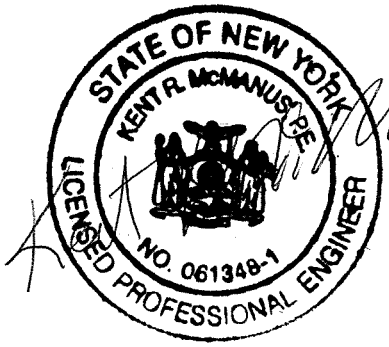
200 Ship Canal Parkway, LLC.

26 Mississippi Street • Suite 100 • Buffalo, New York 14203

REMEDIAL WORK PLAN

BCP Site #C915227

December 2009



Report Prepared By:

Malcolm Pirnie, Inc.

50 Fountain Plaza, Suite 600
Buffalo, New York 14202
716/667-0900

6210-001

MALCOLM PIRNIE

Contents

List of Tables Follows Page

List of Figures Follows Page

Appendices

1. INTRODUCTION

1.1. Project Purpose and Background

The 200 Ship Canal Parkway Site (Site) is a 5.7 acre parcel of vacant, former industrial, land that is being redeveloped by the owner (200 Ship Canal Parkway, LLC) under the New York State Brownfield Cleanup Program (BCP).

The Site is located in the Buffalo Lakeside Commerce Park (BLCP) which is a 275-acre business park that is in the process of being redeveloped from what was the location of heavy industrial operations for the manufacture of pig iron by the Hanna Furnace Company.

The BLCP is located near the southwestern corner of the City of Buffalo, see Figure 1-1, and is partially occupied with three new light industrial/commercial businesses (Certainteed, Cobey, and Sonwil). For development purposes, the BLCP was subdivided into four sub-parcels based on prior uses by Hanna Furnace. The subject Site is located within Sub-parcel 2 which is the location of the former manufacturing operations of the Hanna Furnace facility.

Prior to the existence of the BCP, the Voluntary Cleanup Program (VCP) was in place by the NYSDEC, all of Parcel 2 was accepted into the VCP in 2003 and a Remedial Action Work Plan was prepared for Sub-Parcel 2 in November 2002.

1.2. Site History

The southern portion of what is now the BLCP was purchased in 1902 by the precursor to the Hanna Furnace Corporation. In 1903 the Buffalo and Susquehanna Railroad in cooperation with the Pennsylvania Railroad, initiated construction of the Union Ship Canal, originally called the Goodyear Slip. In 1910 the canal was extended to its current 2240 foot length to provide the pig iron manufacturing operations access to barges with raw materials transported via Lake Erie. Historic records indicate that the first two of four blast furnaces were constructed and first blown between 1902 and 1904 and furnaces 3 and 4 built between 1910 and 1912 and first blown in 1912. The corporate history between 1910 and 1930 is somewhat unclear and discrepant however, in April of 1930, the name changed from the Buffalo Union Furnace Corporation to the Hanna Furnace Corporation. During peak production, the Hanna Furnace Site employed over 800 workers and could produce up to 3100 net tons of iron per day.

MALCOLM PIRNIE

6210001 APRIL 2009

200 SHIP CANAL PARKWAY SITE

FIGURE 1-1
SITE LOCATION

NOT TO SCALE

Beginning in the 1970s, a combination of factors led to the slowdown of iron and steel manufacturing in the United States and Buffalo and on January 29, 1982 Hanna Furnace Corporation shut down all operations at the Plant. In 1983 the plant was purchased by Jordan Foster Scrap Corporation. By 1985 Jordan Foster had dismantled most of the plant's structures and removed rails from the site rail yard. In 1998 the City of Buffalo took title of the property for non-payment of taxes. In 2001 and 2002 the remainder of site structures was demolished to make way for redevelopment of the site.

The City of Buffalo acquired 113 acres of this land in the 1990s after the previous owners declared bankruptcy and abandoned the property. The previous owners had removed most of the operating equipment and all of the rolling stock. Many of the buildings on the site were demolished for scrap, but bankruptcies interrupted that process. The remaining ruins (buildings, foundations, vaults and furnaces) were demolished by the City of Buffalo and the Buffalo Urban Development Corporation (BUDC), formerly Development Downtown, Inc. (DDI) between the summer of 2001 and the spring of 2003.

When the City of Buffalo purchased the land, it was informally subdivided into four parcels, which reflect the diverse industrial land usage by the previous owners of the site as follows:

- Parcel 1 – former railroad yard and surface storage area.
- Parcel 2 - heavy production area, including iron furnaces and numerous buildings. (The 200 Ship Canal Parkway Site falls entirely within this Parcel).
- Parcel 3 – the ship canal and adjacent land primarily used for loading, unloading and stockpiling of raw materials and products.
- Parcel 4 – open fill area, accepted substantial quantities of flue ash and slag.

In late 2006 and early 2007, BUDC acquired the approximately 113 acres of land between Parcel 4 and Tifft Street. Of these 113 acres, 38 were acquired from CSX Transportation. This property was formerly referred to as the Penn 200 Yard. The other 75 acres was purchased from Herbert F. Darling.

As established previously, the Buffalo Lakeside Commerce Park redevelopment area has a long and varied history of industrial use. Environmental investigations conducted to date in the BLCP area have indicated that industrial contamination resulting from this historic use does exist however BUDC, ECIDA, DDI and the City of Buffalo did not play any role in the contamination of this site. Redevelopment of the BLCP is progressing under multiple applicable and relevant regulatory and funding programs including the Brownfield Cleanup Program.

