment controls may not be operated until the personnel who attached the tag remove the tag.

8.14 Electrical Safety

Electricity may pose a particular hazard to site workers due to the use of portable electrical equipment. If wiring or other electrical work is needed, a qualified electrician must perform it.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by Underwriters Laboratories (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or USCG regulations.
- Portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.

- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switchboxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless of an approved submersible construction.
- All extension cord outlets must be equipped with ground fault circuit interrupters (GFCI).
- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must be inspected prior to each use, and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

8.15 Lifting Safety

Using proper lifting techniques may prevent back strain or injury. The fundamentals of proper lifting include:

- Consider the size, shape, and weight of the object to be lifted. A mechanical lifting device or additional persons must be used to lift an object if it cannot be lifted safely alone.
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.
- Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

8.16 Ladder Safety

When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet (9 m) above the upper landing surface to which the ladder is used to gain access; or, when such an extension is not possible because of the

ladder's length, then the ladder shall be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grabrail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

- Ladders shall be maintained free of oil, grease, and other slipping hazards.
- Ladders shall not be loaded beyond the maximum intended load for which they were built, or beyond their manufacturer's rated capacity.
- Ladders shall be used only for the purpose for which they were designed.
- Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).
- Wood job-made ladders with spliced side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.
- Fixed ladders shall be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.
- Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.
- Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces, including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.
- Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a barricade shall be used to keep the activities or traffic away from the ladder.
- The area around the top and bottom of ladders shall be kept clear.
- The top of a non-self-supporting ladder shall be placed with the two rails supported equally unless it is equipped with a single support attachment.
- Ladders shall not be moved, shifted, or extended while occupied.
- Ladders shall have non-conductive side rails if they are used where the employee or the ladder could contact exposed energized electrical equipment.
- The top, top step, or the step labeled that it or any step above it should not be used as a step.
- Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.
- Ladders shall be inspected by the HSM for visible defects on a daily basis and after any occurrence that could affect their safe use.
- Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; corroded components; or other faulty or defective components shall either be immediately marked in a manner that readily identifies them as defective, or be tagged with "Do Not Use" or similar language, and shall be withdrawn from service.
- Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; or corroded components; shall be withdrawn from service.

- Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.
- Single-rail ladders shall not be used.
- When ascending or descending a ladder, the user shall face the ladder.
- Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder.
- An employee shall not carry any object or load that could cause the employee to lose balance and fall.

8.17 Traffic Safety

The project site may be located adjacent to a public roadway where exposure to vehicular traffic is likely. Traffic may also be encountered as vehicles enter and exit the area. To minimize the likelihood of project personnel and activities being affected by traffic, the following procedures will be implemented.

Cones must be placed along the shoulder of the roadway starting 100 feet from the work area to alert passing motorists to the presence of personnel and equipment. A "Slow" or "Men Working" sign must be placed at the first cone. Barricades with flashing lights should be placed between the roadway and the work area.

During activities along a roadway, equipment will be aligned parallel to the roadway to the extent feasible, facing into the oncoming traffic so as to place a barrier between the work crew and the oncoming traffic. All crewmembers must remain behind the equipment and the traffic barrier.

All site personnel who are potentially exposed to vehicular traffic must wear an outer layer of orange warning garments, such as vests, jackets, or shirts. If work is performed in hours of dusk or darkness, workers will be outfitted with reflective garments either orange, white (including silver-coated reflective coatings or elements that reflect white light), yellow, fluorescent red-orange, or fluorescent yellow-orange.

The flow of traffic into and out of the adjacent business must be assessed, and precautions taken to warn motorists of the presence of workers and equipment. Where possible, vehicles should be aligned to provide physical protection of people and equipment.

9.0 SITE-SPECIFIC HAZARDS AND CONTROL MEASURES

9.1 Evaluation of Hazards

The evaluation of hazards is provided as a quick reference as to the known conditions for the Site, wherein the level of detail for each of the subsections is identified.

9.1.1 Hazard Characteristics

Existing information for Site:

 X Detailed Preliminary None

Hazardous/Contaminated Material Form(s):

 X Solid X Liquid Sludge Gas X Vapor

Containment Type(s):

☐ Drum ☒ Tank ☐ Pit ☐ Debris
☐ Pond ☐ Lagoon Other: _____

Hazardous Material Characteristics:

☒ Volatile ☐ Corrosive ☐ Reactive ☐ Radioactive
☒ Ignitable ☒ Toxic ☒ Unknown

Routes of Exposure:

☒ Oral ☒ Dermal ☒ Eye ☒ Respiratory

9.1.2 Potential Health and Safety Hazards

<input checked="" type="checkbox"/> Heat	<input type="checkbox"/> Congested areas
<input checked="" type="checkbox"/> Cold	<input checked="" type="checkbox"/> General Construction
<input type="checkbox"/> Confined space entry	<input checked="" type="checkbox"/> Physical injury
<input type="checkbox"/> Oxygen depletion	<input checked="" type="checkbox"/> Electrical hazards
<input type="checkbox"/> Asphyxiation	<input type="checkbox"/> Handling and product transfer
<input checked="" type="checkbox"/> Excavation	<input checked="" type="checkbox"/> Fire
<input type="checkbox"/> Cave-ins	<input checked="" type="checkbox"/> Explosion
<input checked="" type="checkbox"/> Falls, slippage	<input checked="" type="checkbox"/> Biological Hazards
	<input checked="" type="checkbox"/> Plants – Poison Ivy, Poison Oak
	<input checked="" type="checkbox"/> Insects – Ticks
	<input checked="" type="checkbox"/> Insects – Mosquitoes
	<input checked="" type="checkbox"/> Insects – Bees and Wasps
	<input checked="" type="checkbox"/> Rats and Mice
<input checked="" type="checkbox"/> Heavy equipment	<input type="checkbox"/> Non-ionizing Radiation (i.e. UV, IR, etc.)
<input checked="" type="checkbox"/> Other: Potential Ignition Hazard.	

9.2 Field Activities, Hazards, and Control Procedures

The following task-specific safety analyses identify potential health, safety, and environmental hazards associated with each type of field activity. Because of the complex and changing nature of field projects, supervisors must continually inspect the site to identify hazards that may affect on-site personnel, the community, or the environment. The FS must be aware of these changing conditions and discuss them with the PM whenever these changes impact employee health, safety, the environment, or performance of the project. The FS will keep on-site personnel informed of the changing conditions, and the PM will write and/or approve addenda or revisions to this HASP as necessary.

9.2.1 Mobilization/Construction Stakeout

Description of Tasks

Site mobilization will include establishing excavation locations, determining the location of utilities and other installations, and establishing work areas. Mobilization will also include setting up equipment and establishing a temporary site office. A break area will be set up outside of regulated work areas. Mobilization may involve clearing areas for the SZ and CRZ. During this initial phase, project personnel will walk the site to confirm

the existence of anticipated hazards, and identify safety and health issues that may have arisen since the writing of this plan.

Hazard Identification

The hazards of this phase of activity are associated with heavy equipment operation, manual materials handling, installation of temporary on-site facilities, and manual site preparation.

Manual materials handling and manual site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Installation of temporary field office and support facilities may expose personnel to electrical hazards, underground and overhead utilities, and physical injury due to the manual lifting and moving of materials. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat- or cold-related illnesses; and pathogens, such as rabies, Lyme disease, and blood-borne pathogens.

Controls

Control procedures for these hazards are discussed in Section 8.0, General Safety Practices.

9.2.2 Demolition/Site Clearing

Description of Tasks

Site clearance will involve manual or mechanical removal of objects impeding access to the construction footprint. These obstructions are both natural and man-made items and will include, but not be limited to, fabricated metal and concrete structures, trees, vegetation, rubble, and miscellaneous trash/debris.

Hazard Identification

Hazards associated with demolition and site clearance include personnel working in and around potentially unstable structures, or locations of potential contact with hazardous chemicals, utilities, and/or falling objects. This task will involve manual, as well as mechanical demolition/clearance efforts so exertion and equipment hazards exist.

Controls

PPE – Personnel shall be protected from hazards of irritant and toxic plants and suitably instructed in the first aid treatment available.

Preparatory Operations – Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a licensed Professional Engineer, of the structure to determine the stability of the structure. Any adjacent structure shall where personnel may be exposed shall also be similarly checked. The PO shall have in writing evidence that such a survey has been performed. All structural instabilities shall be shored or braced, under the supervision of a licensed Professional Engineer, prior to access by an FP.

Utilities – All electric, gas, water, steam, sewer, and other service lines shall be shut off, capped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company that is involved shall be notified in advance. If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary.

Hazardous Substances – It shall also be determined if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

Falling Debris/Objects – No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected. Access to the area where falling objects/debris may be encountered must be gated and controlled.

Structural Collapse – Structural or load supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. Walls, which are to serve as retaining walls against which debris will be piled, shall not be so used unless capable of safely supporting the imposed load. Mechanical equipment shall not be used on floors or working surfaces unless such floors or surfaces are not of sufficient strength to support the imposed load.

Rollover Guards – All equipment used in site clearing operations shall be equipped with rollover guards meeting the applicable requirements. In addition, rider-operated equipment shall be equipped with an overhead and rear canopy guard meeting the applicable requirements.

Inspections – During demolition, continuing inspections by a licensed Professional Engineer shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, walls, or loosened material. No FP shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means.

9.2.3 Excavation and Cut/Fill Operations

9.2.3.1 Excavation/Trenching

Description of Tasks

This task includes the excavation of contaminated soils and superficial debris. Excavation depths vary across the site.

Hazard Identification

The hazards of this activity are associated with heavy equipment operation, subsurface intrusion, manual materials handling, stockpiling, and disposal. Subsurface intrusion presents hazards associated with negotiating buried utilities, cave-ins of the excavated areas, and regress methods for personnel working inside the excavated areas. Disruption of contaminated soil also presents a health hazard.

Controls

Underground Utilities – The estimated locations of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during the excavation work, shall be determined prior to opening an excavation. Utility companies or owners shall be contacted (“Call Before You Dig”) within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. While the excavation is open, underground installations shall be protected, supported, or removed, as necessary, to safeguard site personnel.

Cave-Ins – Project personnel in an excavation shall be protected from cave-ins by an adequate protective system, except when:

- Excavations are made entirely in stable rock or excavations are less than five feet in depth and examination of the ground by the SSO provides no indication of a potential cave-in.
- Protective systems shall have the capacity to resist, without failure, all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

Project personnel shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least two feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by the SSO for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the SSO prior to the start of work and as needed throughout operations. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when project personnel exposure can be reasonably anticipated.

Where the SSO finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed personnel shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

Excavation Egress – A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations that are four feet or more in depth so as to require no more than 25 feet or lateral travel for project personnel.

9.2.3.2 Heavy Equipment Operation

Description of Tasks

Heavy equipment to be used for this task include, but are not limited to, excavators, dozers, dump trucks, and water sprayers (if required).

Hazard Identification

The most common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and an object gets caught between two moving parts of the equipment. Operation of the heavy construction equipment may produce harmful noise.

Controls

Equipment Inspection – All vehicles in use shall be checked prior to operation to ensure that all parts, equipment, and accessories that affect safe operations are in proper operating condition and free from defects. All defects shall be corrected before the vehicle is placed in service.

Ground Guides – No personnel shall use any motor vehicle, earthmoving, or compacting equipment having an obstructed view to the rear, unless:

- The vehicle has a reverse signal alarm distinguishable from the surrounding noise level; or
- The vehicle is backed up only when an observer signals that it is safe to do so.

Blocking – Heavy machinery, equipment, or parts thereof that are suspended or held aloft shall be substantially blocked to prevent falling or shifting before employees are permitted to work under or between them.

Noise – Control measures for noise are addressed in Section 4.9.

Traffic – Control measures for traffic are addressed in Section 8.17.

9.2.3.3 Disturbance/Handling of Contaminated Material

Description of Tasks

After the contaminated soil is excavated from below the Site's surface, the material will be stockpiled, dried, and either transported offsite or relocated and backfilled on site.

Hazard Identification

The hazards associated with materials handling include contact of the contaminated material with project personnel, or cross contamination with other site soil.

Controls

Cross Contamination – Following excavation, contaminated soil stockpiles will be placed on a structure constructed to separate the material from the site soil and collect any groundwater leachate. The material shall be covered to prevent storm water erosion or migration of contaminants through storm water.

Air Monitoring – Air and particulate monitoring will be conducted during soil excavation activities to assess the potential for exposure to airborne COCs. If the results of air monitoring indicate the presence of organic vapors or particulates in a concentration causing concern, personnel will upgrade to Level C protection. Refer to Section 5.1, Air Monitoring, for a description of air monitoring requirements and action levels. A

description of each level of personal protection is included in Section 4.0, Personal Protective Equipment.

Traffic – Control measures for traffic are addressed in Section 8.17.

9.2.4 Drilling/Subsurface Intrusion Activities

Description of Tasks

This component of work includes the project tasks of delineation and sampling the PCB-impacted soil, installation of the groundwater cutoff wall, and in-situ soil grouting. Geotechnical testing of the grout and existing site soils will also be conducted.

Hazard Identification

The primary physical hazards for this activity are associated with the use of soil boring and grouting equipment. The equipment is hydraulically powered, and uses static force and dynamic percussion force to advance sampling and penetrating tubes.

Accidents can occur as a result of improperly placing the equipment on uneven or unstable terrain, or failing to adequately secure the equipment prior to the start of operations. Overhead utility lines can create hazardous conditions if contacted by the equipment. Underground installations such as electrical lines, conduit, and product lines pose a significant hazard if contacted.

Controls

Geoprobe and Drill Rig Safety Procedures - The operator of the equipment must possess required state or local licenses to perform such work. All members of the crew shall receive site-specific training prior to beginning work.

The operator is responsible for the safe operation of the rig, as well as the crew's adherence to the requirements of this HASP. The operator must ensure that all safety equipment is in proper condition and is properly used. The members of the crew must follow all instructions of the operator, wear all personal protective equipment, and be aware of all hazards and control procedures. The operator and crew must participate in the Daily Safety Meetings and be aware of all emergency procedures.

Equipment Inspection - Each day, prior to the start of work, the rig and associated equipment must be inspected by the operator. The following items must be inspected:

- Vehicle condition;
- Proper storage of equipment;
- Condition of all hydraulic lines;
- Fire extinguisher; and
- First aid kit.

Equipment Set Up - The drill rig must be properly blocked and leveled prior to raising the derrick. The wheels which remain on the ground must be chocked. The leveling jacks shall not be raised until the derrick is lowered. The rig shall be moved only after the derrick has been lowered.

All well sites will be inspected by the driller prior to the location of the rig to verify a stable surface exists. This is especially important in areas where soft, unstable terrain is common.

The drill rig must be properly blocked and leveled prior to raising the derrick. Blocking provides a more stable drilling structure by evenly distributing the weight of the rig. Proper blocking ensures that differential settling of the rig does not occur.

When the ground surface is soft or otherwise unstable, wooden blocks, at least 24" by 24" and 4" to 8" thick shall be placed between the jack swivels and the ground. The emergency brake shall be engaged, and the wheels that are on the ground shall be chocked.

Rules for Intrusive Activity - Before beginning any intrusive activity, the existence and location of underground pipe, conduit, electrical equipment, and other installations will be determined. This will be done, if possible, by contacting the appropriate client representative to mark the location of the lines. "Call Before You Dig" will verify the potential for encountering subsurface utilities. If the client's knowledge of the area is incomplete, an appropriate device, such as a magnetometer, will be used to locate the line.

Combustible gas readings of the general work area will be made regularly in areas where and/or during operations when the presence of flammable vapors or gases is suspected, such as during intrusive activities (see Section 5.1). Operations must be suspended and corrective action taken if the airborne flammable concentration reaches 10% of the LEL in the immediate area (a one-foot radius) of the point of drilling, or near any other ignition sources.

Overhead Electrical Clearances - If equipment is operated in the vicinity of overhead power lines, the power to the lines must be shut off or the equipment must be positioned and blocked such that no part, including cables, can come within the minimum clearances as follows:

Nominal Voltage	System	Minimum Clearance	Required
0-50kV		10 feet	
51-100kV		12 feet	
101-200kV		15 feet	
201-300kV		20 feet	
301-500kV		25 feet	
501-750kV		35 feet	
751-1,000kV		45 feet	

When the drill rig is in transit, with the boom lowered and no load, the equipment clearance must be at least 4 feet for voltages less than 50kV, 10 feet for voltages of 50 kV to 345 kV, and 16 feet for voltages above 345 kV.

Hoisting Operations - Drillers should never engage the rotary clutch without watching the rotary table, and ensuring it is clear of personnel and equipment.

Unless the drawworks is equipped with an automatic feed control, the brake should not be left unattended without first being tied down.

Drill pipe, auger strings or casing should be picked up slowly. Drill pipe should not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrickman has signaled that he may safely hoist the pipe.

During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor; no one else should be on the rig or derrick.

The brakes on the drawworks of the drill rig should be tested by the driller each day. The brakes should be thoroughly inspected by a competent individual each week.

A hoisting line with a load imposed should not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.

Workers should never stand near the borehole whenever any wire line device is being run.

Hoisting control stations should be kept clean and controls labeled as to their functions.

Catline Operations - Only experienced workers will be allowed to operate the cathead controls. The kill switch must be clearly labeled and operational prior to operation of the catline. The cathead area must be kept free of obstructions and entanglements.

The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.

Personnel should not stand near, step over, or go under a cable or catline which is under tension.

Employees rigging loads on catlines shall:

- Keep out from under the load;
- Keep fingers and feet where they will not be crushed;
- Be sure to signal clearly when the load is being picked;
- Use standard visual signals only and not depend on shouting to coworkers; and
- Make sure the load is properly rigged, since a sudden jerk in the catline will shift or drop the load.

Wire Rope - When two wires are broken or rust or corrosion is found adjacent to a socket or end fitting, the wire rope shall be removed from service or re-socketed. Special attention shall be given to the inspection of end fittings on boom support, pendants, and guy ropes.

Wire rope removed from service due to defects shall be cut up or plainly marked as being unfit for further use as rigging.

Wire rope clips attached with U-bolts shall have the U-bolts on the dead or short end of the rope; the clip nuts shall be re-tightened immediately after initial load carrying use and at frequent intervals thereafter.

When a wedge socket fastening is used, the dead or short end of the wire rope shall have a clip attached to it or looped back and secured to itself by a clip; the clip shall not be attached directly to the live end.

Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or pulling loads, shall consist of one continuous piece without knot or splice.

An eye splice made in any wire rope shall have not less than five full tucks.

Wire rope shall not be secured by knots. Wire rope clips shall not be used to splice rope.

Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire clips or knots.

Pipe/Auger Handling - Pipe and auger sections shall be transported by cart or carried by two persons. Individuals should not carry auger or pipe sections without assistance.

Workers should not be permitted on top of the load during loading, unloading, or transferring of pipe or rolling stock.

Employees should be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe.

Slip handles should be used to lift and move slips. Employees are not permitted to kick slips into position.

When pipe is being hoisted, personnel should not stand where the bottom end of the pipe could whip and strike them.

Pipe and augers stored in racks, catwalks or on flatbed trucks should be secured to prevent rolling.

9.2.5 Subsurface Chemical Sample Collection/Analysis

Description of Tasks

This sub-task consists of the collection of soil samples for subsequent field and laboratory analysis. The physical hazards of soil sampling are primarily associated with the sample collection methods, procedures utilized, and the environment itself.

Hazard Identification

Incidental contact with COCs is the primary hazard associated with sampling the stabilized material. This contact may occur through the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. The primary hazards associated with these sampling procedures are not potentially serious; however, other operations in the area, or the

conditions under which samples must be collected, may present chemical and physical hazards. The hazards directly associated with sampling procedures are generally limited to strains/sprains and potential eye hazards. Potential chemical hazards may include contact with media containing site COCs and potential contact with chemicals used for equipment decontamination.

Controls

PPE – To control dermal exposure during sampling activities, a minimum of Level D protection will be worn. If necessary, based on field observations and site conditions, air monitoring may be conducted during sediment sampling activities. If the results of air monitoring indicate the presence of airborne contaminants in a concentration causing concern, personnel will upgrade to Level C protection. Refer to Section 5.1, Air Monitoring, for a description of air monitoring requirements and action levels. A description of each level of personal protection is included in Section 4.0, Personal Protective Equipment.

9.2.6 UST Closure

9.2.6.1 Working in Confined Spaces

Description of Tasks

The project will involve the closure of several USTs.

Hazard Identification

Closure activities may require the entrance into confined spaces to facilitate cleaning and removal of the USTs.

Controls

All personnel required to enter into confined or enclosed spaces must be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of required protective and emergency equipment. The PO shall comply with all specific regulations that apply to work in dangerous or potentially dangerous areas.

9.2.6.2 Working with Compressed Air

Description of Tasks

The proposed method of purging the USTs includes the injection of compressed gas into the tank and attached piping network.

Hazard Identification

Uncontrolled release of the highly pressured air can cause injury to FP during this task. Cylinders must also be properly managed to ensure they are not compromised during storage and/or use.

Controls

Pressure Regulation – Compressed air used for cleaning purposes shall be reduced to less than 30 pounds per square inch and then only with effective chip guarding and personal protective equipment.

Cylinder Storage – Valve protection caps shall be in place and secured when compressed gas cylinders are transported, moved, or stored. Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved. Compressed

gas cylinders shall be secured in an upright position at all times, except if necessary for short periods of time when cylinders are actually being hoisted or carried. Cylinders shall be placed in a location where they cannot become part of an electrical circuit.

9.2.7 Site Capping System Construction

Refer to Section 8.0 for general safety procedures.

9.2.8 Creek Relocation

Refer to Section 8.0 for general safety procedures.

9.2.9 Decontamination

All equipment will be decontaminated before leaving the site. Personnel involved in decontamination activities may be inadvertently exposed to skin contact with contaminated materials and chemicals brought from the EZ. Personnel involved in decontamination activities must wear PPE that is, at a minimum, one level below the level worn by personnel working in the EZ.

9.2.10 Demobilization

Demobilization involves the removal of all tools, equipment, supplies, and vehicles brought to the site. The hazards of this phase of activity are associated with heavy equipment operation and manual materials handling.

Manual materials handling may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Heavy equipment operation presents noise and vibration hazards, and hot surfaces, to operators. Personnel in the vicinity of heavy equipment operation may be exposed to physical hazards resulting in fractures, contusions, and lacerations and may be exposed to high noise levels. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat-or cold-related illnesses; and pathogens, such as rabies, Lyme disease, and blood-borne pathogens.

Control procedures for these hazards are discussed in Section 8.0, General Safety Practices.

9.3 Chemical Hazards

The chemical hazards associated with site operations are related to inhalation, ingestion, and skin exposure to site COCs. Concentrations of airborne COCs during site tasks may be measurable, and will require air monitoring during certain operations. Air monitoring requirements for site tasks are outlined in Section 5.1.

COCs at the site include heavy metals, some VOC compounds, some SVOC compounds and potentially other industrial chemicals including PCBs and pesticides.

The potential for inhalation of site COCs is low. The potential for dermal contact with soils containing site COCs during remedial operations is moderate. Table 6 lists the primary contaminants that have been identified at the Site and the media in which they are present.

Table 6 – List of Primary Contaminants

Media: Soil		
Volatile Organic Compounds	Concentration (mg/kg)	Applicable Monitoring Instrument
Acetone	0.0139 - 0.125	PID
Benzene	0.0012	PID
Chloroform	0.00053 - 0.0024	PID
Ethylbenzene	0.00076 – 0.0039	PID
Methylene Chloride	0.0013 – 0.0865	PID
Tetrachloroethene	0.00068 – 0.0124	PID
Xylene (total)	0.00075 – 0.0626	PID
Semi-Volatile Organic Compounds	Concentration (mg/kg)	Applicable Monitoring Instrument
Acenaphthene	0.0205 – 1.56	Not Applicable
Acenaphthylene	0.0175 – 0.372	Not Applicable
Anthracene	0.0295 – 3.95	Not Applicable
Benzo(a)anthracene	0.0197 – 6.89	Not Applicable
Benzo(a)pyrene	0.0319 – 7.33	Not Applicable
Benzo(b)fluoranthene	0.0267 – 7.13	Not Applicable
Benzo(g,h,i)perylene	0.0286 – 0.994	Not Applicable
Benzo(k)fluoranthene	0.0440 – 2.37	Not Applicable
Chrysene	0.0186 – 6.75	Not Applicable
Dibenzo(a,h)anthracene	0.0388 – 0.481	Not Applicable
Fluoranthene	0.0176 - 16	Not Applicable
Fluorene	0.0198 – 1.86	Not Applicable
Indeno(1,2,3-cd)pyrene	0.0346 – 1.14	Not Applicable
Naphtalene	0.0436 – 0.455	Not Applicable
Phenanthrene	0.0219 - 16	Not Applicable
Pyrene	0.0145 – 10.4	Not Applicable

Media: Soil		
Metals	Concentration (mg/kg)	Applicable Monitoring Instrument
Arsenic	2.6 - 136	Not Applicable
Barium	25.1 - 431	Not Applicable
Cadmium	0.53 - 1.8	Not Applicable
Chromium	12.1 - 145	Not Applicable
Copper	11.8 - 2,900	Not Applicable
Lead	3.4 - 7,170	Not Applicable
Manganese	66 - 1,370	Not Applicable
Mercury	0.041 - 158	Not Applicable
Nickel	9.4 - 69.4	Not Applicable
Silver	1.6 - 2.3	Not Applicable
Zinc	20.6 - 727	Not Applicable
Cyanide	0.29 - 0.67	Not Applicable
Pesticides/PCBs	Concentration (mg/kg)	Applicable Monitoring Instrument
4,4'-DDD	0.0075 - 0.109	Not Applicable
4,4'-DDE	0.0029 - 0.031	Not Applicable
4,4'-DDT	0.0031 - 0.081	Not Applicable
Alpha-Chlordane	0.009	Not Applicable
Dieldrin	0.0462	Not Applicable

Miscellaneous	Concentration (%)	Media	Applicable Monitoring Instrument
methane	Unknown	Landfill Gas	VRAE - Multigas Monitor (PGM-7800/7840)

Media: Groundwater		
Volatile Organic Compounds	Concentration (ppb)	Applicable Monitoring Instrument
Acetone	11.2 – 321	PID
Benzene	353 – 12,900	PID
Chloroform	0.36 – 29.4	PID
Ethylbenzene	17.3 – 3,330	PID
1,1,1-Trichloroethane	0.43 – 21.9	PID
Cis-1,2-Dichloroethene	0.42 - 18	PID
m,p-Xylene	17 – 10,100	PID
o-Xylene	3.0 – 4,100	PID
Methyl Tert Butyl Ether	0.24 – 9,690	PID
Tetrachloroethene	0.38 – 23.9	PID
Toluene	0.22 – 9,300	PID
Trichloroethene	0.88 – 32.2	PID
Xylene (Total)	27.4 – 14,200	PID

Media: Groundwater		
Semi-Volatiles Organic Compounds	Concentration (ppb)	Applicable Monitoring Instrument
2,4-Dimethylphenol	52.4 - 135	Not Applicable
2-Methylnaphtalene	123 - 276	Not Applicable
2-Methylphenol	15.4 - 28.5	Not Applicable
Acenaphtene	0.78 - 2.3	Not Applicable
Benzo(a)anthracene	0.40 - 2.3	Not Applicable
Benzo(a)pyrene	1.2 - 1.7	Not Applicable
Benzo(b)fluoranthene	0.66 - 1.6	Not Applicable
Benzo(g,h,i)perylene	0.99 - 1.1	Not Applicable
Benzo(k)fluoranthene	1.2 - 1.6	Not Applicable
Bis(2-Ethylhexyl)phtalate	1.1 - 10.8	Not Applicable
Chrysene	0.31 - 2.3	Not Applicable
Indeno(1,2,3-cd)pyrene	0.91 - 0.98	Not Applicable
Naphtalene	0.47 - 682	Not Applicable
Phenol	1.0 - 24.9	Not Applicable
Pyrene	0.48 - 5.3	Not Applicable

Media: Groundwater		
Metals	Concentration (ppb)	Applicable Monitoring Instrument
Arsenic	4.3 – 136	Not Applicable
Barium	214 – 3,900	Not Applicable
Beryllium	2.3 – 5.2	Not Applicable
Cadmium	8.4	Not Applicable
Chromium	13.2 – 7,960	Not Applicable
Copper	38.7 – 3,720	Not Applicable
Iron	1,550 – 555,000	Not Applicable
Lead	9.0 – 2,800	Not Applicable
Manganese	32.2 – 15,600	Not Applicable
Mercury	0.31 – 356	Not Applicable
Nickel	50.7 – 781	Not Applicable

10.0 EMERGENCY PROCEDURES

10.1 General

Prior to the start of operations, the work area will be evaluated for the potential for fire, contaminant release, or other catastrophic event. Unusual conditions or events, activities, chemicals, and conditions will be reported to the FS/SSO immediately.

The FS/SSO will establish evacuation routes and assembly areas for the site. All personnel entering the site will be informed of this route and the assembly area.

10.2 Emergency Response

If an incident occurs, the following steps will be taken:

- The FS/SSO will evaluate the incident and assess the need for assistance and/or evacuation;
- The FS/SSO will call for outside assistance as needed;
- The FS/SSO will ensure the PM is notified promptly of the incident; and
- The FS/SSO will take appropriate measures to stabilize the incident scene.

10.2.1 Fire

In the case of a fire at the site, the FS/SSO will assess the situation and direct fire-fighting activities. The FS/SSO will ensure that the PM is immediately notified of any fires. Site personnel will attempt to extinguish the fire with available extinguishers, if safe to do so. In the event of a fire that site personnel are unable to safely extinguish with one fire extinguisher, the local fire department will be summoned.

10.2.2 Contaminant Release

In the event of a contaminant release, the following steps will be taken:

- Notify FS/SSO immediately;
- Evacuate immediate area of release;
- Conduct air monitoring to determine needed level of PPE; and
- Don required level of PPE and prepare to implement control procedures.

The FS/SSO has the authority to commit resources as needed to contain and control released material and to prevent its spread to off-site areas.

10.3 Medical Emergency

All employee injuries must be promptly reported to the SSO/FS, who will:

- Ensure that the injured employee receives prompt first aid and medical attention;
- In emergency situations, the worker is to be transported by appropriate means to the nearest urgent care facility (normally a hospital emergency room); and
- If the injured person is a SESI employee, notify SESI at 973-808-9050.

10.3.1 Emergency Care Steps

Survey the scene. Determine if it is safe to proceed. Try to determine if the conditions that caused the incident are still a threat. Protect yourself from exposure before attempting to rescue the victim.

- Do a primary survey of the victim. Check for airway obstruction, breathing, and pulse. Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the victim for symptoms.
- Phone Emergency Medical Services (EMS). Give the location, telephone number used, caller's name, what happened, number of victims, victim's condition, and help being given.
- Maintain airway and perform rescue breathing as necessary.
- Perform CPR as necessary.
- Do a secondary survey of the victim. Check vital signs and do a head-to-toe exam.

Treat other conditions as necessary. If the victim can be moved, take him/her to a location away from the work area where EMS can gain access.

10.4 First Aid - General

All persons must report any injury or illness to their immediate supervisor or the FS. Trained personnel will provide first aid. Injuries and illnesses requiring medical treatment must be documented. The FS and SSO must fill out an accident/incident report as soon as emergency conditions no longer exist and first aid and/or medical treatment has been ensured. The report must be completed and submitted to the PM within 24 hours after the incident.

If first-aid treatment is required, first aid kits are kept at the CRZ. If treatment beyond first aid is required, the injured person(s) should be transported to the medical facility. If the injured person is not ambulatory, or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics should be summoned. If there is any doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

10.4.1 First Aid - Inhalation

Any employee complaining of symptoms of chemical overexposure as described in Section 4, General Site Safety Procedures, will be removed from the work area and transported to the designated medical facility for examination and treatment.

10.4.2 First Aid - Ingestion

Call EMS and consult a poison control center for advice. If available, refer to the MSDS for treatment information. If the victim is unconscious, keep them on their side and clear the airway if vomiting occurs.

10.4.3 First Aid - Skin Contact

Project personnel who have had skin contact with contaminants will, unless the contact is severe, proceed through the CRZ, to the wash area. Personnel will remove any contaminated clothing, and then flush the affected area with water for at least 15

minutes. The worker should be transported to the medical facility if he/she shows any sign of skin reddening, irritation, or if he/she requests a medical examination.

10.4.4 First Aid - Eye Contact

Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the EZ, must immediately proceed to the eyewash station in the CRZ. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Flush the eye with clean running water for at least 15 minutes. Arrange prompt transport to the designated medical facility.

10.5 Reporting Injuries, Illnesses, and Safety Incidents

Injuries and illnesses, however minor, will be reported to the FS immediately. The FS will complete an injury report and submit it to the HSM, and the PM by end of shift.

10.6 Emergency Information

The means to summon local public response agencies such as police, fire, and ambulance will be reviewed in the daily safety meeting. These agencies are identified in Table 7.

Table 7 – Emergency Contacts

Local Emergency Contacts	Telephone No.
EMERGENCY	911
Saint Joseph's Medical Center	(914) 378-7000
Police Emergency	911
Police (Yonkers Police Department)	(914) 377-7900
Fire Emergency	911
Rescue Squad	911
Ambulance	911
Project Emergency Contacts	Telephone No.
PM – Dean Giovanetti	973-808-9050
FM – Chris Mazur	518-569-8654
Miscellaneous Contacts	Telephone No.
N.Y. Poison Control Center	(800) 222-1222
National Response Center and Terrorist Hotline	(800) 424-8802
Center for Disease Control	(800) 311-3435
Utility Mark-Out	(800) 962-7962

10.6.1 Directions to Hospital

Saint Joseph's Medical Center
127 South Broadway
Yonkers, New York 10701

(914) 378-7000 (emergency no.)

Directions to Hospital:

- Start out going west on Nepperhan Avenue toward New School Street (0.2 miles)
- Turn left of S Broadway/US-9/NY-9A (0.1 miles)

- Arrive at Saint Joseph's Medical Center, at 127 S Broadway

Total Estimated Distance: 0.47 miles

Total Estimated Time: 2 minutes

Saint Joseph's Medical Center Location Map is on Figure 2

11.0 LOGS, REPORTS, AND RECORD KEEPING

The following is a summary of required health and safety logs, reports, and record keeping for the operations at the subject site.

11.1 HASP Field Change Request

To be completed for initiating a change to the HASP. PM approval is required. The original will be kept in the project file (See Attachment 3).

11.2 Medical and Training Records

The HSM must obtain and keep a log of personnel meeting appropriate training and medical qualifications for the site work. The log will be kept in the project file. Each company's Human Resources Department will maintain medical records, in accordance with 29 CFR 1910.1020.

11.3 Exposure Records

Any personnel monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be kept in accordance with 29 CFR 1910.1020. For SESI employees, the originals will be sent to the Human Resources Manager. For subcontractor employees, the original file will be sent to the subcontractor employer with a copy maintained in the SESI project file.

11.4 Accident/Incident Report

Any accident/incident reports must be completed following procedures given in Section 10.5 of this HASP. The originals will be sent to the HSM for maintenance. A copy of the forms will be kept in the project file. (See Attachment 4)

11.5 OSHA Form 200

An OSHA Form 200 (Log of Occupational Injuries and Illnesses) will be kept at the project site. All recordable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to the Human Resources Manager for maintenance. Subcontractor employees must also meet the requirements of maintaining an OSHA 200 Form. The accident/incident report meets the requirements of the OSHA Form 101 (Supplemental Record), which must be maintained with the OSHA Form 200 for all recordable injuries or illnesses.

11.6 On-Site Health and Safety Field Logbooks

The HSM or designee will maintain an on-site health and safety log book in which daily Site conditions, activities, personnel, and significant events will be recorded. Calibration records and personnel monitoring results, if available, will also be recorded in the field logbook. The original logbook will be kept in the project file.

Whenever any personnel monitoring is conducted onsite, the monitoring results will be noted in the filed logbook. These will become part of the exposure records file and will be maintained by the HSM.

A signatory page is included (See Attachment 5) and is to be signed by those working on and/or visiting the site.

11.7 Material Safety Data Sheets

Material Safety Data Sheets (MSDS) will be obtained and kept on file at the project site for each hazardous chemical brought to, use, or stored at the Site (See Attachment 6).