2. ENVIRONMENTAL SITE CONDITIONS

2.1. Previous Environmental Investigations

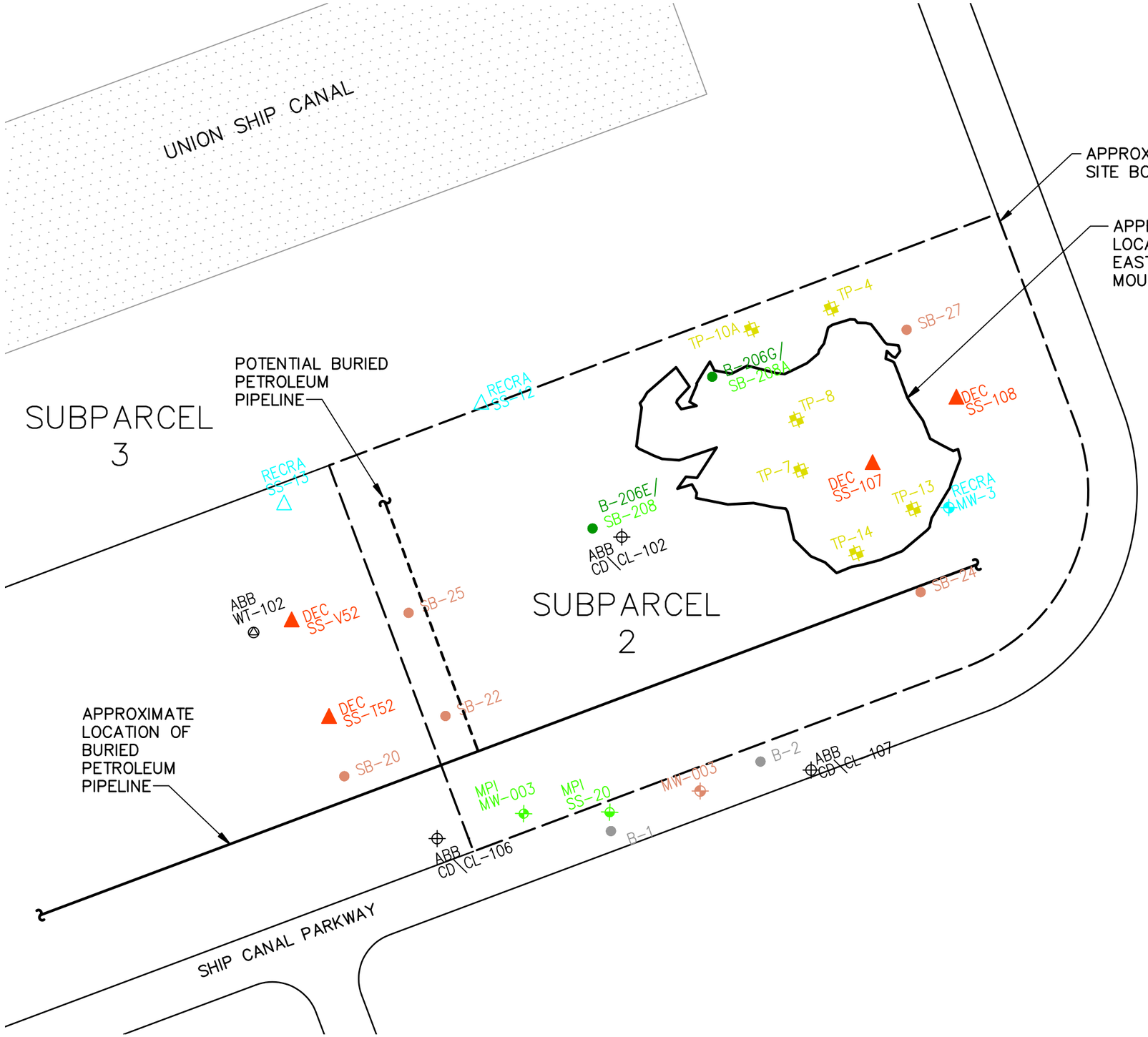
In the past 27 years, there have been at least 17 separate environmental investigations conducted on the former Hanna Furnace site by 13 different public or private entities. Of these 17 studies, eight investigations included the subject site on sub-parcel 2. The eight studies that included the subject 5.7 acre Site; include:

- 1988 - RECRA Environmental, Inc.
- 1994 - NYSDEC
- 1995 - ABB Environmental Services, Inc.
- 2000 - Malcolm Pirnie, Inc.
- 2001 - ERM
- 2003 - URS/Nature's Way
- 2007 - EmpireGeo Services

The following is a brief summary of the sampling performed on the subject site during each of these investigations. Figure 2-1 illustrates the appropriate locations of the historic sampling points.

In 1988 Recra Environmental Inc. - published a Site Characterization and Environmental Assessment of the Hanna Furnace Site for the New York State Department of Transportation. As part of the study, Recra collected a surface soil sample (SS-12) from the northern boundary of the Site from the 0.5' to 1.5' depth. These two samples were analyzed for PCBs, oil & grease, ammonia, and four metals (arsenic, chromium, copper, and lead). Analytical results that no parameters exceeded the SCOs. Recra also installed one of seven groundwater monitoring wells of their study on the subject Site. Well MW-3 was installed near the eastern end of the Site to a depth of 14 feet. No analytical results were reported in the report for this well.

In 1994 NYSDEC - collected two samples (ENC-107 and ENC-108) of impacted "soil" material from within an open concrete enclosure on the Site. These samples were analyzed for PCBs using an immunoassay method and a list of 12 metals. PCBs were not detected above the 1 PPM method detection limit. Arsenic, barium, cadmium, and lead were present in these samples at concentrations greater than the current restricted commercial Soil Cleanup Objectives. Since these two samples from the concrete



LEGEND

N.

RECRA ENVIRONMENTAL, INC.

- △ RECRA SS– = SURFACE SOIL SAMPLE, 1988
- ⌖ RECRA MW– = MONITORING WELL (DESTROYED), 1988

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

- ▲ DEC SS– = SURFACE SOIL SAMPLE, 1994

ABB ENVIRONMENTAL SERVICES, INC.

- ⊘ ABB WT– = DRUM SAMPLE LOCATION, 1995
- ⌖ ABB CD/CL = STRUCTURE SEDEMENT/ LIQUID SAMPLE, 1995

MALCOLM PIRNIE, INC.

- ⌖ MPI MW– = MONITORING WELL, 2000
- ⌖ MPI SS– = DEBRIS PILE SAMPLE, 2000

CLOUGH, HARBOR & ASSOCIATES, LLP

- ● B–1 = GEOTECHNICAL BORING LOCATION, 2004

BARRON & ASSOCIATES, P.C.

- ● B–209/ SB–202 = COMBINED GEOTECHNICAL (BARRON & ASSOC.) AND ENVIRONMENTAL (MALCOLM PIRNIE) SOIL BORING LOCATION

ERM, INC.

- ● SB–34 = SOIL BORING, 2002
- ⌖ MW–004 = MONITORING WELL, 2002

EMPIRE GEO SERVICES, INC

- ⌖ TP–14 = TEST PIT, 2007

50 0 50 100

SCALE: 1" = 100'

6210F001

MALCOLM PIRNIE

200 SHIP CANAL PARKWAY, LLC

200 SHIP CANAL PARKWAY SITE
BUFFALO, NEW YORK

HISTORICAL
SAMPLING LOCATIONS
SCALE: 1" = 100'

MALCOLM PIRNIE, INC.

APRIL 2009

FIGURE 2–1

enclosure are not representative of Site soil/fill, the results are not summarized in Table 2-1, Summary of Analytical Results – Soil/Fill.

In 1995 ABB Environmental Services, Inc. – collected two sump liquid/sediment samples (CD/CL-102 and CD/CL-106) from underground structures of the oil shack area of the subject site. These samples were analyzed for TCL VOCs, SVOCs, Pesticides, PCBs, and metals. The liquid and sediment collected from these two structure sumps contained SVOC and metals above the current restricted commercial SCOs and class GA groundwater standards. Since the samples are not representative of Site soil or fill, the results are not summarized in Table 2-1, Summary of Analytical Results – Soil/Fill.

In 2000 Malcolm Pirnie, Inc. – as part of a Supplemental Investigation of the Former Railroad Yard (Parcel 1), Malcolm Pirnie collected soil/fill samples from a debris pile located on the subject property of Parcel 2. The sample (SS-20) was collected from a test pit and analyzed for VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide. Only one PAH, (benzo(a)pyrene), was present above the restricted commercial SCO. A groundwater sample from well MW-003 was analyzed for the same list of parameters as listed above for the debris pile samples. Several common metals were detected above the Class GA groundwater standards, including iron, manganese, selenium, and sodium.

In 2001 ERM Northeast, Inc., - collected four surface (0'- 0.5') and four subsurface (2' - 4') soil samples from four soil borings on the subject property (SB-22, SB-24, SB-25, and SB-27). These eight samples were analyzed for VOCs, STARS list SVOCs, and metals. Total cyanide was the only parameter detected at concentrations above the restricted commercial SCOs. Subsurface samples from SB-22 and SB-24 contained cyanide at 32 and 28 mg/kg respectively. The SCO for total cyanide is 27 mg/kg..

In 2003, Nature's Way as subcontractor to URS – delineated three areas of petroleum-impacted soil for removal and off-site disposal. One or more of these areas of impacted soil were believed to be related to a steel pipeline that runs in an east/west orientation on Parcel 2 and extents onto the subject Site. This pipeline was delineated and cleaned from its western end to an easterly point on the subject Site at which point evaluation, cleaning, and capping ended. This pipeline is known to contain petroleum or petroleum impacted water, and the bedding material in which the pipe resides may also contain petroleum.

In 2007 EmpireGeo Services, Inc. – completed a test pit exploration of soil/fill stockpiles located on Parcel 2. Although no samples were submitted for chemical analyses, petroleum impacted soil/fill and groundwater was observed and documented at six locations (TP-4, TP-7, TP-8, TP-10A, TP-13 and TP-14) beneath the fill mound at the subject Site.

MALCOLM PIRNIE

Table 2-1

Summary of Analytical Results - Soil/Fill

Soil/Fill Management Plan

200 Ship Canal Parkway, LLC

Buffalo, New York

Analytes	Restricted Use Clean Up Objectives	1998 RECRA Environmental, Inc.	2001 ERM Northeast, Inc.								2000 Malcolm Pirnie
	Commercial	RECRA SS-12	ERM SB-22 (0-0.5')	ERM SB-22 (2-4')	ERM SB-24 (0-0.5')	ERM SB-24 (2-4')	ERM SB-25 (0-0.5')	ERM SB-25 (2-4')	ERM SB-27 (0-0.5')	ERM SB-27 (2-4')	MPI SS-20
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VOCs											
Chloroform	350	NS	ND	ND	ND	ND	ND	ND	ND	ND	0.006 J
Toluene	500[b]	NS	ND	ND	ND	ND	ND	ND	ND	ND	0.006 J
SVOCs-STARS											
Napthalene	500[b]	NS	0.089 J	ND	ND	ND	ND	ND	ND	ND	0.067 J
Anthracene	500[b]	NS	0.087 J	ND	ND	ND	ND	ND	ND	ND	0.340 J
Acenaphthylene	500[b]	NS	ND	ND	ND	ND	ND	ND	ND	ND	0.170 J
Acenaphthene	500[b]	NS	0.064 J	ND	ND	ND	ND	ND	ND	ND	0.047 J
Benzaldehyde	NA	NS	ND	ND	ND	ND	ND	ND	0.048 J	ND	ND
Benzo(a)anthracene	5.6	NS	0.49	ND	0.14 J	ND	0.052 J	ND	ND	ND	1.4 J
Benzo(b)fluoranthene	5.6	NS	0.66	ND	0.23 J	ND	0.087 J	ND	0.27 J	ND	2 J
Benzo(k)fluoranthene	56	NS	0.64	ND	0.22 J	ND	0.079 J	ND	0.22 J	ND	0.78 J
Benzo(g,h,i)perylene	500[b]	NS	0.12 J	ND	0.07 J	ND	0.039 J	ND	0.096 J	ND	0.95 J
Benzo(a)pyrene	1[f]	NS	0.41	ND	0.19 J	ND	0.07 J	ND	0.14 J	ND	**1.5 J**
Carbazole	NA	NS	0.0052 J	ND	ND	ND	ND	ND	ND	ND	0.047 J
Chrysene	56	NS	0.68	ND	0.19 J	ND	0.078 J	ND	0.16 J	ND	1.4 J
Bis(2-Ethylhexyl)phthalate	NA	NS	0.41	ND	0.48	ND	ND	ND	ND	ND	0.064 J
Dibenzofuran	350	NS	0.04 J	ND	ND	ND	ND	ND	ND	ND	0.057 J
Dibenz(a,h)anthracene	0.56	NS	0.064 J	ND	ND	ND	ND	ND	ND	ND	0.27 J
Fluoranthene	500[b]	NS	0.57	ND	0.22 J	0.091 J	ND	ND	0.13 J	ND	2.3
Indeno(1,2,3-cd)pyrene	5.6	NS	0.18 J	ND	0.1 J	ND	0.061 J	ND	0.13 J	ND	0.79 J
Phenanthrene	500[b]	NS	0.18 J	ND	0.12 J	ND	0.041 J	ND	0.063 J	ND	1.1
Pyrene	500[b]	NS	0.81	ND	0.23 J	ND	0.071 J	ND	0.14 J	ND	3.2 J
2-Methylnaphthalene	NA	NS	0.12 J	ND	0.04 J	ND	ND	ND	ND	ND	ND
Metals											
Aluminum	NA	NS	ND	40,700	ND	29,500	ND	9,810	ND	35,700	6,480
Arsenic	16[f]	6.0	ND	2.3	ND	ND	ND	7.4	ND	8.8 J	11.7
Barium	400	NS	ND	323	ND	130	ND	75.9	ND	259 J	86.6 J
Beryllium	590	NS	ND	6.8	ND	5.1	ND	0.99	ND	5.7	ND
Cadmium	9.3	NS	ND	ND	ND	ND	ND	0.83	ND	ND	3.7 J
Calcium	NA	NS	ND	218,000 J	ND	14,9000 J	ND	63,600	ND	177,000 J	36,200
Chromium, hexavalent [h]	400	NS	ND	8.1 J	ND	7.3 J	ND	11.9	ND	16.3 J	NS