Appendix D

Sanborn Maps



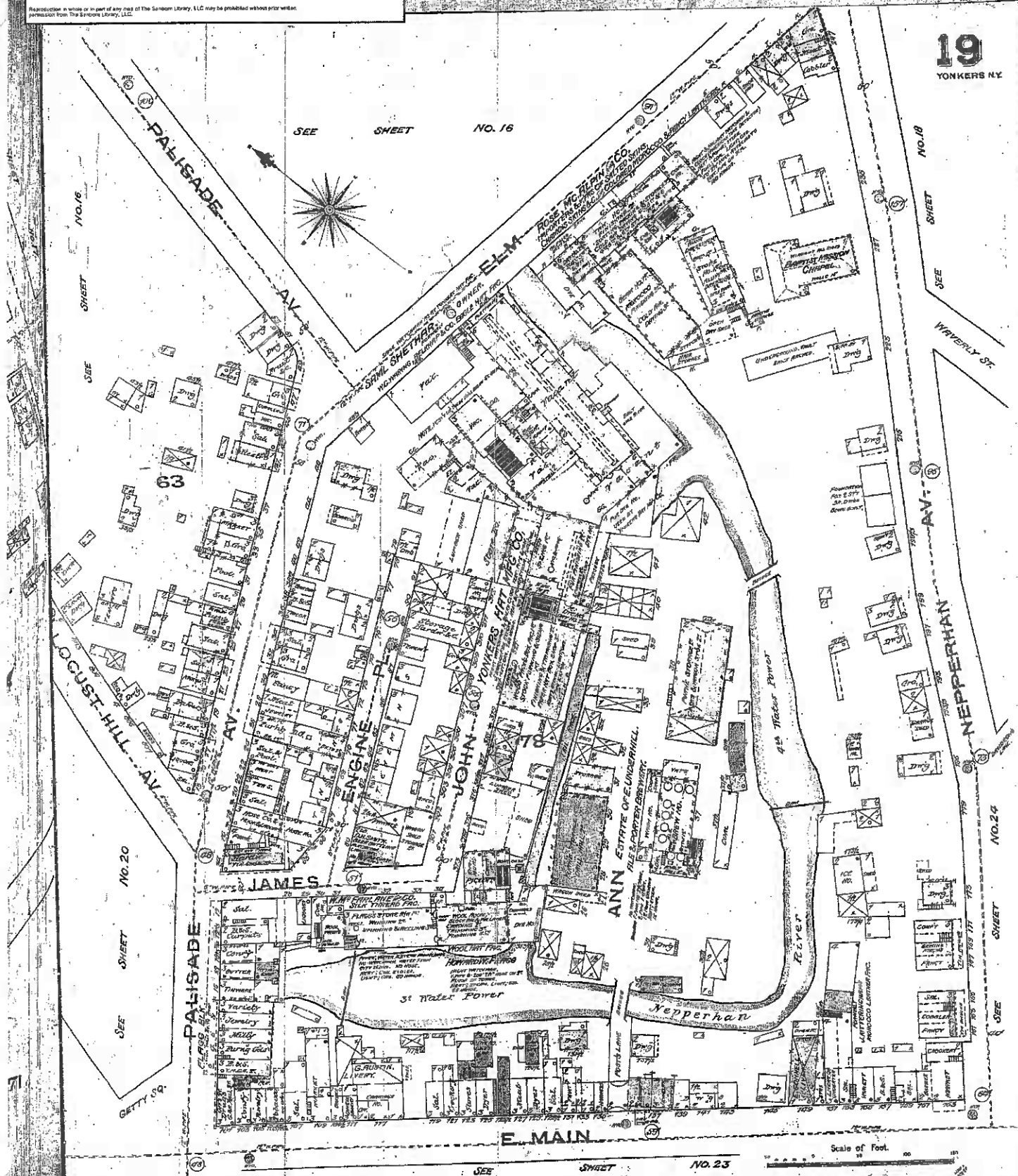
The Sanborn Library, LLC

Copyright © 1988 The Sanborn Library, LLC

AMS
EDR Research Associates

Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC.

19
YONKERS N.Y.





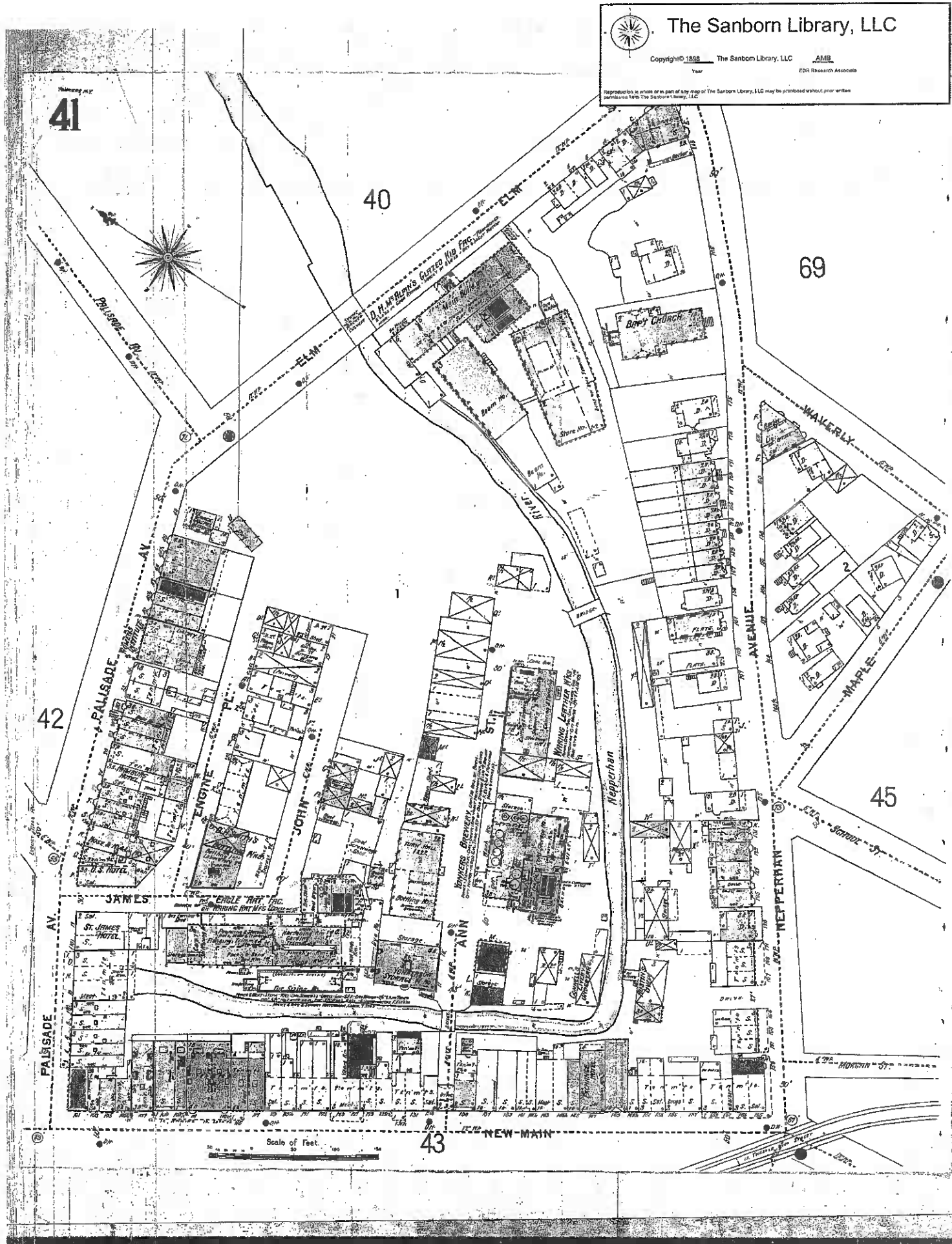
The Sanborn Library, LLC

Copyright © 1898 The Sanborn Library, LLC

AMS

EDR Research Associates

Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC





YONKERS N.Y.

19

(41)

THE WINDING RIVER CO. LUMBER FACTORY

THIS FACTORY, CONSTRUCTED IN 1907, IS A LARGE, TWO-STORY BUILDING, WITH A GABLE ROOF, AND IS EQUIPPED WITH A SAWMILL, AND A LUMBER DRYING KILN. IT IS LOCATED ON THE WINDING RIVER, AND IS ONE OF THE LARGEST LUMBER FACTORIES IN THE CITY.

THE WINDING RIVER CO. LUMBER FACTORY

THIS FACTORY, CONSTRUCTED IN 1907, IS A LARGE, TWO-STORY BUILDING, WITH A GABLE ROOF, AND IS EQUIPPED WITH A SAWMILL, AND A LUMBER DRYING KILN. IT IS LOCATED ON THE WINDING RIVER, AND IS ONE OF THE LARGEST LUMBER FACTORIES IN THE CITY.

ETHAN PLUGS ROAD

THIS ROAD, CONSTRUCTED IN 1907, IS A SMALL, ONE-STORY BUILDING, WITH A GABLE ROOF, AND IS EQUIPPED WITH A SAWMILL, AND A LUMBER DRYING KILN. IT IS LOCATED ON THE WINDING RIVER, AND IS ONE OF THE LARGEST LUMBER FACTORIES IN THE CITY.

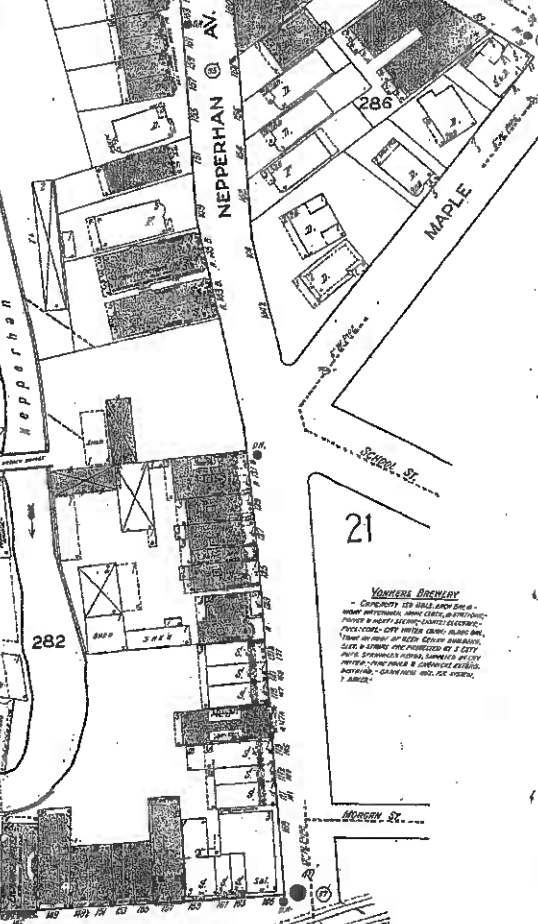
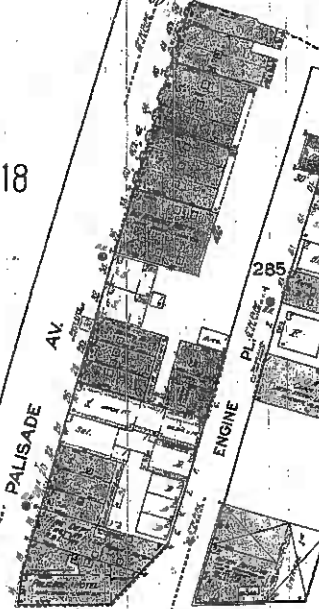
29

22

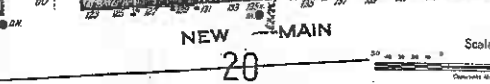
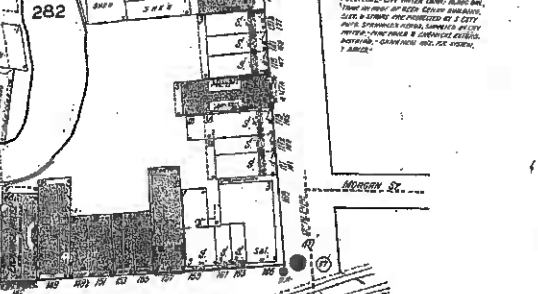
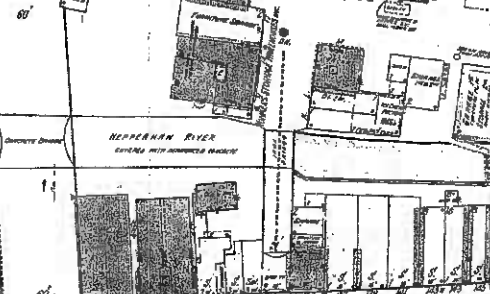
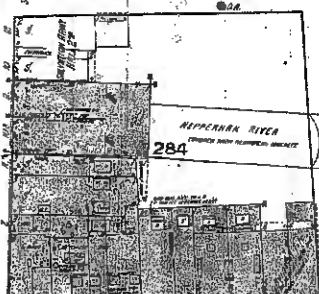
18

21

20



YONKERS BREWERY
CONCERNING ITS BUILDING AND SITE -
THE BREWERY, CONSTRUCTED IN 1907, IS A LARGE, TWO-STORY BUILDING, WITH A GABLE ROOF, AND IS EQUIPPED WITH A BREWERY, AND A LUMBER DRYING KILN. IT IS LOCATED ON THE WINDING RIVER, AND IS ONE OF THE LARGEST BREWERIES IN THE CITY.



NEW MAIN

Scale of Feet.





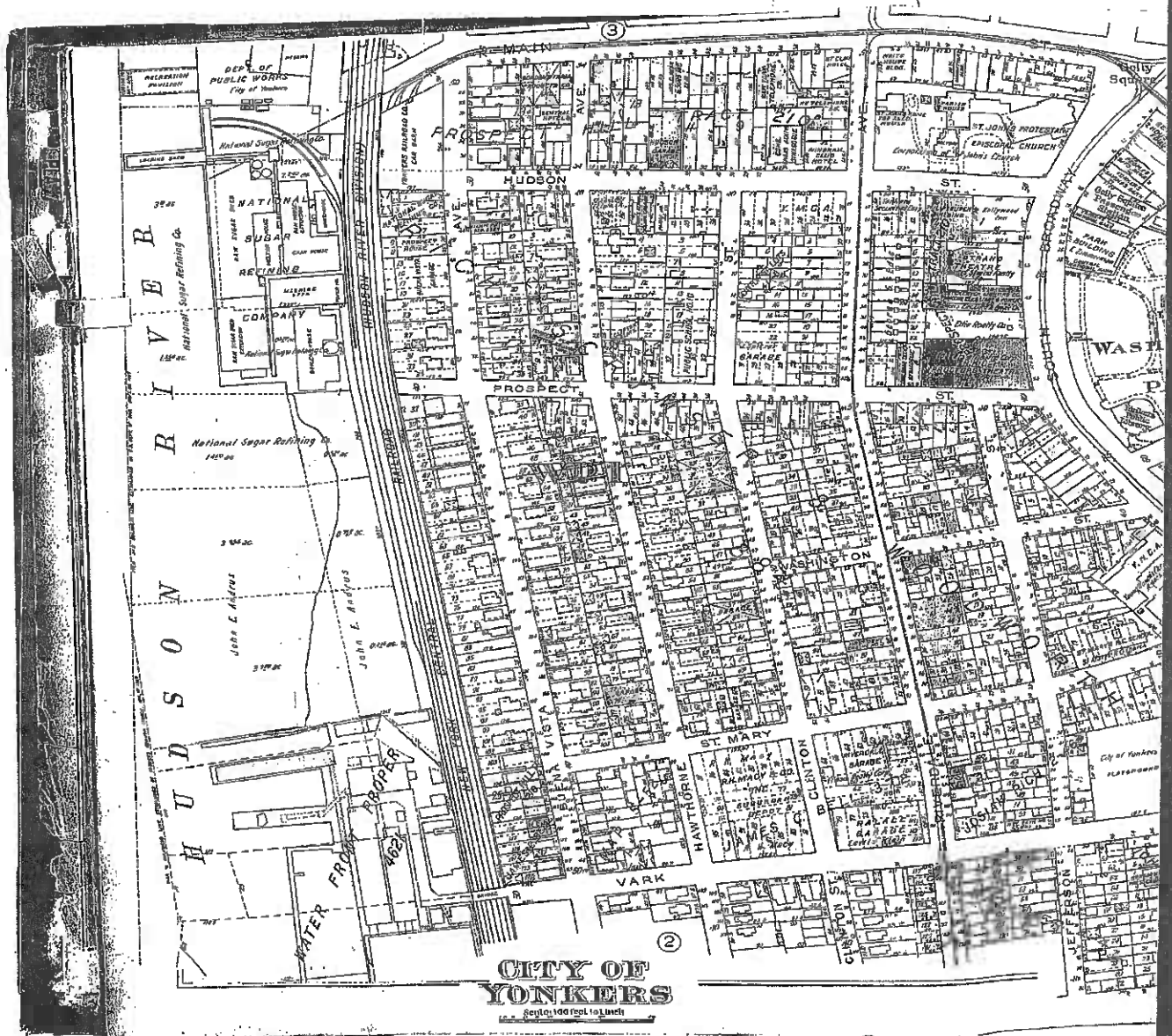
The Sanborn Library, LLC

Copyright © 1942 The Sanborn Library, LLC

AMB

Sanborn Research Association

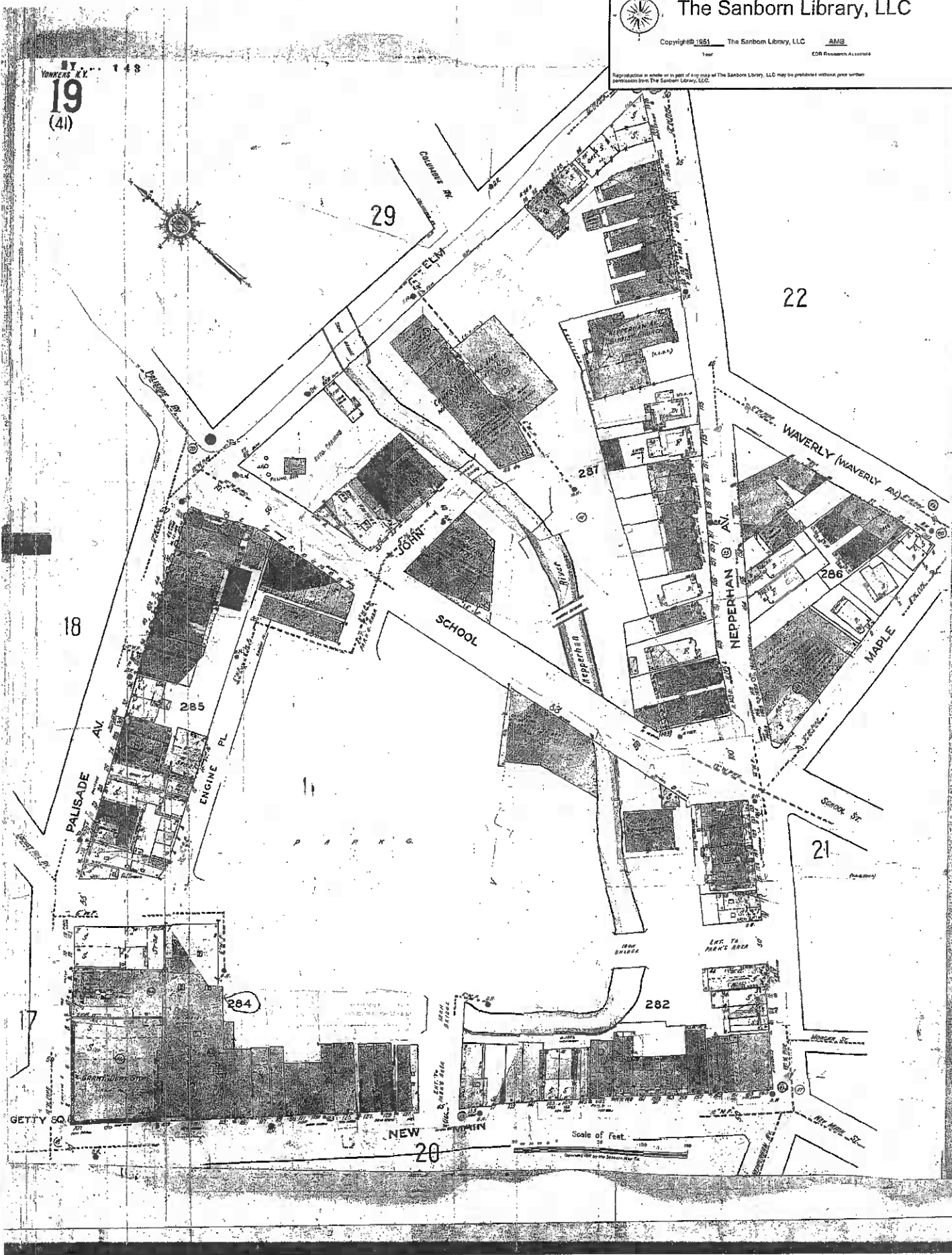
Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC.



The Sanborn Library, LLC

Copyright © 1942 The Sanborn Library, LLC
 Year: 1942
 EDR Research Associates

Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC.



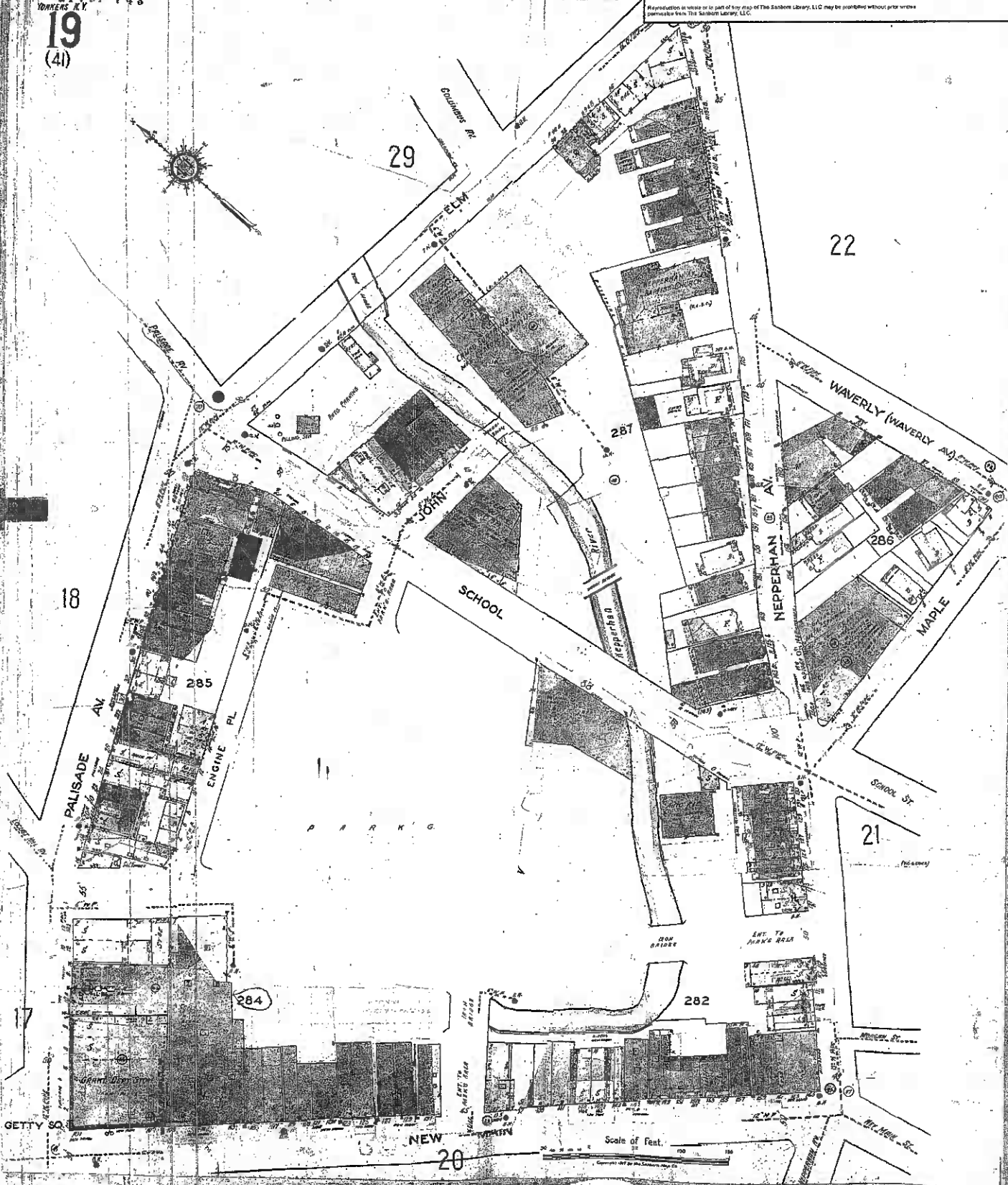


The Sanborn Library, LLC

Copyright 1951 The Sanborn Library, LLC
AMB
CDS Research Associates

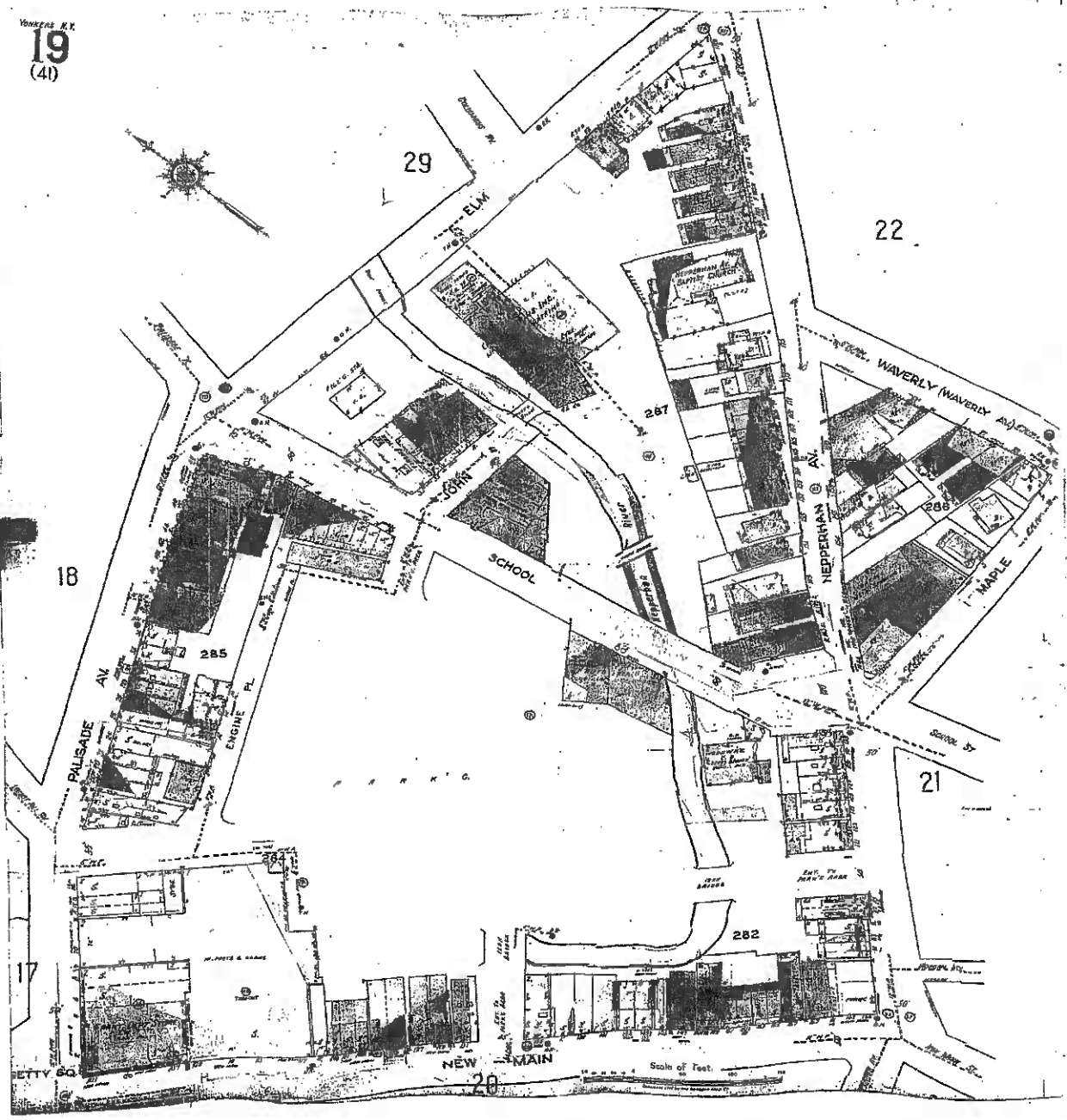
Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC.

BY
YORKERS N.Y.
19
(41)





YONGES R.R.
19
(41)



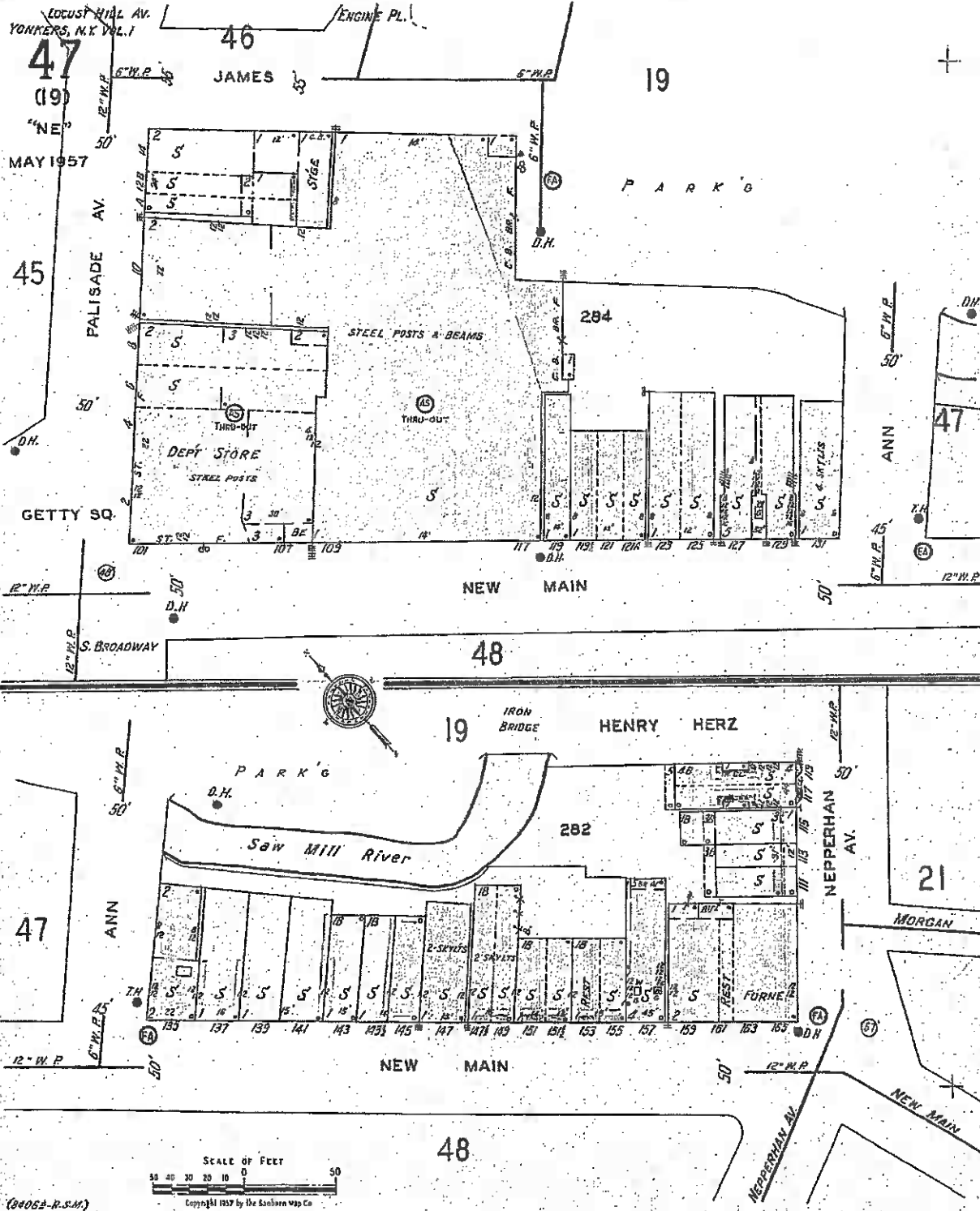
18

29

22

21

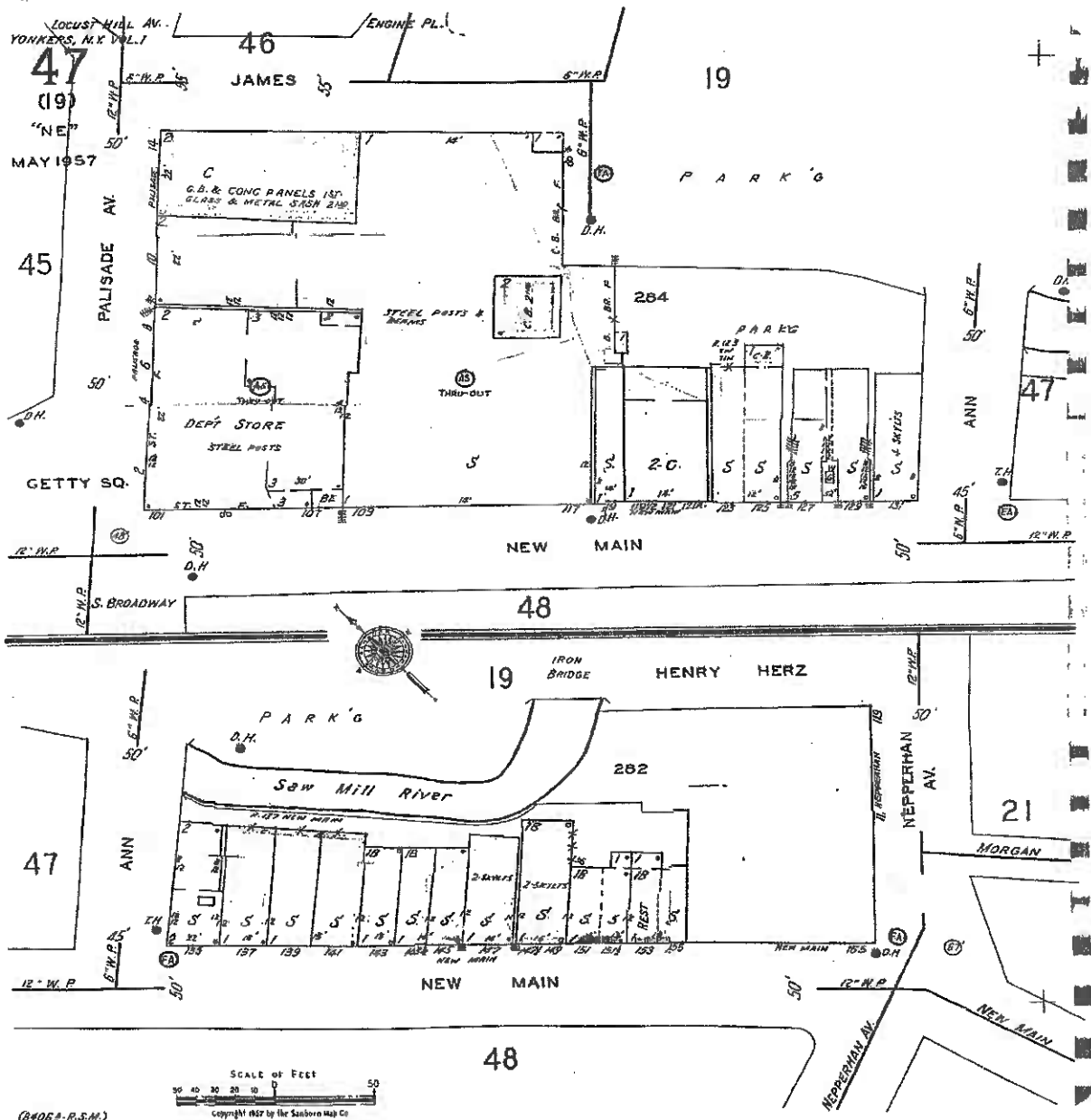
20



The Sanborn Library, LLC

Copyright 1957 The Sanborn Library, LLC
Year
EDR Research Associates

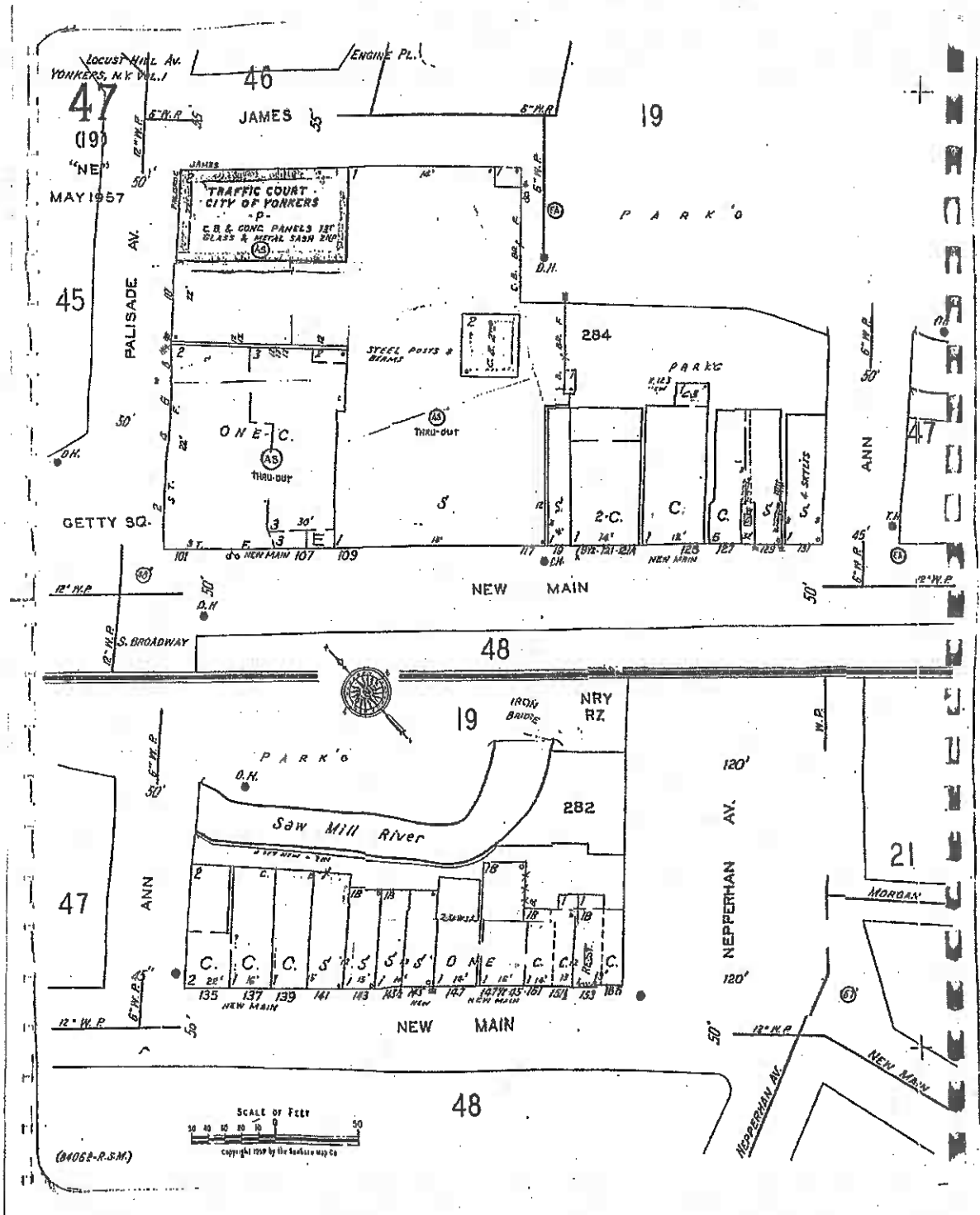
Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC.