Created by: T. Hemmerling on 5/1/2009
Checked by: J. Richert on 5/1/2009

MALCOLM PIRNIE

Table 2-1

Summary of Analytical Results - Soil/Fill

Soil/Fill Management Plan

200 Ship Canal Parkway, LLC

Buffalo, New York

Analytes	Restricted Use Clean Up Objectives	1998 RECRA Environmental, Inc.	2001 ERM Northeast, Inc.								2000 Malcolm Pirnie
	Commercial	RECRA SS-12	ERM SB-22 (0-0.5')	ERM SB-22 (2-4')	ERM SB-24 (0-0.5')	ERM SB-24 (2-4')	ERM SB-25 (0-0.5')	ERM SB-25 (2-4')	ERM SB-27 (0-0.5')	ERM SB-27 (2-4')	MPI SS-20
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Chromium, trivalent [h]	1,500	11	ND	8.1 J	ND	7.3 J	ND	11.9	ND	16.3 J	42.9 J
Cobalt	NA	NS	ND	2.5	ND	2.2	ND	4.8	ND	4.8 J	6.7 B
Copper	270	79	ND	59.7 J	ND	78.5 J	ND	104 J	ND	29.8	69.4 J
Total Cyanide [h]	27	NS	ND	**31.6**	ND	**28.3**	ND	8 J	ND	19.5	ND
Iron	NA	NS	ND	18,600	ND	18,500	ND	21,200	ND	51,700	27,800
Lead	1,000	96	ND	24.6	ND	26.9	ND	58.4 J	ND	50.8	208 J
Magnesium	NA	NS	ND	18,000 J	ND	10,500 J	ND	11,600	ND	13,000	11,300
Manganese	10,000[d]	NS	ND	3,620	ND	1,190	ND	640	ND	2,280 J	384
Total Mercury	2.8[j]	NS	ND	0.057	ND	ND	ND	0.16	ND	ND	0.19 J
Nickel	310	NS	ND	5	ND	3.8	ND	10.4	ND	12.7 J	19 J
Potassium	NA	NS	ND	3,450 J	ND	2,300 J	ND	1,210	ND	2,240	1,450
Selenium	1,500	NS	ND	31.6 J	ND	8.3 J	ND	ND	ND	ND	22.6 J
Sodium	NA	NS	ND	880	ND	485	ND	193	ND	575	ND
Vanadium	NA	NS	ND	20.7	ND	16.8	ND	ND	ND	37	22.9
Zinc	10,000[d]	NS	ND	112 J	ND	55.75	ND	411 J	ND	205 J	254 J
Pesticides and PCBs											
4,4'-DDE	62	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.0138 J
4,4'-DDT	47	ND	NS	NS	NS	NS	NS	NS	NS	NS	0.015 J
Other											
Oil and Grease	NA	320	NS	NS	NS	NS	NS	NS	NS	NS	NS
Ammonia	NA	43	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:

J = estimated value.

B = Result is between the instrument detection limit and the contract required detection limit.

NS = Not sampled.

ND = Not detected.

A bold/shaded value indicates an exceedence of a clean up objective.

Only those parameters having a value above the laboratory detection limit and found at a minimum of one location are shown.

b = The SCOs for commercial use were capped at a maximum value of 500 ppm.

d = The SCOs for the metals were at a maximum value of 10,000 ppm.

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

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 SCO.

j = This SCO is the lower of the values for mercury (elemental).

Created by: T. Hemmerling on 5/1/2009

Checked by: J. Richert on 5/1/2009

2.2. Summary of Site Contamination

Based on investigations performed to date at the subject site, soil and groundwater contains constituents of potential concern (COPCs) in the soil/fill and the groundwater. Table 2-1 provides a summary of soil/fill analytical data and Table 2-2 provides a summary of groundwater data. Although the degree of contamination appears relatively low based on these data, the number of samples collected at the Site is also relatively low relative to the size of the site. Also significant areas of impact have been visually identified but have not yet been sampled. These include petroleum-impacted soil/fill and groundwater beneath the large fill mound and the steel pipe located along the southern and western sides of the Site. This pipeline is known to contain at least residual amounts of petroleum and may have impacted the bedding and/or soil/fill adjacent to it.