The Sanborn Library, LLC

Copyright© 1973 The Sanborn Library, LLC
Year
AMB
EOR Research Associate

Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC.



©1991 Sanborn Co., EDR Sanborn, Inc.



The Sanborn Library, LLC

Copyright© 1991 The Sanborn Library, LLC
Year
EDR Research Associates

Reproduction in whole or in part of any map of The Sanborn Library, LLC may be prohibited without prior written permission from The Sanborn Library, LLC

Appendix C
Applicable SCGs

Appendix C

Applicable SCGs

Table of Contents

1.0	SCG'S for site characterization and remedial investigation	2
2.0	SCGs for remedy selection	3
3.0	SCGS for underground storage tank closure	4
4.0	SCGs for remedial action.....	5
5.0	SCGs for site management.....	7

1.0 SCG'S FOR SITE CHARACTERIZATION AND REMEDIAL INVESTIGATION

The following standards and criteria typically will apply to Site Characterizations and Remedial Investigations conducted in New York State:

- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes
- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 182 - Endangered & Threatened Species of Fish & Wildlife
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands Maps and Classification
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 257 - Air Quality Standards
- 10 NYCRR Part 5 of the State Sanitary Code - Drinking Water Supplies (May 1998)
- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
-

The following guidance typically applies to Site Characterizations and Remedial Investigations conducted in New York State:

- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (October 1994)
- Technical Guidance for Screening Contaminated Sediments (January 1999)

- Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife (July 1987)
- Wildlife Toxicity Assessment for Cadmium in Soils (May 1999)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- The 10 ppt Health Advisory Guideline for 2,3,7,8-TCDD in Sportfish Flesh
- The 1 ppm Health Advisory Guideline for Cadmium in Sportfish Flesh
- Criteria for the Development of Health Advisories for Sportfish Consumption
- NYSDOH Indoor Air Sampling & Analysis Guidance (August 8, 2001 or subsequent update)
- NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (draft October 2004 or subsequent final draft)
- DER Interim Strategy for Groundwater Remediation at Contaminated Sites in New York State

2.0 SCGS FOR REMEDY SELECTION

The following standards and criteria typically apply to the remedy selection process conducted in New York State:

- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources

The following guidance typically applies to the remedy selection process conducted in New York State:

- TAGM 4044 - Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills (March 1992)
- TAGM 4051 - Early Design Strategy (August 1993)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)

- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Freshwater Wetlands Regulations - Guidelines on Compensatory Mitigation (October 1993)
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- Technical Guidance for Screening Contaminated Sediments (January 1999)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.047FS Presumptive Remedies: Policy and Procedures (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.048FS Presumptive Remedies:
- Site Characterization and Technology Selection for CERCLA sites with Volatile Organic Compounds in Soils (September 1993)
- USEPA Office of Solid Waste and Emergency Response Directive 9355.049FS Presumptive Remedy for CERCLA Municipal Landfills (September 1993)

3.0 SCGS FOR UNDERGROUND STORAGE TANK CLOSURE

The following standards and criteria typically apply to UST closures conducted in New York State:

- 6 NYCRR Part 612 - Registration of Petroleum Storage Facilities (February 1992)
- 6 NYCRR Part 613 - Handling and Storage of Petroleum (February 1992)
- 6 NYCRR Part 614 - Standards for New and Substantially Modified Petroleum Storage Tanks (February 1992)
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Subpart 374-2 - Standards for the Management of Used Oil (November 1998)
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 40 CFR Part 280 - Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks

The following guidance typically applies to UST closures conducted in New York State:

- STARS #1 - Petroleum-Contaminated Soil Guidance Policy

- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- SPOTS #14 - Site Assessments at Bulk Storage Facilities (August 1994)
- Spill Response Guidance Manual
- Permanent Closure of Petroleum Storage Tanks (July 1988)
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

4.0 SCGS FOR REMEDIAL ACTION

The following standards and criteria typically apply to Remedial Actions conducted in New York State:

- 29 CFR Part 1910.120 - Hazardous Waste Operations and Emergency Response
- 40 CFR Part 144 - Underground Injection Control Program
- 10 NYCRR Part 67 – Lead
- 12 NYCRR Part 56 - Industrial Code Rule 56 (Asbestos)
- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures
- 6 NYCRR Part 361 - Siting of Industrial Hazardous Waste Facilities
- 6 NYCRR Part 371 - Identification and Listing of Hazardous Wastes (November 1998)
- 6 NYCRR Part 372 - Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities (November 1998)
- 6 NYCRR Subpart 373-4 - Facility Standards for the Collection of Household Hazardous Waste and Hazardous Waste from Conditionally Exempt Small Quantity Generators (November 1998)
- 6 NYCRR Subpart 374-1 - Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities (November 1998)
- 6 NYCRR Subpart 374-3 - Standards for Universal Waste (November 1998)

- 6 NYCRR Part 375 - Inactive Hazardous Waste Disposal Sites (as amended January 1998)
- 6 NYCRR Part 376 - Land Disposal Restrictions
- 19 NYCRR Part 600 - Waterfront Revitalization and Coastal Resources
- 6 NYCRR Part 608 - Use and Protection of Waters
- 6 NYCRR Part 661 - Tidal Wetlands - Land Use Regulations
- 6 NYCRR Part 663 - Freshwater Wetlands - Permit Requirements
- 6 NYCRR Parts 700-706 - Water Quality Standards (June 1998)
- 6 NYCRR Part 750 through 758 - Implementation of NPDES Program in NYS ("SPDES Regulations")
- Technical Guidance for Screening Contaminated Sediments (January 1999)

The following guidance typically applies to Remedial Actions conducted in New York State:

- TAGM 4013 - Emergency Hazardous Waste Drum Removal/ Surficial Cleanup Procedures (March 1996)
- TAGM 4046 - Determination of Soil Cleanup Objectives and Cleanup Levels (January 1994)
- TAGM 4059 - Making Changes To Selected Remedies (May 1998)
- STARS #1 - Petroleum-Contaminated Soil Guidance Policy
- STARS #2 - Biocell and Biopile Designs for Small-Scale Petroleum-Contaminated Soil Projects
- TAGM 3028 - "Contained In" Criteria for Environmental Media: Soil Action Levels (August 1997)
- Citizen Participation in New York's Hazardous Waste Site Remediation Program: A Guidebook (June 1998)
- TOGS 1.1.1 - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations
- TOGS 1.3.8 - New Discharges to Publicly Owned Treatment Works
- TOGS 2.1.2 - Underground Injection/Recirculation (UIR) at Groundwater Remediation Sites
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants
- State Coastal Management Policies

- OSWER Directive 9200.4-17 - Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (November 1997)
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

5.0 SCGS FOR SITE MANAGEMENT

The following standards and criteria typically apply to Site Management activities conducted in New York State:

- 6 NYCRR Part 175 - Special Licenses and Permits--Definitions and Uniform Procedures

The following guidance typically applies to Site Management activities conducted in New York State:

- Groundwater Monitoring Well Decommissioning Procedures (May 1995)
- The activity is a component of a program selected by a process complying with the public participation requirements of section 1.10, to the extent applicable.
- NYSDOH Environmental Health Manual CSFP-530 - "Individual Water Supplies - Activated Carbon Treatment Systems"

Appendix B

NYSDEC Significant Threat Determination

Appendix B to be included

APPENDIX A

Well Logs

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-2
LOCATION		See Figure 1		APPROX. ELEV.	54.21	DATE 8/17/2007	

DEPTH FT.	SAMPLES	* RE SAMP LING ANCE	P I D R E A D .	DESCRIPTION
0				6" Asphalt
				Vacuum excavated to 5'
				FILL: Brown coarse to fine SAND, little Gravel, little Silt with Brick
5				
10		10	0	
			Hg 0.00	Brown medium to fine SAND, some Silt, little Gravel with Cobbles and Boulders
			0	
			Hg 0.00	
15				
20				
25				Boring Complete @ 20 Feet
				Monitoring Well Installed, see monitoring well detail sheet for general schematic
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 12' DATE: 8/17/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

PROJECT NO.		N-7190		INSPECTED BY: GP		BORING NO.		MW-3	
LOCATION		See Figure 1		APPROX. ELEV. 58.69		DATE 8/20/2007			

DEPTH F T .	S A M P L E S	* S A M P L I N G C E	P I D R E A D	DESCRIPTION
0				6" Topsoil, organics Vacuum excavated to 5'
5	■	75/5"	1.5 Hg 0.022	FILL: Brown coarse to fine SAND, little Gravel, little Silt with Brick and Metal ----- FILL: Brown medium to fine SAND, some Gravel, little Silt with Brick and Boulders -----
10	■	45	1.2 Hg 0.020	FILL: Concrete pieces ----- Brown medium to fine SAND, little Gravel, little Silt with Cobbles -----
15				
20				Boring Complete @ 18' Monitoring Well installed, see Monitoring Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 12' DATE: 8/20/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

PROJECT NO.

N-7190

INSPECTED BY: GP

BORING NO.

MW-4

LOCATION

See Figure 1

APPROX. ELEV. 62.95

DATE 8/27/2007

DESCRIPTION

DEPTH FT.	SAMPLES	* RESAMPLING DISTANCE	PID READ	DESCRIPTION
0				6" Topsoil, Organics
				Vacuum excavated to 5'
				FILL: Brown coarse to fine SAND, little Gravel, little Silt with Brick
5				
10		20/6" 55/1" 75/3"	1.3 Hg 0.021	FILL: Brown medium to fine SAND, little Gravel, little Silt with Concrete and Boulders
				Gray medium to fine SAND, some Silt, little gravel with Cobbles
15				
20				Boring Complete @ 17.5 Feet
				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL
140 LB. HAMMER 30 INCH DROP * Blows/Ft.

DEPTH TO WATER: 11'

DATE:

8/27/2007

REMARKS: AT COMPLETION OF BORING

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-5
LOCATION		See Figure 1		APPROX. ELEV.	68.74	DATE 8/27/2007	

DEPTH F T	S A M P L E S	* S A M P L I N G	R E S I S T A N C E	P I D R E A D	DESCRIPTION
0					6" Topsoil, Organics Vacuum excavated to 5' FILL: Brown medium to fine SAND, little Gravel, little Silt with Brick
5					
10			43	2.2 Hg 0.00	FILL: Brown medium to fine SAND, some Silt, little Gravel with Brick and Boulders
			30	2.1 Hg 0.00	FILL: Gray medium to fine SAND, little gravel, little Silt with Brick
15					Gray-Brown medium to fine SAND, little gravel, little Silt with Cobbles
20					
25					
30					Boring Complete At 29 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
35					
40					

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 19' DATE: 8/27/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

PROJECT NO. N-7190INSPECTED BY: GP

BORING NO.

MW-6

LOCATION See Figure 1APPROX. ELEV. 72.68DATE 8/13/2007

DEPTH FEET	SAMPLES	* RESISTANCE PLI	PID READ	DESCRIPTION
0				4" Asphalt and 6" Base Vacuum excavated to 5' FILL: Brown medium to fine SAND, little Gravel, little Silt
5				Brown medium to fine SAND, little Gravel, little Silt with Cobbles ...frequent Cobbles and Boulders
10				
15				
20				
25				
30				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
35				Possible Bedrock At 35 Feet Boring Complete At 35 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
40				
SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.				DEPTH TO WATER: <u>21'</u> DATE: <u>8/13/2007</u> REMARKS: <u>AT COMPLETION OF BORING</u>

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO. N-7190 INSPECTED BY: GP BORING NO. MW-8
LOCATION See Figure 1 APPROX. ELEV. 74.69 DATE 8/13/2007

DEPTH FT.	SAMPLES	* R S S A M P L I N G C E	P I D R E A D	DESCRIPTION
0				4" Asphalt and 4" Base Vacuum excavated to 5'
5				FILL: Gray-Brown coarse to fine SAND, little Gravel, little Silt
10				Cobble or Boulder
15		21	0	FILL: Gray-Brown medium to fine SAND, little Gravel, little Silt w/ Brick
		19	Hg 0.0 0 Hg 0.0	
20				
25				Boring Complete At 25 Feet
30				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
35				
40				
SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.				DEPTH TO WATER: <u>21'</u> DATE: <u>8/13/2007</u> REMARKS: AT COMPLETION OF BORING

PROJECT NO.		N-7190		INSPECTED BY: GP		BORING NO.		MW-9	
LOCATION		See Figure 1		APPROX. ELEV. 64.36		DATE 8/29/2007			

DEPTH FT.	SAMPLES	* RE SAMP LING IN CH	P I D R E A D	DESCRIPTION
0			1.2 Hg 0.0	Vacuum excavated to 5'
5			1.0 Hg 0.0	FILL: Dark/Gray-Brown medium to fine SAND and Silt, trace Gravel w/ Brick Same with white Clay and fine Sand
10				Boring Complete At 10 Feet
15				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 3' DATE: 8/13/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO. <u>N-7190</u>		INSPECTED BY: <u>GP</u>		BORING NO. <u>MW-10</u>
LOCATION <u>See Figure 1</u>		APPROX. ELEV. <u>64.97</u>		DATE <u>8/29/2007</u>

DEPTH FT.	SAMPLES	* RE SAMPLING DISTANCE	P I D READ	DESCRIPTION
0 5 10 15 20 25 30 35 40			1.8/1.4 Hg 0.0	6" Concrete Vacuum excavated to 5' FILL: Dark/Gray-Brown medium to fine SAND and Silt, trace Gravel w/ Brick
				Boring Complete At 10 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: <u>8'</u> DATE: <u>8/29/2007</u> REMARKS: <u>AT COMPLETION OF BORING</u>
--	---

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.

N-7190

INSPECTED BY: GP

BORING NO.

MW-11

LOCATION

See Figure 1

APPROX. ELEV. 64.79

DATE 8/29/2007

DEPTH FEET	SAMPLES	* RESAMPLING SEQUENCE	PID READ	DESCRIPTION
0			0.8 Hg 0.0	Vacuum excavated to 5' FILL: Dark/Gray-Brown medium to fine SAND and Silt, trace Gravel w/ Brick
5			0.7 Hg 0.0	Dark/Gray-Greenish clayey SILT and fine Sand, trace Gravel
10				Boring Complete At 10 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
15				
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL
140 LB. HAMMER 30 INCH DROP * Blows/Ft.

DEPTH TO WATER: 1' DATE: 8/29/2007
REMARKS: AT COMPLETION OF BORING

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO. N-7190INSPECTED BY: GP

BORING NO.

MW-14LOCATION See Figure 1APPROX. ELEV. 111.85DATE 9/5/2007

DEPTH FT.	SAMPLES	* RE SAMPLING DISTANCE	PID READ	DESCRIPTION
0				4" Brick Pavers
				Vacuum excavated to 5'
				FILL: Brown coarse to fine SAND, little Gravel, trace Silt with Brick
5				
10				
15				
20	37 50/3"	0.0 Hg 0.007 0.0 Hg 0.014		Brown coarse to fine SAND, little Gravel, little Silt
25				
30				Boring Complete At 28 Feet
35				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL
140 LB. HAMMER 30 INCH DROP * Blows/Ft.DEPTH TO WATER: 20' DATE: 9/5/2007
REMARKS: AT COMPLETION OF BORING

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-15
LOCATION		See Figure 1		APPROX. ELEV.	73.74	DATE	9/4/2007

DEPTH FT	SAMPLES	* RESSAMPLING STANDARD	P I D READ	DESCRIPTION
0			2.3	4" Concrete and 4" Stone Base
			Hg 0.004	Vacuum excavated to 5'
			2.3	
			Hg 0.007	FILL: Dark-Brown coarse to fine SAND, little Gravel, little Silt with Brick and Concrete
5				
10				
15				
20		12	0.2	FILL: Dark-Gray medium to fine SAND, little Gravel, little Silt with Concrete
			Hg 0.003	FILL: Concrete, Sand, Silt, Gravel
25				
30				Light/Gray-Brown medium to fine SAND, little Gravel, trace Silt
35				
				Rock at 38 feet
40				Boring Complete At 40 Feet Monitoring Well installed, see Monitoring Well Detail sheet

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 18' DATE: 9/4/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.

N-7190

INSPECTED BY:

GP

BORING NO.

MW-16

LOCATION

See Figure 1

APPROX. ELEV.

61.92

DATE 8/15/2007

DEPTH FT	SAMPLES	* S A M P L I N G C E	R E S I D U E	P I D R E A D	DESCRIPTION
0					6" Asphalt
					Vacuum excavated to 5'
					FILL: Gray-Brown medium to fine SAND, little Gravel, little Silt w/ Cobbles and Brick
5					
10		18		0 Hg 0.007	Gray-brown medium to fine SAND, little Gravel, little Silt with Cobbles
		19		0 Hg 0.008	
15					Boring Complete At 15 Feet
20					Monitoring Well installed, see Monitoring Well Detail sheet for schematic
25					
30					
35					
40					

SAMPLER: 2-INCH O.D. SPLIT BARREL
140 LB. HAMMER 30 INCH DROP * Blows/Ft.

DEPTH TO WATER: 7.5 DATE: 8/15/2007
REMARKS: AT COMPLETION OF BORING

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY: GP		BORING NO.		MW-17	
LOCATION		See Figure 1		APPROX. ELEV. 64.28		DATE 8/29/2007			

DEPTH FT.	SAMPLES	* RESISTANCE SAMPLING	PID READ	DESCRIPTION
0		18	0.7	3" Asphalt
				Vacuum excavated to 5'
5			0.7	FILL: Dark/Gray-Brown medium to fine SAND, little Gravel, little Silt w/ Brick Fill: Same with gray clayey Silt
10				Refusal at 8 Feet Boring Complete At 8 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
15				
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 1' DATE: 8/29/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-18
LOCATION		See Figure 1		APPROX. ELEV.	61.91	DATE	8/15/2007

DEPTH F T .	S A M P L E S	* R S E S I S T A N C E	P I D R E A D .	DESCRIPTION
0				6" Asphalt Vacuum excavated to 5' FILL: Gray fine Sand and Silt, trace Gravel with Cobbles and Boulders
5				
10		18	0 Hg 0.009	Dark/Gray-Brown fine SAND and Silt, trace Gravel, little Silt w/ frequent Cobbles and Boulders
15				Boring Complete At 15 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 7.5' DATE: 8/15/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-19
LOCATION		See Figure 1		APPROX. ELEV.	62.85	DATE 8/15/2007	

DEPTH FT.	SAMPLES	* RE SAMP LING IN G C E	P I D R E A D	DESCRIPTION
0				6" Asphalt
				Vacuum excavated to 5'
				FILL: Dark/Gray-Brown fine SAND, little Gravel, little Silt w/ Brick
5				
		12	0 Hg 0.0	Dark/Gray fine SAND and Silt, trace Gravel, trace Organic
10		38	0 Hg 0.0	Dark/Gray fine SAND, some Silt, trace Gravel
				Same with Cobbles and Boulders
15				Boring Complete At 14 Feet
				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 7.5' DATE: 8/15/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

PROJECT NO.		N-7190		INSPECTED BY: GP		BORING NO.		MW-20	
LOCATION		See Figure 1		APPROX. ELEV. 61.24		DATE 8/14/2007			

DEPTH F T	S A M P L E S	* S A M P L I N G	R E S I S T A N C E	P I D R E A D	DESCRIPTION
0					4" Asphalt
					Vacuum excavated to 5'
					FILL: Brown SILT, some coarse to fine Sand with Cobbles
5					
					...with Boulders
10					
					Black SILT, some coarse to fine SAND (Odor)
					(Sample Collected)
15					
					Boring Complete At 15 Feet
					Monitoring Well installed, see Monitoring Well Detail sheet for schematic
20					
25					
30					
35					
40					

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 10' DATE: 8/14/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY: GP		BORING NO.		MW-21	
LOCATION		See Figure 1		APPROX. ELEV. 61.5		DATE 8/14/2007			

DEPTH F T	S A M P L E S	* S A M P L I N G	R E S I S T A N C E	P I D R E A D	DESCRIPTION
0					4" Asphalt
					Vacuum excavated to 5'
					FILL: Brown Sand, Silt, Gravel with Cobbles
5					
10					Tan/brown SAND and Gravel, trace Silt with Boulders and Cobbles
15					Refusal on Boulder/Rock at 14.5 Feet
					Boring Complete At 14.5 Feet
					Monitoring Well installed, see Monitoring Well Detail sheet for schematic
20					
25					
30					
35					
40					

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 10' DATE: 8/14/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-22
LOCATION		See Figure 1		APPROX. ELEV.	60.00	DATE 8/16/2007	

DEPTH FT.	SAMPLES	* RESSAMPLING DISTANCE	PID READ	DESCRIPTION
0				6" Asphalt
				Vacuum excavated to 5'
				FILL: Brown Sand, Gravel, Silt with Cobbles, Brick and Concrete
5				
10		29	0 Hg 0.012	FILL: Brown medium to fine SAND, little Gravel, little Silt with Brick and Concrete
				Brown medium to fine SAND, little Gravel, little Silt with frequent Cobbles and Boulders
15				
				Brown medium to fine SAND, little Gravel, little Silt
20				Boring Complete At 19 Feet
				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 10' DATE: 8/16/2007 REMARKS: AT COMPLETION OF BORING
--	--

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-23
LOCATION		See Figure 1		APPROX. ELEV.	62.95	DATE	8/14/2007

DEPTH FT.	SAMPLES	* RE SAMP LING IN CE	P I D R E A D	DESCRIPTION
0				4" Asphalt and 4" Base Vacuum excavated to 5' FILL: Brown Silt, Sand, Gravel with Cobbles
5				
10				Brown coarse to fine SAND, little Gravel, little Silt with Cobbles
15				Dark brown medium to fine SAND, little Silt, little Gravel
20				Boring Complete At 20 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 7' DATE: 8/14/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO. <u>N-7190</u>		INSPECTED BY: <u>GP</u>		BORING NO. <u>MW-24</u>
LOCATION <u>See Figure 1</u>		APPROX. ELEV. <u>58.22</u>		DATE <u>8/16/2007</u>

DEPTH F T	S A M P L E S	* R S I M P L I N G C E	P I D R E A D	DESCRIPTION
0				6" Asphalt Vacuum excavated to 5' FILL: Brown fine SAND, little Gravel, little Silt w/ Brick
5				
10		29	0 Hg 0.004	Brown coarse to fine SAND, little Gravel, little Silt w/ Cobbles and Boulders
15				Boulders
20				Brown coarse to fine SAND, little Gravel, little Silt w/ frequent Cobbles and Boulders
25				Boring Complete At 20 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: <u>13'</u> DATE: <u>8/16/2007</u> REMARKS: <u>AT COMPLETION OF BORING</u>
--	--

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.

N-7190

INSPECTED BY:

GP

BORING NO.

MW-25

LOCATION

See Figure 1

APPROX. ELEV.

56.14

DATE 8/14/2007

DEPTH F T	S A M P L E S	* R E S I S T A N C E	P I D R E A D	DESCRIPTION
0				4" Asphalt
				Vacuum excavated to 5'
				FILL: Sand/Gravel/Silt with Brick and Cobbles
5				
10				Brown Sandy SILT with frequent Cobbles and Boulders
15				Boring Complete At 15 Feet
				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL
140 LB. HAMMER 30 INCH DROP * Blows/Ft.

DEPTH TO WATER: 7' DATE: 8/14/2007
REMARKS: AT COMPLETION OF BORING

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-28
LOCATION		See Figure 1		APPROX. ELEV.	58.57	DATE	8/22/2007

DEPTH F T	S A M P L E S	* R S A M P L I N G C E	P I D R E A D	DESCRIPTION
0				6" Asphalt Vacuum excavated to 5' FILL: Gray fine SAND, little Gravel, little Silt w/ Brick
5		50/5"	1.4 Hg 0.003	FILL: Dark/Gray-Brown medium to fine SAND and Silt, little Gravel w/ Cobbles, Boulders and Coal
10		29	1.4 Hg 0.003	Brown coarse to fine SAND and Silt, little Gravel w/ frequent Cobbles and Boulders
15				Boulders
20				Brown coarse to fine SAND, little Gravel, little Silt w/ Cobbles and Boulders
25				Boring Complete At 17 Feet
30				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 8' DATE: 8/22/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

PROJECT NO.		N-7190		INSPECTED BY: GP		BORING NO.		MW-29	
LOCATION		See Figure 1		APPROX. ELEV. 56.72		DATE 8/22/2007			

DEPTH FT.	SAMPLES	* RE SAMPLING DISTANCE	P I D R E A D	DESCRIPTION
0				6" Asphalt
				Vacuum excavated to 5'
				FILL: Brown medium to fine SAND, some Silt, little Gravel, w/ Brick
5				
		16	1.3 Hg 0.00	FILL: Brown medium to fine SAND and Silt, little Gravel w/ Brick
		20	1.8 Hg 0.00	Brown medium to fine SAND and Silt, little Gravel w/ Cobbles and Boulders
10				
15				
20				Boring Complete At 18 Feet
				Monitoring Well installed, see Monitoring Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 8' DATE: 8/22/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	MW-30
LOCATION		See Figure 1		APPROX. ELEV.	56.09	DATE	8/22/2007

DEPTH F T	S A M P L E S	* R S E S I S T A N C E	P I D R E A D	DESCRIPTION
0				6" Asphalt Vacuum excavated to 5' FILL: Brown medium to fine SAND, some Silt, little Gravel, w/ Brick
5		20	0 Hg 0.012	FILL: Brown medium to fine SAND and Silt, little Gravel w/ Brick
10		16	0 Hg 0.016	Dark gray-brown medium to fine SAND, little Gravel, little Organic clayey Silt with Cobbles ...frequent cobbles and boulders
15				
20				Boring Complete At 16 Feet Monitoring Well installed, see Monitoring Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 12' DATE: 8/22/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

PROJECT NO.		N-7190		INSPECTED BY: GP		BORING NO.		SV-1	
LOCATION		See Figure 1		APPROX. ELEV. 55.77		DATE 8/20/2007			

DEPTH FT.	SAMPLES	* RESISTANCE SAMPLING	P I D READ	DESCRIPTION
0				Topsoil
				Vacuum excavated to 5'
				FILL: Brown Sand, Gravel, Silt w/ Metal and Brick
5				
		38	2.0	FILL: Brown fine SAND, little Silt, little Gravel w/ Brick
			Hg 0.00	
		50/6"	1.9	...frequent cobbles and boulders
			Hg 0.004	
10				
				Brown medium to fine SAND, some Silt, little Gravel
15				
20				Boring Complete At 16 Feet
				Soil Vapor Well installed, see Soil Vapor Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: NE DATE: 8/20/2007 REMARKS: AT COMPLETION OF BORING
--	---

PROJECT NO. N-7190 INSPECTED BY: GP BORING NO. SV-2
LOCATION See Figure 1 APPROX. ELEV. 62.97 DATE 8/20/2007

DEPTH F T	S A M P L E S	* R E S I S T A N C E	P I D R E A D	DESCRIPTION
0				Topsoil
				Vacuum excavated to 5'
				FILL: Brown Sand, Gravel, Silt w/ Metal and Brick
5				FILL: Brown medium to fine SAND and Silt, little Gravel w/ Brick
10		15	0.7	
		35	Hg 0.0	
			1.1	
15			Hg 0.0	Brown medium to fine SAND, some Silt, little Gravel
20				Boring Complete At 19 Feet
				Soil Vapor Well installed, see Soil Vapor Well Detail sheet for schematic
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL
140 LB. HAMMER 30 INCH DROP * Blows/Ft.

DEPTH TO WATER: 10' DATE: 8/20/2007
REMARKS: AT COMPLETION OF BORING

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	SV-3
LOCATION		See Figure 1		APPROX. ELEV.	67.76	DATE 8/27/2007	

DEPTH FT.	SAMPLES	* RE SAMP LING IN G C E	P I D R E A D .	DESCRIPTION
0				Topsoil
				Vacuum excavated to 5'
				FILL: Brown fine SAND, little Gravel, little Silt w/ Brick
5				FILL: Dark/Brown-Gray medium to fine SAND, some Silt, little Gravel w/ Brick
10		50/2"	1.3 Hg 0.007	Brown medium to fine SAND, little Gravel, little Silt with Cobbles and Boulders
15				Boring Complete At 13 Feet
				Soil Vapor Well installed, see Soil Vapor Well Detail sheet for schematic
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: 13' DATE: 8/27/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	SV-8
LOCATION		See Figure 1		APPROX. ELEV.	56.5	DATE 8/16/2007	

DEPTH F T	S A M P L E S	* R S A M P L I N G C E	P I D R E A D	DESCRIPTION
0			0	6" Asphalt
			Hg 0.007	Vacuum excavated to 5'
				FILL: Dark Brown Sand, Gravel, Silt w/ Brick, cobbles
5			0	
			Hg 0.012	
10				Boring Complete At 6 Feet
				Soil Vapor Well installed, see Soil Vapor Well Detail sheet for schematic
15				
20				
25				
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: NE DATE: 8/16/2007 REMARKS: AT COMPLETION OF BORING
--	---

Fig.

SESI CONSULTING ENGINEERS P.C.

PROJECT NO.		N-7190		INSPECTED BY:	GP	BORING NO.	SV-9
LOCATION		See Figure 1		APPROX. ELEV.	74.08	DATE	9/5/2007

DEPTH F T	S A M P L E S	* R S E S A M P L I N G C E	P I D R E A D	DESCRIPTION
0				4" Concrete and 4" Stonebase Vacuum excavated to 5'
5				FILL: Dark-Brown coarse to fine SAND, little Gravel, little Silt with Brick and Concrete
10		28	0 Hg 0.004	FILL: Dark-Brown coarse to fine SAND, little Gravel, little Silt with Brick
15		35	0 Hg 0.004	
20				Boring Complete At 13.5 Feet
25				Soil Vapor Well installed, see Soil Vapor Well Detail sheet for schematic
30				
35				
40				

SAMPLER: 2-INCH O.D. SPLIT BARREL 140 LB. HAMMER 30 INCH DROP * Blows/Ft.	DEPTH TO WATER: NE DATE: 9/5/2007 REMARKS: AT COMPLETION OF BORING
--	--

Fig.

Appendix I

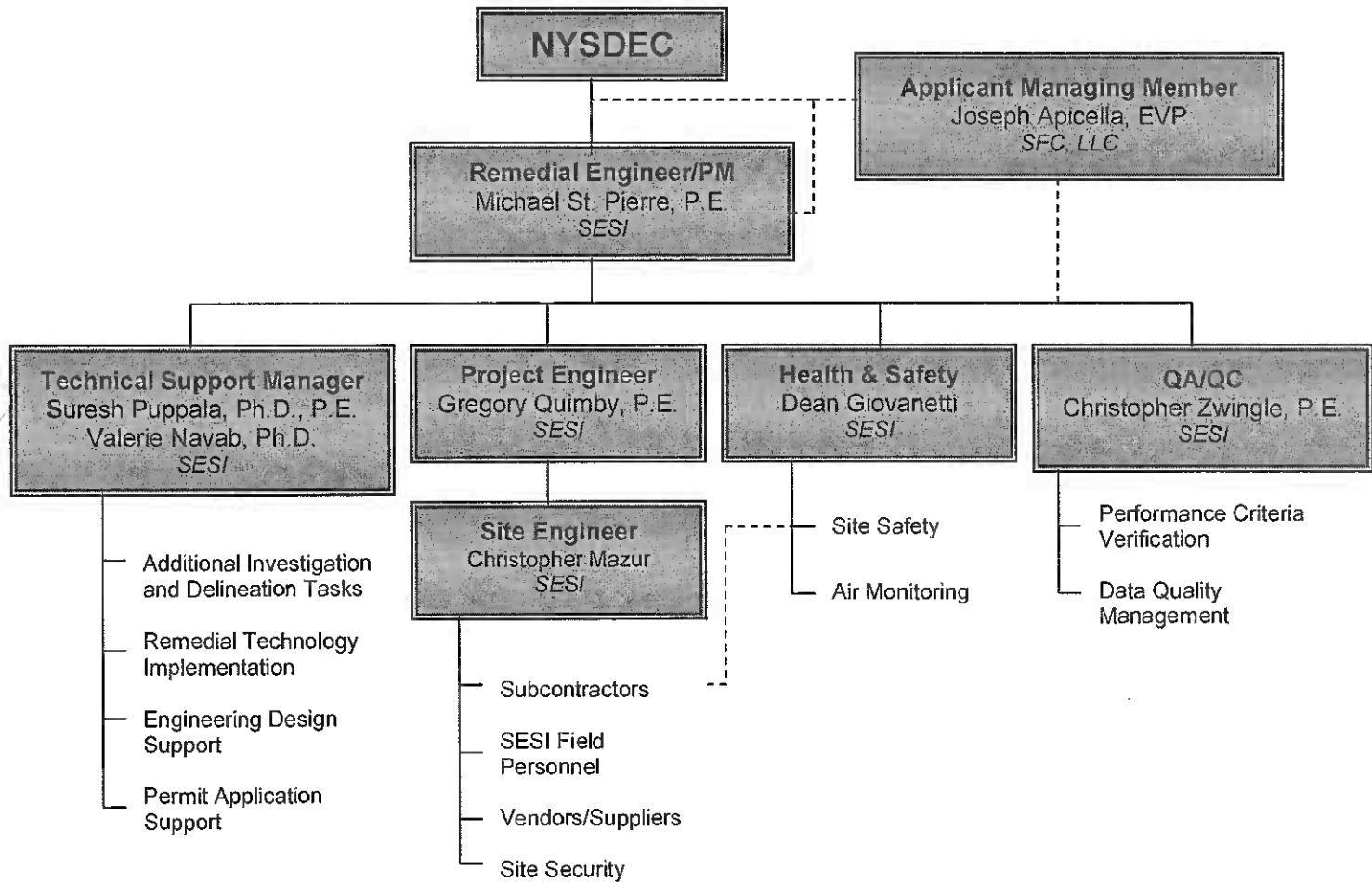
Resumes of Key Personnel

Appendix I – Resumes of Key Project Personnel

River Park Center RAWP City of Yonkers, Westchester County, New York

NYSDEC BCP No.: C360083

Project Organization Chart



MICHAEL W. ST. PIERRE, P.E.
Remedial Engineer / Project Manager

EDUCATION

B.S. Civil Engineering; New Jersey Institute of Technology, Newark, NJ
M.S. Civil Engineering; New Jersey Institute of Technology, Newark, NJ

PROFESSIONAL REGISTRATIONS

Professional Engineer - State of New Jersey
Professional Engineer - State of New York
Professional Engineer - State of Pennsylvania

SUMMARY OF EXPERIENCE

Twenty years engineering experience encompassing:

- Geotechnical Investigation/Analysis, Foundation Engineering, and Soil Improvement
- Site-Civil Engineering Design
- Environmental Remediation and Redevelopment

1987 – Present SESI Consulting Engineers, Pine Brook, NJ

Michael joined SESI on a part-time basis in 1987 and became a Principal of the firm in 2006. He has been involved in civil engineering site plan design for residential subdivisions, office buildings, shopping centers and warehouses. The design work includes grading, drainage, stream encroachment, utilities, parking areas, roadways and retaining wall designs.

Michael has been involved in designing, managing and inspecting field work for all phases of sitework and foundation construction including dynamic compaction, piles, shallow foundations, compacted fills, environmental sampling, monitoring of settlement points and surveying. He has also been involved in numerous surface and subsurface soil and ground water investigations and prepared geotechnical reports that provide recommendations for site preparation procedures, foundation design criteria and pavement design.

Michael has designed and inspected numerous dynamic compaction projects involving industrial landfills and miscellaneous uncontrolled fills. Michael's expertise is not limited to soft soils. He has been instrumental in numerous projects involving slope failures, underpinning techniques, deep compacted fills using available non-select materials, artificial inducement of settlement using surcharge preloads, and all other aspects of geotechnical engineering.

In recent years, Michael has become involved with large and small environmental engineering projects. These include Phase 1 and Phase 2 site assessments, permitting, sampling oversight and oversight of remedial activities. His work includes preparation and acceptance of Remedial Investigation Work Plans, Remedial Investigation Reports and Remedial Action Work Plans. He has been involved with several large projects in the Brownfield Clean-up Program in New York and has worked closely with the NYSDEC.

PROFESSIONAL AFFILIATIONS

Member of the American Society of Civil Engineers
Member of the National Society of Professional Engineers

CHRISTOPHER F. ZWINGLE, P.E.
QA/QC Program Manager

EDUCATION

M.S. Civil Engineering, New Jersey Institute of Technology, Newark, N.J.
B.S. Civil Engineering, New Jersey Institute of Technology, Newark, N.J.
B.A. Geology, Fairleigh Dickinson University, Madison, N.J.
Partial - M.S. Hydrogeology, Washington State University, Pullman, WA.