2.3. Summary of Parcel 2 Remedial Action Work Plan

In November 2002, O'Brien & Gere Engineers, Inc. published a Remedial Action Work Plan (RAWP) for all of Subparcel 2 of the Hanna Furnace Site in support of the Voluntary Cleanup of Parcel 2. The RAWP was prepared under the NYSDEC ReBuild Now initiative. The RAWP identified the primary constituents of concern at Parcel 2 as being PAHs and metals in soil and groundwater. The COPCs were compared to Site-Specific Action Levels (SSALs) developed for Parcel 2. Petroleum-related non-aqueous phase liquid (NAPL) in shallow soil/fill was also identified as a concern at two locations on Parcel 2, neither of which are located on the subject site and both have since been removed.

The RAWP established Remedial Action Objectives (RAOs) based primarily on a qualitative Human Health Risk Assessment prepared by Malcolm Pirnie (Malcolm Pirnie, 2000). The RAOs for Parcel 2 are twofold:

1. To minimize potential human exposure to on-site soil/fill and groundwater, and
2. to prevent releases to the environment of petroleum-impacted soil/fill.

The RAWP for Parcel 2 recommended a site remedy including removal of petroleum-impacted soil/fill and a site-wide cover system. The remedy consisted of the following components:

- Removal and Management of Soil/Fill containing NAPL
- Site Preparation
- Cover System
- Soil/Fill Management
- Management of Construction Water
- Institutional Controls, and

Table 2-2
Summary of Analytical Results - Groundwater

Remedial Work Plan
200 Ship Canal Parkway, LLC
Buffalo, New York

Analytes	WATER QUALITY STANDARDS (GA)	2000 Malcolm Pirnie	
		MPI MW-003	MPI MW-003 (Duplicate)
	ug/L	ug/L	ug/L
VOCs			
VOCs	NA	ND	ND
SVOCs			
Di-n-butylphthalate	50	4 J	ND
Metals			
Aluminum	--	402	277
Barium	1,000	65.1 B	59.5 B
Calcium	--	159,000	141,000
Cyanide	200	20	10
Iron	300	**2,960**	**2340 J**
Lead	25	4.3 J	4.1 J
Magnesium	35,000	32,100	28,900
Manganese	300	**846**	**757**
Potassium	--	61,000	53,200 J
Selenium	10	**84.5 J**	**63.2 J**
Sodium	20,000	**44,000**	**39,000**
Zinc	2,000	86.2	40
Pesticides			
Pesticides	NA	ND	ND
PCBs			
PCBs	NA	ND	ND

Notes:
ND = Not Detected.
NA = Not Applicable.
-- = no water quality standard has been specified.
B = Result is between the instrument detection limit and contract required detection limit.
J = Indicates an estimated value. Result is below quantitation limit but above zero.
Shaded and bolded text indicates that guidance criteria was exceeded.

Created by: T. Hemmerling on 4/30/2009
Checked by: J. Richert on 5/1/2009

- Site Maintenance

Since the publishing of the 2002 Parcel 2 RAWP, three areas of petroleum-impacted soil have been removed from Parcel 2 (URS/Nature's Way, 2003) and additional investigation of Parcel 2 has been performed and other areas of impacted soil/fill have been identified (EmpireGeo, 2007). Also, in 2006, the NYSDEC promulgated new Soil Cleanup -Objectives (SCOs) under NYCRR Part 375-6.4 that are risk-based and applied based on site use. These SCOs replace the SSALs used previously for the BLCP. However, the remedial action objectives remain unchanged for Parcel 2 and the recommended site remedy remains the same as that recommended in the 2002 RAWP:

- Removal of petroleum-impacted soil/fill.
- Implementation of a Soil/Fill Management Plan.
- Placement of a site-wide cover system consisting of:
  - Paved surfaces and site structures.
  - One foot of clean soil cover in areas absent of buildings or pavement.

2.4. Additional Site Characterization

As presented above, several environmental studies have characterized Parcel 2 of the BLCP, and many included some the 5.7-acre subject Site. However, none of these studies focused solely on the subject site and therefore the subject Site is not completely characterized and further characterization is planned as part of the remedial action. Investigations to date have identified areas of known petroleum impact and, given the historical use of Parcel 2 as the manufacturing area of the Hanna Furnace facility, additional, not yet discovered, areas of impact may be identified with further investigation.

Although the site warrants and will be subject to additional environmental characterization, the environmental information obtained to date is sufficient to:

- Assess potential human health risks posed by the site.
- Identify remedial action objectives and a preferred cleanup track.
- Identify and evaluate remedial alternatives.
- Select and support a Site remedy.