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Professional Engineer, New Jersey (#29177)
Professional Engineer, New York (#61541)
New Jersey Underground Storage Tank License (#0017884)

SUMMARY OF EXPERIENCE

Twenty-five years of engineering experience encompassing:

- Geotechnical Engineering
- Landfill Engineering and Contaminated Site Redevelopment
- Remediation Engineering

2005 - Present **SESI Consulting Engineers, Pine Brook, N.J.**
Re-joined SESI Consulting Engineers as a Principal.

2005 **PMK Group, Cranford, N.J.**
Technical Director for landfill and geotechnical engineering projects.

1995 – 2004 **TRC Raviv Associates, Inc., Millburn, NJ**
As the Engineering Director for TRC Raviv Associates, Millburn, NJ my responsibilities included design and management of engineering projects for the firm, personnel, and budgets. Many projects involved the investigation and remediation of contaminated and Brownfields sites where the end point was site redevelopment. Many other projects involved traditional geotechnical engineering design, including landfill engineering. Acted as the firm's account manager for ExxonMobil Corporation and oversaw the investigations and remediation of refineries and terminals.

Representative projects included:

- (1) Conducted environmental and geotechnical investigations, and designed the closure and redevelopment plan for the 70-acre Carteret Landfill. The design includes a capping system, a leachate collection system, a landfill gas recovery system, and the design of retaining walls. After closure the site will be re-developed with 30-acres of buildings.
- (2) Fast tracked the design and construction of a new landfill gas extraction system for the former Whippary Paperboard Landfill, Whippary, NJ. The landfill is bounded on one side by a townhouse complex, and on the other by a new facility for Tiffany & Co. This project was required as the original system failed. There was a safety concern with the townhouses, and Hanover Township would not approve occupancy of the new building. The system included installing 25 landfill gas collection wells, numerous monitoring wells, new conveyance piping, and all new mechanical infrastructure.

- (3) Designed capping systems for a variety of sites. Capping systems include clay soil, geosynthetic clay liners, geotextiles, soil cement, and asphalt. For the Dundee Canal, in Clifton, NJ, I designed a geotextile/soil cap over 15-feet of very soft and compressible sediments that required special anchoring systems to prevent failure during construction.
- (4) Instrumental in the design of a coal tar ground water remediation system for the Newport Development in Jersey City, NJ. The recovery system consists of 25-foot deep trenches installed with an in-situ trenching machine trenches beneath a high-rise office building under construction.
- (5) Designed and performed construction management of secondary containment systems for tank fields, containing 4.5 million gallon capacity tanks, for Chevron in Perth Amboy, NJ.
- (6) Designed and managed ground water remediation systems, a few of which include:
 - + A vacuum well point extraction system for toluene contamination at a site in Edison, NJ.
 - + A vacuum extraction system for a site in Moonachie, NJ with large amount of free product (tetrachloroethylene) in the subsurface. Performed in-situ chemical oxidation to remove product, and started a pump and treat system as an interim measure to control migration.
- (7) Litigation/Expert for General Mills, Inc. – Expert reports, depositions, and litigation support on soil and ground water contamination during 1999/2000. Case settled 1-02-2001.
- (8) Expert for Morris Township Planning Board, NJ, in 2001 – Expert report and testimony for application for a controversial subdivision. Issues were steep slopes, storm water runoff, geotechnical stability issues.

1990 – 1995 Exxon Research & Engineering Company, Inc., Florham Park, NJ

Technical consultant to Exxon affiliates worldwide for site investigations, remediation, and contaminated site management. This involved travel to sites throughout North, South, and Central America, and providing engineering expertise to affiliates.

Managed the technical work of contract engineering firms, project budgets, and schedules at the Exxon Bayway Refinery, Linden, NJ and the Bayonne Terminal, Bayonne, NJ. This involved the remediation of the 1,300-acre refinery and the 300-acre Bayonne Terminal (Bayonne, NJ), both of which were in use throughout the 1900s. Reported to senior Exxon management (the Board of Directors) regarding strategies and budgets. Representative projects included:

- (1) Engineered over 20 subsurface free oil remediation projects at the Bayway Refinery and the Bayonne Terminal. One project involved designing a high vacuum recovery system for a site with over a million gallons of gasoline in the subsurface.
- (2) Directed the remedial investigation of the 50-acre Bayway sludge lagoons. This site had been used by the Refinery since the mid 1900's and contains 20 feet of oily sludges and other wastes. The remedial action is a perimeter slurry wall, a capping system, stabilized sludge, and ground water recovery.
- (3) Performed investigations and installed safeguards a large marketing terminal in Ribeiro Preto, Brazil and at a refinery in Managua, Nicaragua. This included working with facility managers to develop environmental strategies.

- (4) Consulted to the Canadian Department of Defense (on behalf of Exxon) on a large subsurface oil cleanup at the Goose Bay Air Force Base in Labrador. This project involved cold regions engineering of remediation pumping equipment.
- (5) Designed containment areas and environmental contingency plans for re-fueling large mining equipment at the Carter and Caballo coal mines in Gillette Wyoming.
- (6) Performed waste site audits for Exxon affiliates throughout the country. This involved visiting and evaluating facilities to ensure they would not become a liability to Exxon in the future.

1980 – 1990 SESI Consulting Engineers, Pine Brook, NJ

Performed traditional geotechnical engineering investigations and design, developed engineering reports and plans, and provided construction management and oversight of projects.

Representative projects included:

- (1) Performed numerous soils investigations and foundation designs for commercial structures with poor and compressible soils. Experienced with structural fill construction, surcharging soft compressible soils, dynamic compaction, and deep foundations.
- (2) Designed and managed the construction of a 200-foot long by 20-foot high dam for the Salvation Army Camp in Bloomingdale, NJ. This dam is the entrance showcase for the Camp, and is pictured on the NJDEP - Dam Safety Program home web page.
- (3) Designed retaining walls and slope stability projects. One project involved a 70-foot vertical rock cut adjacent to the Catskill Aqueduct system in White Plains, NY, and included a geologic evaluation of rock stability and development of blasting recommendations.
- (4) Designed and provided construction oversight for a subsurface sewerage disposal system for a 350-unit condominium complex in Glen Gardener, NJ. The system consisted of 6-disposal beds, 200-feet by 60-feet each.
- (5) Designed and implemented de-watering systems for deep earth structures, most of which were deep pumping stations for sewer projects.

SPECIALIZED TRAINING

- OSHA 40-Hour Health and Safety Training
- ASTM - Risk Based Correction Action Training, 1996
- DNAPL Delineation and Remediation Training, 1995
- Statistics and Geostatistics, Association of Ground Water Scientists and Engineers, 1994
- IBM PC Applications in Ground Water Pollution & Hydrology (Cleary, Pinder), 1992

- Dissolved Organic Contaminants in Ground Water (Univ. of Waterloo, Canada), 1991

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

PROFESSIONAL INSTRUCTION

Instructor for annual short course on Ground Water Remediation, Rutgers University

SURESH PUPPALA, Ph.D., P.E.
Technical Support Manager

EDUCATION

Ph.D. Civil Engineering, NJIT, Newark NJ, 1998

M.S. Environmental Engineering, NJIT, Newark, NJ, 1993

B.S. Civil Engineering, Osmania University, Hyderabad, India, 1991

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Professional Engineer, New Jersey

Subsurface Evaluator Certification, NJDEP

UST Installation/Closure Certification, NJDEP

EXPERIENCE

Twelve years of engineering experience encompassing extensive design, modeling, laboratory, and field experience implementing innovative and traditional site characterization/remediation technologies.

2006 - Present SESI Consulting Engineers, Pine Brook, NJ

Project Engineer/Manager for Brownfield and remediation and redevelopment projects. Responsible for conducting geoenvironmental investigations, remedial designs, and treatability studies for soil and groundwater contaminated sites.

July 2006 – Present SESI Consulting Engineers, Pine Brook, NJ

Senior Project Engineer responsible for:

- Overseeing implementation of design/specifications for landfill closure and redevelopment in Carteret NJ.
- Overseeing completion of Preliminary Assessments and Phase I environmental investigations.

September 1998 – June 2006 PMK Group, Cranford, NJ

Project Engineer responsible for:

- Prepared proposals and related cost estimates to comply with New Jersey Technical Requirements for Site Remediation (N.J.A.C 7:26E) at hazardous waste sites.
- Prepared proposals for procuring "brownfield" grants from NJEDA Hazardous Discharge Site Remediation Fund and USEPA Brownfields Assessment, Revolving Loan Fund and Cleanup Grant programs.
- Managed projects with budgets of \$ 250,000 and greater. Coordinated other routine administrative activities such as issuing work orders, resolving sub-contractor agreement issues, monthly invoicing to clients, etc.
- Worked on relatively complex projects involving, former/current Superfund sites, brownfields redevelopment, New Jersey School Construction Corporation sites and New Jersey Sports & Exposition Authority sites.

- Coordinated completion of Preliminary Assessment and Environmental Site Assessment reports for various sites in New Jersey.
- Implemented workplans and prepared reports for Site Investigation, Remedial Investigation, Remedial Action, for numerous hazardous waste sites in New Jersey (worked at approximately 100 sites).
- Responsible for overseeing implementation of bench-scale and pilot scale treatability studies in support of Remedial Actions such as Enhanced Monitored Natural Attenuation, Soil Vapor Extraction, Air Sparging and Surfactant Flushing. Coordinated the full-scale implementation of some of these technologies to function as engineering controls and emplacement of related institutional controls (e.g. establishing Classification Exception Areas and Deed Notices to address groundwater and soil contamination).
- Implementation of the above discussed work typically involved the following:
 - ❖ Reviewing Health and Safety Plans and verifying compliance by field personnel.
 - ❖ Emergency response for oil spills and Indoor Air Quality issues.
 - ❖ Overseeing Underground Storage Tank closures and related safety requirements for excavations, confined space entry and explosive atmospheres.
 - ❖ Overseeing installation of ground water monitoring wells.
 - ❖ Using Global Positioning System to survey monitoring wells, underground storage tanks and soil sampling locations. Coordinated execution of topographic/hydrographic surveys by Professional Surveyors.
 - ❖ Characterizing site hydrogeology based on information obtained from oriented rock cores, borehole gamma and video logging, integrated GPS/Magnetometer surveys, Electromagnetic surveys, GPR surveys, borehole flowmeter tests, long-term water level measurements in multiple wells, baildown tests, pump tests, slug tests.
 - ❖ Overseeing completion of Human Health and Ecological Risk Assessment to develop site-specific cleanup criteria in accordance with New Jersey Department of Environmental Protection's (NJDEP) requirements.
 - ❖ Using statistical methods to evaluate if groundwater contamination is attenuating naturally.
 - ❖ Designing and building remediation systems to remove free-phase product at hazardous waste sites.
 - ❖ Overseeing treatment of contaminated water from basements and large USTs (about 50,000 gallons to 100,000 gallons) utilizing activated carbon systems, and observing compliance with permit requirements for discharging treated water into sewers.

1995 – August 1998 Center for Environmental Engineering and Science, NJIT, Newark, NJ

Research Assistant responsible for the following:

- Member of a team researching an innovative technology (Pneumatic Fracturing) to enhance existing remediation techniques.
- Conducted bench and pilot scale demonstrations of Pneumatic Fracturing Integrated with *In-Situ Vitrification*: A DOE project involving lab and field demonstrations of injecting a "starter path" (graphite/glass-frit powder) for melt initiation in the Hanford Formation. Checked the effectiveness of Geophysical methods in delineating the extent of the

injected material, followed by site excavation to map the extent of the lens (graphite/glass-frit powder) that was created.

Bio-Stimulation: Worked on a field demonstration of Pneumatic Fracturing enhancing Bioremediation of a BTEX contaminated site. This was achieved by delivering liquid amendments to the subsurface in an atomized state and maintaining aerobic conditions through 'Vacuum Extraction'.

Bio-Augmentation: Worked on a technology transfer project, where the formation was inoculated with microorganisms designed to degrade TCE. Participated in conducting survivability tests, to check the ability of the microorganisms to survive high injection pressures and shear forces during injection.

Soil Vapor Extraction: Worked on projects where pneumatic fracturing was used to enhance permeability of the formation to improve the efficiency of an existing vapor extraction system.

Permeable Reactive Barriers: Worked on a field demonstration of placing a reactive barrier of Iron powder in the sub-surface for degrading TCE, using Pneumatic Fracturing.

- Participated in site characterization studies and well installations at all the sites mentioned above.
- Implemented soil/rock sampling protocols using split-spoons, macro cores and double barrel rock cores.
- Worked with high-pressure pneumatic injection equipment, solid and liquid supplements feed systems.
- Worked with data acquisition equipment, tiltmeters that measure ground surface heave during fracturing, linear variable displacement transducers, pressure transducers, rotameters (and other flow measuring instrumentation), photo-ionization detectors, surveying equipment.

Conducted geo-physical surveys using electromagnetic methods for site characterization (Electrical Resistivity, Terrain Conductivity, Magnetometer).

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

National Groundwater Association

PUBLICATIONS

S.Puppala, J.R.Schuring, and D. Washington "An Approach for Modeling Pneumatic Fracture Propagation and the Distribution of Injected Amendments," at the 4th International Symposium on Environmental Geotechnology and Global Sustainable Development, Boston, Massachusetts, USA, August 9-13, 1998.

VALERIE NAVAB, Ph.D
Staff Engineer

EDUCATION

D.E.A (Diploma of Advanced Studies (PhD), first) in protection and development of the Soil and the Subsoil, Institut National Polytechnique de Lorraine (with honors).

Engineering degree, Ecole Nationale Supérieure des Mines (with honors).

The Ecole Nationale Supérieure des Mines de France is homologous with the Massachusetts Institute of Technology (M.I.T), Cambridge, MA (USA) and upon graduation, a degree from one institution is recognized by the other.

M.S. of mechanical engineering (top 10%), University Pierre et Marie Curie of Paris VI.

Licence in mathematical physics (with honors), University Pierre et Marie Curie of Paris.

D.E.U.G in mathematics (two-year university degree, with honors), University Pierre et Marie Curie of Paris VI.

Mathematical Baccalaureat (with honors), College Victor Duruy in Paris.

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Professional Engineer (France, 1997)

French Officer in the Order of Saint-Cyr (since 1997)

TECHNICAL SPECIALTIES

Dr. Navab has over 6 years of experience encompassing:

- Environmental & Remedial Engineering
- Mathematics and Statistics applied to Civil Engineering
- Modeling
- Compliance Monitoring
- Mining Engineering
- Landfill Closure

RELATIVE PROJECT EXPERIENCE

RI/FS, Remedial Design, Exxon Company, Linden, NJ. Participated in soil and ground water remediation projects at the Bayway Refinery, ExxonMobil's largest and oldest facility operating in the United States. Prepared remedial action workplans for the site. Reports included site descriptions, operational history, geology, hydrogeology, summary of environmental investigations, remedial actions for soil, groundwater and free product, use of institutional controls, and design of preliminary remedial actions.

Remedial Design, Former Celotex Industrial Park, Edgewater, NJ. Participated in the preparation of remedial action workplans for the site. Analyzed sample results to delineate extent of arsenic contamination. Participated in soil cap design.

Remedial Design, Mallinckrodt Baker Inc., Phillipsburg, NJ. Contaminants were carried by the groundwater from the plant to the immediately adjacent Delaware River. Responsible for the design of a new piping system that diverted contaminated groundwater to a treatment plant.

Landfill Engineering, Carteret Landfill, Carteret, NJ. Participated in the closure of the largest and oldest public landfill within the Tri-State Area. Participated in design, analysis of the cross sections, permitting and construction monitoring.

Landfill Engineering, Tiffany Landfill, Whippany, NJ. Participated in design and permitting, weekly QA/QC inspection and monitoring of the landfill liner and leachate collection system. Calculated the new grading of the landfill and supervised the field work during its construction.

Site Assessments, Preliminary Assessments and Phase I and Phase II Environmental Site Assessments, Various NJ Clients. Performed preliminary assessments on multiple properties in New Jersey. Performed review of records, database searches, telephone inquiries, site visits, review of aerial photographs and analyzed the results of soil and groundwater sampling done in accordance with the New Jersey Department of Environmental Protection Field Sampling Procedures Manual to identify areas of concern.

Safety Database Management, ExxonMobil, New Jersey. Implementation of a safety program and a database for TRC Raviv work that would analyze the reasons leading to accidents and find solutions to prevent their occurrence. Overseeing compliance with federal, state and local regulations, and managing timely incident reporting, investigation, analysis, record-keeping and follow-up.

Groundwater Modeling, State of New Mexico. Used EPA-recommended mathematical model to evaluate the radioactive and toxic chemical contamination of privately owned wells in habitations located around a uranium mine.

Hydrogeological Investigations, Pantex Plant, TX. Assessment of groundwater contamination, literature search, dosage calculation and identification of issues that hadn't been adequately addressed before. Participated in the elaboration of a book for public interest groups.

REPRESENTATIVE EXPERIENCE (Cont'd)

Radiation Dose Calculation, Port St. Lucie Nuclear Reactor, FL. Collaboration with medical doctors, lawyers and EPA representatives in litigation case. Estimation of the radiation dose plaintiffs received thanks to mathematical formulas accepted by EPA. Review of records and database search.

Air Pollution Assessment, State of Louisiana. Assessment of the resuspension of uranium ore dust along haul roads from the mine to the mill. Performed quantitative approach thanks to mathematical formulas related to air pollution and accepted by the EPA.

Mathematical Modeling, US EPA, International Copper Association, Eastman Kodak. Participated in development of a mathematical model entitled "Biotic Ligand Model" used to calculate metal speciation and predict metal toxicity to aquatic organism. Personally responsible for both the cadmium and nickel portions of the project from their inception. Academic researches, data extraction, calibration and programming.

Sediment Transport Modeling, Jamaica Bay, NY, US EPA. Formulation of the mathematical data and equations for model calculations in order to determine the level of heavy metal deposits in streams and wetlands flowing directly into Jamaica Bay. Analysis, documentation and manipulation of the results from 3-dimensional time variable water quality models.

Groundwater Modeling, State of North Carolina. Evaluation of the impact on water quality by livestock farming. Documentation, analysis and manipulation of the results from 2-dimensional time variable water quality models.

Groundwater Modeling, US EPA. Participated in extensive research study involving numerous water sources used to cool off various nuclear power plants throughout the United States. Responsible to list thermodynamics equations necessary for the modelisation of a river situated nearby a nuclear plant, which would be used to cool off its heat rejections.

Risk Assessment of Mines Collapse, France and Germany. Study of the dynamics of abandoned iron mine collapse. Use of "multi-criterion" methods to assess the condition of each mine and establish a priority in the areas to evacuate. Responsible of modeling, data analysis and interpretation of the results. Interfacing with officials, regulatory agencies and insurance companies.