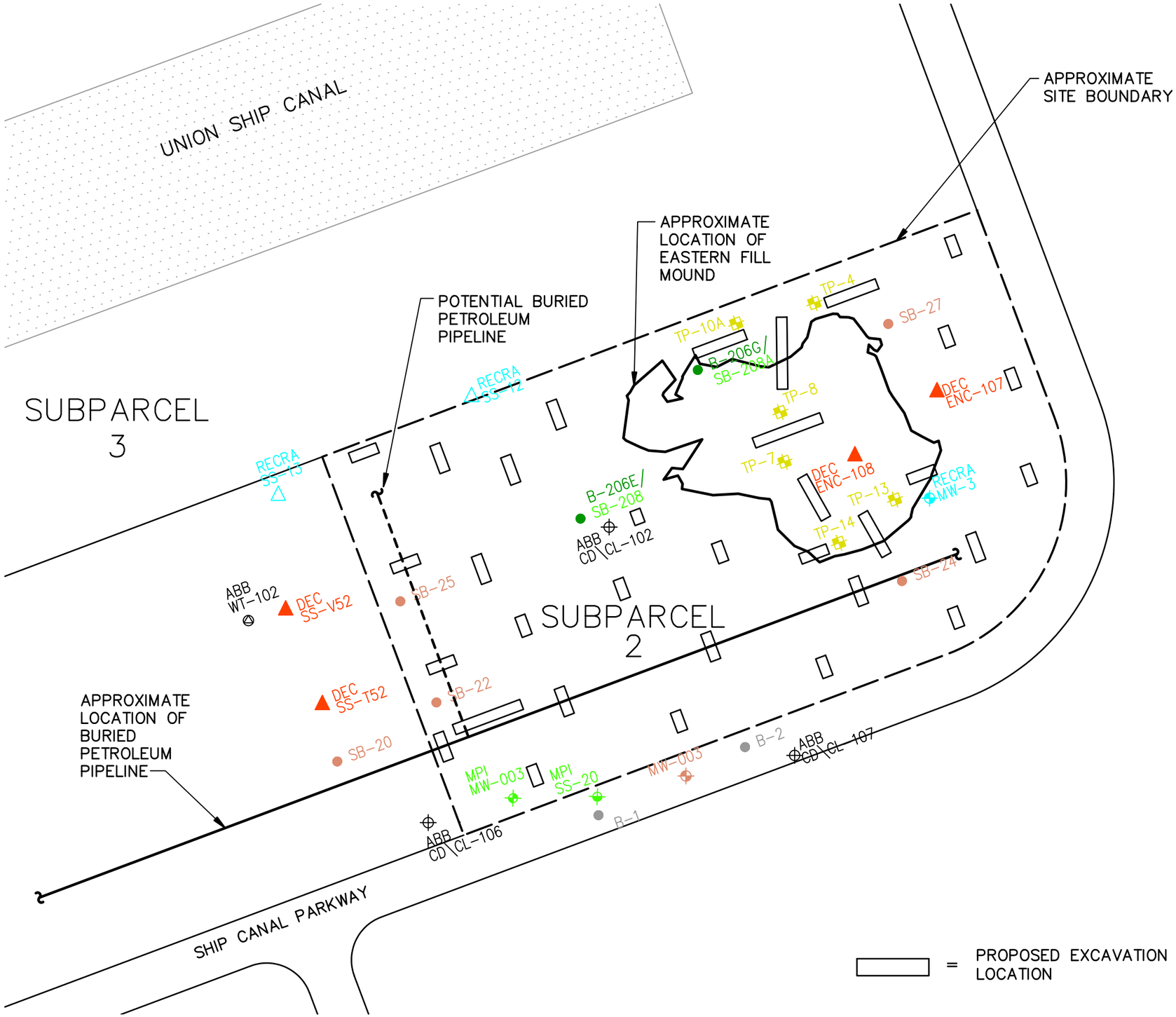
2.4.1. Proposed Characterization Work

As a necessary part of the Site remedy, areas of petroleum-impacted soil/fill will be located and delineated using a backhoe. At least one area of impact has been identified beneath the fill mound located on the eastern half of the subject site. Six of 23 test pits dug by EmpireGeo in 2007 encountered visible evidence of petroleum impact. Also, the east/west pipeline is known to contain petroleum and may have petroleum-impacted

soil/fill or bedding adjacent to it. Impacted areas will be delineated using visual, olfactory and air monitoring means during removal of the impacted soils. The horizontal and vertical extent of the excavation will be confirmed analytically by excavation sidewall and bottom sampling. Figure 2-2 depicts the approximate location of known petroleum impacted soil/fill and the locations of proposed exploratory test pits.

Confirmation samples will be collected within defined lateral boundaries of the excavation(s) to confirm removal relative to the Restricted Commercial Use SCOs for VOCs and SVOCs. A representative soil sample will be collected from the base of the excavation and vertical face of each of the excavation boundaries. Should analytical results detect concentrations in excess of the SCOs, the area of excavation will be extended and the working face re-sampled until all sides and bottom meet SCOs.

In addition to delineation of known areas of impact, those areas of the site that have not yet been sufficiently characterized will be tested using a backhoe to sample the subsurface soil and groundwater as necessary. A total of 20 test pits are proposed to be excavated to the depth of native soil or the water table, whichever is encountered first. The 20 test pits will be arranged in a biased grid pattern that focuses the test pits in areas not yet tested, mostly on the western half of the Site outside of where EmpireGeo's study was focused. Soil/fill will be sampled from up to 10 of the test pits based on results of field screening and observations. Sampled collected will be analyzed for the full VOCs, SVOCs, TAL metals, cyanide and pH. If floating product or sheen is noted on the surface of the groundwater within a test pit, a sample of the water surface will be collected and analyzed for VOCs, and SVOCs. If additional areas of significantly impacted soil/fill are identified from the test pit investigation, these areas will be delineated and removed.



LEGEND

RECRA ENVIRONMENTAL, INC.

- △ RECRA SS– = SURFACE SOIL SAMPLE, 1988
- ⌖ RECRA MW– = MONITORING WELL (DESTROYED), 1988

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

- ▲ DEC SS– = SURFACE SOIL SAMPLE, 1994
- ENC = ENCLOSURE SAMPLE, 1994

ABB ENVIRONMENTAL SERVICES, INC.

- ⊘ ABB WT– = DRUM SAMPLE LOCATION, 1995
- ⌖ ABB CD/CL = STRUCTURE SEDEMENT/ LIQUID SAMPLE, 1995

MALCOLM PIRNIE, INC.

- ⌖ MPI MW– = MONITORING WELL, 2000
- ⌖ MPI SS– = DEBRIS PILE SAMPLE, 2000

CLOUGH, HARBOR & ASSOCIATES, LLP

- ● B–1 = GEOTECHNICAL BORING LOCATION, 2004

BARRON & ASSOCIATES, P.C.

- ● B–209/ SB–202 = COMBINED GEOTECHNICAL (BARRON & ASSOC.) AND ENVIRONMENTAL (MALCOLM PIRNIE) SOIL BORING LOCATION

ERM, INC.

- ● SB–34 = SOIL BORING, 2002
- ⌖ MW–004 = MONITORING WELL, 2002

EMPIRE GEO SERVICES, INC

- ⌖ TP–14 = TEST PIT, 2007

▭ = PROPOSED EXCAVATION LOCATION

N.

50 0 50 100

SCALE: 1" = 100'

6210F002

MALCOLM PIRNIE

200 SHIP CANAL PARKWAY, LLC

200 SHIP CANAL PARKWAY SITE
BUFFALO, NEW YORK

PROPOSED
EXCAVATION LOCATIONS
SCALE: 1" = 100'

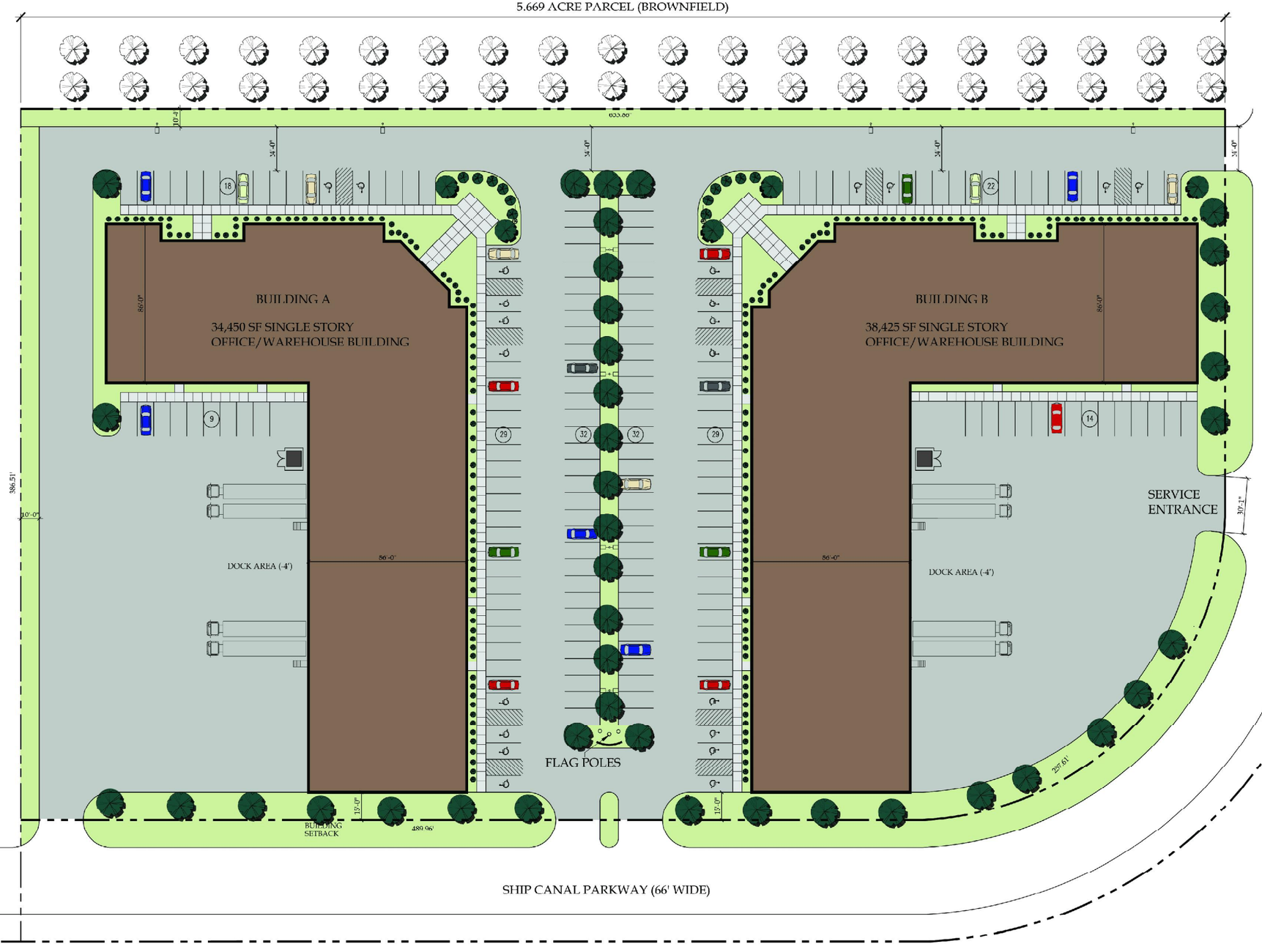
MALCOLM PIRNIE, INC.
SEPTEMBER 2009
FIGURE 2–2

3. PLANNED SITE REDEVELOPMENT

The site owner plans to construct two separate office/warehouse buildings on the BCP Site, each with a footprint of approximately 35,000 square feet. Figure 3-1 provides a preliminary color conceptual rendering of the planned site redevelopment, subject to modification/finalization.

UNION SHIP CANAL OPEN SPACE

5.669 ACRE PARCEL (BROWNFIELD)



30 0 30 60

SCALE: 1" = 60'

6210F003

MALCOLM PIRNIE	200 SHIP CANAL PARKWAY, LLC 200 SHIP CANAL PARKWAY SITE BUFFALO, NEW YORK	CONCEPTUAL SITE PLAN SCALE: 1" = 60'
		MALCOLM PIRNIE, INC. SEPTEMBER 2009 FIGURE 3–1

XREFS: IMAGES: F:\Projects\6210001 Savarino\CADD\Site Plan.tif
User: DEWYER Spec: PIRNIE STANDARD File: F:\Projects\6210001 Savarino\CADD\6210F003.DWG Scale: 1:1 Date: 09/17/2009 Time: 11:31 Layout: Layout1

4. RISK EVALUATION AND REMEDIAL GOALS

4.1. Qualitative Human Health Risk Assessment

As presented in the RAWP for Parcel 2, with the exception of the areas of petroleum-impacted soil/fill present on Parcel 2, the environmental condition of the soil/fill and groundwater on Parcel 1 and Parcel 2 are similar. For this reason along with the fact that they are adjacent to each other and formerly part of the same manufacturing facility, the conclusions presented in the Qualitative Human Health Risk Assessment (Malcolm Pirnie, 2001) for Parcel 1 are also applicable for Parcel 2. The risk assessment concluded that PAHs and metals in the surface and subsurface soil/fill pose limited risk to current site trespassers and future site users through possible direct contact and inhalation of respirable dust. Future site construction and utility workers could also be exposed to COPC in surface and subsurface soil/fill and groundwater during intrusive (digging) work. These potential risks would be of limited frequency and duration and can be minimized by following appropriate health and safety procedures. The potential for future site workers and visitors to be exposed to COPC in surface soil/fill can be eliminated by placement of a cover system over the site soil/fill. Therefore, if areas of significantly impacted soil/fill are removed from the Site as predevelopment remedial measures and the entire site is covered, the identified potential human health risks posed by Site COPCs will be sufficiently mitigated.