Mathematical Modeling, France Rail Company, Italy. Participated in development of a mathematical model used to assess where to relocate all the extracted materials resulting from the construction of a tunnel between Lyon (France) and Turino (Italy).

Mathematical Modeling, Nuclear Department of Electricity of France. Used Finite Element Method to develop an error estimator and assess the deformation of the metallic parts of a power plant after extreme increases of temperature. Literature search, programming, calibration of 2-dimensional and 3-dimensional models.

SPECIALIZED TRAINING

"Water Quality Modeling" – Environmental Engineering Department, Manhattan College, June 2000

"40-Hour Health and Safety Hazardous Waste Operations and Emergency Response Meeting the Training Requirements of 29 CFR 1910.120" OSHA Training – Emilcott Associates, Inc., December 2003

"Basic Training in Geographic Information Systems for Wildlife Conservation" – Wildlife Conservation Society, November 2004

"Occupational Health and Safety Training Program, Annual 8-Hour Refresher Course" – TRC Environmental Corporation, November 2004

"Geosynthetic in Waste Containment Applications" – Continuing Education Units, Geosynthetic Education Institute, April 2004

"Occupational Health and Safety Training Program, Annual 8-Hour Refresher Course" – Certificate of Training, TRC Environmental Corporation, November 2005

"Technical Requirements for Site Remediation," Rutgers University, Cook College, February 2005

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

Society of the Engineers of the Ecole Nationale des Mines de France
Silicon French Association
SETAC (Society of Environmental Toxicology and Chemistry)

PUBLICATIONS

"An Application of the Biotic Ligand Model (BLM) Framework for Cadmium"

Kuen-Ben Wu, Valerie Navab, Robert C. Santore, Paul R. Paquin, and Dominic M. Di Toro, Ph.D., SETAC (Society of Environmental Toxicology and Chemistry), 22nd Annual Meeting, November 2001.

"An Application of the Biotic Ligand Model (BLM) Framework for Nickel"

Kuen-Ben Wu, Valerie Navab, Rooni Mathew, Robert C. Santore, Paul R. Paquin, Joe S. Meyer, Kevin V. Brix and Dominic M. Di Toro, Ph.D., SETAC, 22nd Annual Meeting, November 2001.

"Alternative Approaches for Modeling the Physiological Response of Aquatic Organisms to Acute Metal Toxicity".

Paul R. Paquin, V. Zoltay, Kuen-Ben Wu, Valerie Navab, Rooni Mathew, Robert C. Santore and Dominic M. Di Toro, Ph.D., SETAC, 22nd Annual Meeting, November 2001.

"Application of the Biotic Ligand Model to Acute Metal Toxicity for Aquatic Organisms".

Robert C. Santore, Rooni Mathew, Valerie Navab, V. Zoltay, Paul R. Paquin, Kuen-Ben Wu and Dominic M. Di Toro, Ph.D., SETAC, 22nd Annual Meeting, November 2001.

"The Biotic Ligand Model–Predictive Model for Acute Aquatic Toxicity of Metals"

Robert C. Santore, Paul R. Paquin, Dominic M. Di Toro, Kuen-Ben Wu, Christos Kavvadas and Valerie Navab. Workshop on the Bioavailability of Metals in Surface Waters – Integrating Science and Regulations. Het Pand, Ghent, Belgium, February 2002.

"Evaluation of Radioactive and Toxic Chemicals at Pantex Plant" - Report for STAND by Valerie Navab, Rachael Hawkins and Marvin Resnikoff. November 2002 - Radioactive Waste Management Associates.

"Environmental Impact of radioactive waste facilities at Homestake Uranium Mine and Mill" - Beat Hinterman, Valerie Navab and Marvin Resnikoff. February 2003 - Radioactive Waste Management Associates.

DEAN P. GIOVANETTI, P.G.
Health and Safety Program Manager

PROFESSIONAL QUALIFICATIONS

Mr. Giovanetti has over 12 years of diverse experience designing municipal solid waste landfills and conducting geotechnical and environmental investigations in soil and groundwater. He has also conducted computerized groundwater, stormwater, and leachate collection simulations. He has participated in the design of many components of municipal solid waste landfills including: gas collection systems, leachate collection systems, baseliner and final cover systems, stormwater collection systems, and roadways. He has managed soil and groundwater investigation in New Jersey, New York, Pennsylvania, and West Virginia. These investigations have included classification of lithologic and stratigraphic materials, hydrogeologic and geologic aspects of solid and hazardous waste investigations involving identification, aquifer testing, geophysical investigations including ground penetrating radar and seismic refraction and reflection, and piezometer and monitoring well installations.

EDUCATION

M.S.C.E., Geotechnical Engineering, New Jersey Institute of Technology, 2005
B.S., Geoscience, Montclair State University, 1995

SPECIALIZED TRAINING:

40-hour OSHA Health and Safety Training
Troxler Nuclear Densometer Certification
Certified GSSI SIR II Ground Penetrating Radar Operator

REGISTRATION/CERTIFICATIONS:

Registered Professional Geologist, State of Tennessee, License Number 4733
NJDEP Subsurface Evaluator, License Number 0027279

RELAVENT PROJECT EXPERIENCE

New Jersey Data Center, Piscataway, NJ for DuPont Fabros of Washington, D.C. Project Manager for over 300,000 square foot computer logistic center geotechnical investigation and design. Managed the field investigation, completed report preparation, presented design options including drilled shafts and deep dynamic compaction, maintained contact with the client through weekly conference calls, designed deep foundation system consisting of large diameter drilled shafts.

Geotechnical Investigation and Foundation Design, Prologis, Elizabeth, NJ. Project Manager of geotechnical investigation and foundation design for 1 million square foot warehouse logistic center. Site challenges included environmental impacts by former site uses, a natural clay soil confining layer that could not be compromised, and 10 feet thick peat soil layers. Design solutions included surcharging with environmentally impacted soil to meet the Brownfield agreement criteria, and wick drains to expedite settlement.

Alliance Sanitary Landfill, Taylor Borough, Pennsylvania. Conducting tasks to facilitate the application for a major expansion at the landfill. Tasks include managing background water quality collection and reporting, temporary stormwater management system design, developing and detailing the operational sequence for construction, and coordinating the design of a rock crushing and soil screening plant.

Ocean County Landfill, Manchester Township, New Jersey. Task manager for the design of a supplemental gas collection header to collect landfill gas from the existing gas collection system and waste cells and transport the landfill gas to an existing flare and electrical generating system.

Pottstown Landfill, Pottstown, Pennsylvania. Assembled and conducted a computer simulation depicting the operation of the leachate collection system for Pottstown Landfill using WaterCAD, by Haestad Methods. The simulation was used to pinpoint flow restrictions and pump deficiencies. Mr. Giovanetti designed new and specified new pumps to provide solutions to the deficiencies in the leachate collection system.

Brookhaven Landfill, Brookhaven, New York, October 2002. Conducted storm water channel design and analysis using Haestad computer software for temporary waste filling conditions which will exist when the next landfilling phase commences. The design includes calculations for an hydraulic jump which will occur at the base of a temporary downshute.

Sullivan County Landfill, Monticello, New York. Conducted storm water and detention basin design and analysis using Haestad computer software to support landfill expansion design.

New York City, School Construction Authority, Queens, New York, August 2002: Conducted field inspection for monitoring well installation for aquifer characterization.

Independent Real Estate Developer, Upper Freehold, New Jersey, residential development. Performed a computer-simulated groundwater mounding analysis using NJDEP recognized software (SUNADA). Identified hydrogeologic limitations, imputed corresponding model parameters, and analyzed and presented model outputs. Recommended grading changes based on model results.

Service Station Remedial Investigation, Bloomfield, New Jersey, privately owned and operated gas station. Project manager for groundwater remediation associated with UST release. Responsibilities included developing and maintaining remediation schedule, analyzing sampling data, writing summaries and remediation reports, and developing appropriated remediation technologies to facilitate the implementation of a NJDEP Groundwater Classification Exemption Area.

New Mexico Department of Transportation, Ruidoso, New Mexico, Route 70 widening, geotechnical sampling and data collection. Project Geologist for state highway widening project. Directed drillers in collecting soil and rock samples. Performed load tests on selected rock cores. Identified soil samples for geotechnical testing including sieve analysis, hydrometer tests, atterburg limit tests, and unconfined and confined compression tests. Maintained soil and rock core logs for all borings inspected.

Martin Real Estate, Hampton Township, New Jersey, NJDPES discharge to groundwater permits, 200-acre residential and commercial development. As project manager conducted hydrogeologic study to support an amendment to a Discharge to Groundwater permit. The amendment was to allow for an increase in discharge from 20,000 gpd to 200,000 gpd. The study included supervising the installation of additional groundwater monitoring wells, collecting soil samples, evaluating soil samples, and identifying samples for testing. Using USGS MODFLOW, developed a computer simulated groundwater model for this site, including the expanded hydrogeologic data, to depict the effect of the added treated effluent discharge to the regional groundwater aquifer. Also designed a 72-hour pump test to be implemented to evaluate the potential potable water supply.

MTBA, Queens and Manhattan, New York, geophysical survey at the Queens Midtown Tunnel. Performed a ground penetrating radar and metal detection survey at tunnel entrances and exits and associated access roadways to the Queens Midtown Tunnel. Results were recorded electronically on the geophysical equipment. Actual underground features that were identified were then included on sited drawings in AUTOCAD format. Finalized Drawings indicating locations, depths and relative sizes of underground utilities and features were presented to the client.

County of Union, New Jersey, UST Management Program. Task associated with the UST management program included the decommissioning, upgrade, or replacement of 70 UST's at 28 facilities throughout Union County. As a result of discharges to the subsurface from leaking USTs, several facilities have undergone or are undergoing site investigation, remedial investigations, or remediation. The environmental investigations are performed in accordance with the NJDEP technical regulation, (NJAC 7:26E), and the USEPA standards and guidelines. Where contamination was encountered above NJDEP or EPA criteria, I developed and implemented remedial investigation to delineate the vertical and horizontal extent of the contamination. The remedial investigations included soil borings and sampling, groundwater monitoring well installations, soil removal and disposal, Enhanced Fluid Recovery and the injection of Oxygen Releasing Compounds.

Middlesex, New Jersey, Air Pollution Permit, County of Middlesex Administration Building. Middlesex County was in violation for not previously permitting emergency electrical and fire suppression equipment. Our permit preparation was helpful in Middlesex County avoiding financial penalty. Permitted equipment included building boilers, emergency generators and emergency sprinkler drive motors. The permit was prepared using NJDEP current software, "RADIUS".

Pocono Mountain Lakes Estates (PMLE), Township of Lehman, , Pennsylvania, Water Supply Study. Tasks included researching local geology and hydrogeology, developing a plan to locate and install water supply wells at a site previously impacted by salt contamination. Prior delineation studies were evaluated, the site inspected and areas with high potential for well locations evaluated. Prepared report outlining the procedures for drilling, installing and testing two potential water supply wells for PMLE. The report was submitted to Lehman Township.

Bolkema Fuel Terminal Facility, Wyckoff, NJ, Remedial Investigation. The environmental investigations performed in accordance to the Technical Requirements for Site Remediation (NJAC 7:26E), the NJDEP Field Sampling Procedures Manual, and United States Environmental Protection Agency (USEPA) standards and guidelines. The site investigation included soil borings and sampling, groundwater monitoring well installations and sampling, and soil removal and disposal.

Empire Development, Hackensack Meadowlands, New Jersey, groundwater characterization. Responsibilities included maintaining field instruments, downloading recorded data, measuring and recording stream data, implementing weather dependent water sampling program and supervising three technicians.

Phillips Lighting Inc., Fairmont, West Virginia, Remedial Investigation. Responsibilities included managing field sampling teams as well as conducting field sampling. Also responsible for maintaining communications with the client, the WVDEP and the USEPA. Further responsibilities included managing subcontractors, compiling analytical data, analyzing data and recommending subsequent remedial actions.

Westinghouse Inc., Hillside New Jersey, PCB contamination remediation design.
Researched cleanup and encapsulation methods for PCB contamination in concrete floors. Based on PCB wipe sample results, designed and implemented two test programs. Responsibilities included oversight test programs, supervising technicians, waste disposal, interpreting the test results and recommending a clean up.

Princeton University, Palmer Hall, Princeton, New Jersey, August 1998 to September 1998. Responsibilities included directing drilling, oversight of sampling for both delineation of contamination and disposal, and inspection of excavation. Worked with the NJDEP and a Radiation Specialty subcontractor in developing a soil-blending plan for on site reuse of the radium-contaminated soil.

Office Complex, Berkley Heights, New Jersey, August 1997 to August 1998. Responsibilities included daily communication with the site construction superintendent including written reports, liaison with geotechnical engineers, structural engineers and individual contractors. Responsible for inspection of all structural soil and concrete operations at the site including building footing subgrades and steel reinforcement, and slab subgrades and steel reinforcement, and roadway and parking area subgrades.

PROFESSIONAL AFFILIATIONS

Association of Engineering Geologists
Geological Society of New Jersey

GREGORY J. QUIMBY, P.E., R.B.P.
Project Engineer

EDUCATION

M.S. Geoenvironmental Engineering, NJIT, Newark, NJ (in-progress)

B.S. Environmental Engineering, USMA, West Point, NY, 1999

PROFESSIONAL REGISTRATIONS

Professional Engineer, New Jersey (# 46410)

Registered Brownfield Professional

EXPERIENCE

Eight years of engineering experience encompassing:

- Remediation Engineering
- Contaminated Site Redevelopment
- Environmental Planning
- Program and Project Management

2006 - Present SESI Consulting Engineers, Pine Brook, NJ

Project Engineer/Manager for Brownfield and remediation and redevelopment projects. Responsible for conducting geoenvironmental investigations, remedial designs, and treatability studies for soil and groundwater contaminated sites.

2004 - 2005 AMEC Earth and Environmental, Inc., Somerset, NJ

Project Manager and Assistant Program Manager responsible for conducting environmental remediation and planning projects for Department of Defense Clients. Performed remediation and design-build construction projects relating to military firing ranges and training areas. Authored redevelopment feasibility studies identifying areas of contamination, potential remedial alternatives, and conceptual redevelopment construction plans.

1999 – 2003 U.S. Army Engineers, Fort Bragg, NC

Captain serving in a U.S. Army Engineering Brigade. Duty positions included Platoon Leader, Company Executive Officer, and Battalion Staff Officer. Projects included expedient airfield and road/trail construction, demolition, anti-terrorism/force protection construction, and Afghan infrastructure reconstruction.

RELATIVE PROJECT EXPERIENCE

Remedial Design, Brownfield Redevelopment, Perth Amboy, NJ. Project Engineer responsible for conducting a supplemental Remedial Investigation and Remedial Design for a 105-acre Brownfield site contaminated with metals, PCB, and NAPL. The remedial design included measures to remove source contamination in soil, restrict groundwater flow through the site, provide a site capping system, and treat contaminated groundwater via a modified permeable reactive barrier.

Unexploded Ordnance Remediation, Fort A.P. Hill, VA. Project Manager for the remediation of a 34 acre site contaminated with unexploded ordnance (UXO) impacted soil and surficial debris. Remediation was conducted in accordance with the redevelopment plans for the site and included a subsurface geophysical investigation, delineation of contaminants, contaminant excavation, and demilitarization/demolition of exhumed and surficial hazards.

PCB Remediation, Cape Canaveral Air Force Station, FL. Project Engineer responsible for the remediation of PCB-impacted soil at a former Air Force space launch complex. Remediation was performed in conjunction with facility decommissioning and involved delineation and excavation of contaminants, post-excavation verification sampling, and conceptual remedial planning for the demolition of the PCB impacted steel superstructure.

Brownfield Redevelopment Feasibility Studies/Conceptual Plans, Various Locations, NJ, NY, WI, GA. Project Manager and primary author and investigator for multiple conceptual redevelopment plans for customers including Fort Dix, NJ, Camp Smith, NY, Fort McCoy, WI, and Moody Air Force Base, GA. All of these projects involved: Investigation of historic uses of land potentially contaminated with lead and/or unexploded ordnance; analysis of remedial alternatives for identified areas of contamination; conceptual redevelopment planning; and development of environmental Best Management Practices to be implemented along with the proposed remediation/redevelopment plans.

PCB Delineation and IRM Design, Paulsboro, NJ. Project Engineer for the delineation and fate and transport modeling of PCB impacted soil, sediment, and surface water at a Greenfield redevelopment site. The project also involved development of an Interim Remedial Measure design to address contamination posing an immediate risk to ecological receptors.

SPECIALIZED TRAINING

40-Hour Health and Safety Hazardous Waste Operations and Emergency Response Meeting the Training Requirements of 29 CFR 1910.120" OSHA Training – June 2004

Underground Storage Tank Investigation and Closure – Rutgers University Continuing Education Program – September 2007

"Geosynthetics in Waste Containment Applications" – Continuing Education Units, Geosynthetic Education Institute, October 2006

PROFESSIONAL AFFILIATIONS

Society of American Military Engineers
Institute of Brownfield Professionals
National Brownfield Association
Project Management Institute

CHRISTOPHER D. MAZUR
Site Engineer

EDUCATION

M.S. Environmental Engineering NJIT, Newark, NJ (in-progress)
B.S. Environmental Science Plattsburgh State University, Plattsburgh, NY

SUMMARY OF EXPERIENCE

Chris has an academic background in environmental science combined with diverse professional experience. He has held positions requiring a high level of self-motivation, dedication, sound judgment and initiative. He has strong technical, analytical and problem-solving skills applicable to many industries and fields.

1/2005 – Present Environmental Engineer, SESI Consulting Engineers, Pine Brook, NJ

Landfill Closure/Redevelopment - Responsible for performing site inspection and daily environmental oversight services for the closure and subsequent redevelopment of an existing landfill facility. The project involved sampling and analysis of over 50,000 cubic yards of fill material brought in to cap the site, constructing landfill gas and leachate collection systems, conducting performance/feasibility studies to optimize the landfill gas flare, and relocating two creeks that ran through the site.

NAPL Delineation – Responsible for conducting a field investigation to delineate horizontal and vertical extent of Dense and Light NAPL contamination at a Brownfield redevelopment site in Perth Amboy, NJ.

1/2004 – 12/2004 Environmental Technician, Professional Service Industries, Schenectady, NY

- Responsible for monitoring abatement project work, ensuring that contractors follow project specifications and comply with all federal, state, and local regulations.
- Present suggestions to assure the project will progress as efficiently as possible.
- Conducted air monitoring for the presence of airborne fibers.
- Responsible for the identification, assessment and quantification of suspect asbestos-containing materials (ACM).
- Collected representative samples of suspect ACM for laboratory analysis.
- Composed survey reports for management.

8/2003 – 12/2003 William H. Miner Research Institute, SUNY Plattsburgh, NY

Independent study of Agricultural Engineering in which a no discharge system was tested through ground water samples. Water samples were collected at seven separate wells and tests such as pH, conductivity, nitrogen and phosphorus contents, and dissolved oxygen were taken to determine the effects that the system had on that specific area as well as to see if it was in fact a no discharge system.