4.2. Remedial Goals

The remedial goals for the Site are:

1. Elimination of significant threats to public health posed by petroleum impacted soil/fill through removal and off-site disposal of these impacted soil/fill materials prior to Site redevelopment.
2. Mitigation of potential risks to public health posed by COPCs in on-Site soil/fill by placing a barrier (Site cover system) over the entire site.
3. Mitigate potential risks to public health posed by COPCs in on-Site groundwater by placing restrictions on the use of Site groundwater.

4.3. Remedial Action Objectives

Based on the contaminant characterization results and the Qualitative Risk Assessment, soil/fill material and groundwater are the media of concern for the Site. The constituents of potential concern (COPC) for soils consist primarily of metals and polyaromatic hydrocarbons (PAHs). Results of groundwater sampling indicate that constituents

present in the soil/fill material have not significantly impacted groundwater quality. Since groundwater is not an exposure pathway, except during invasive construction activities, groundwater treatment or containment is not required following construction.

The identification of the remedial action objective (RAO) for the soil/fill material at the Site is based primarily on the human health and environmental risks posed by the Site as identified in the Qualitative Risk Assessment (Malcolm Pirnie, 2001). The RAO for the Site is minimizing potential exposure risks associated with direct contact with soil/fill material and groundwater.

In order to achieve the RAO, the entire Site will be covered as part of redevelopment. The remedial alternative is a cover system that will be placed directly on top of the regraded soil/fill material. The proposed cover system will include clean material; vegetated soil cover in areas that will not receive significant equipment or vehicular use; asphalt in areas that will become roads, sidewalks, and parking lots; and concrete in areas that will become slab-on-grade structures.

4.4. Cleanup Track and SCGs

Site cleanup under Track 1 and 2 were considered and evaluated (see Section 5.2.2.2) but ultimately eliminated from consideration based on excessive cost.

Cleanup under Track 1 requires achieving unrestricted use soil cleanup objectives as specified in 6NYCRR Subpart 375-6.8(a) resulting in unrestricted Site use. Implementing the Track 1 alternative at this Site would involve removal of all on-site soil/fill material to native material or bedrock, and replacement with documented clean soil per Appendix 5X of Draft DER-10 (March 2008) Allowable Constituent Levels for Imported Fill or Soil.

Cleanup under Track 2 would require achieving the lowest of three applicable restricted use contaminant-specific soil cleanup objectives for all soils above bedrock as set forth in Section 375-6.4, (protection of public health), Section 375-6.5 (protection of groundwater), and Section 375-6.6 (protection of ecological resources). Soils at depths greater than 15 feet below ground surface would not need to be removed to achieve the above listed contaminant-specific cleanup objectives if:

- The soils below 15 feet do not represent a source of contamination.
- The environmental easement requires that contaminated soils below 15 feet be managed pursuant to a site management plan.
- Off-site groundwater does not exceed standards.
- On-site groundwater use is restricted.

For this Site, Track 1 and Track 2 cleanups would essentially be the same because the thickness of the impacted soil/fill averages eight feet across the Site, thus the depth and volume of soil/fill removed under either scenario is the same. As discussed in Section 5.2.2.2, the significant volume of impacted soil/fill that would need to be removed and replaced by clean soil under a Track 1 or Track 2 cleanup is cost prohibitive.

Based on the environmental conditions and the proposed future use of the Site, Cleanup Track 4 is planned for remediation and redevelopment of the Site. Track 4 cleanup will involve:

- Removal of the petroleum-impacted abandoned pipeline and related impacted soil/fill as well as other known and potentially other impacted soil/fill. Site cleanup and soil management will be based on restricted commercial use soil cleanup objectives (SCOs) set forth in NYCRR Subpart 375-6.8.
- Placement of a Site cover system that includes Site structures, paved roadways, walkways, and parking areas. Where structures and paved surfaces are not planned, a minimum one foot thick soil layer will be placed that meets the SCOs for restricted commercial use.
- Use of long-term institutional or engineering controls for overall Site and groundwater use as well as regular Site inspections and monitoring.

Standards, Criteria, and Guidance Values (SCGs) for the Site will be the Soil Cleanup Objectives (SCOs) for restricted commercial use as contained in NYCRR Subpart 375-6.8.

5. REMEDIAL ALTERNATIVES

5.1. Predevelopment Remedial Measures

Prior to implementation of Site-wide remedial measures and redevelopment several pre-redevelopment work items will be addressed, these include:

- Soil/fill Mound – an above grade soil/fill mound is located on the eastern half of the Site. This soil/fill mound was created from soil/fill material excavated during road and utility construction on the Buffalo Lakeside Commerce Park and was screened and characterized per the Parcel 1 and 2 Soil/Fill Management Plans at that time. The mound also contains a significant amount of concrete and other large solid debris. Because of its size and location on the site, this mound will be sorted and leveled prior to site remediation and redevelopment. Large rocks, concrete and other solid items will be either buried on site or removed from the site for off-site disposal.
- Petroleum Pipeline - an abandoned pipeline that contains petroleum will need to be removed along with related petroleum-impacted soil/fill.
- Petroleum-Impacted Soil/fill - one area of petroleum-impacted soil/fill is known to exist on the Site beneath the large soil/fill mound. This and other petroleum impacted soil/fill found during the pre-redevelopment investigations and redevelopment activities will be removed as part of redevelopment.

5.1.1. Removal of Petroleum-Impacted Pipeline

A buried petroleum-filled steel pipeline remains on the Site and requires tracing, removal and off-site disposal including any oil sludge from the pipeline as well as significantly impacted soil/fill along the pipeline. This pipeline was encountered in May 2004 during a removal action of petroleum impacted soil at the parcel directly west of the subject BCP site. It is reportedly oriented east/west and located approximately 125 feet north of the centerline of Ship Canal Parkway. The main pipeline is an estimated 950 feet long and the eastern 250' are located on the subject BCP site. The top of the pipeline is approximately 4' below ground surface. The pipeline was cleaned of oily sludge and water from its western end to approximately 50 feet onto the BCP Site at which point the pipeline was sealed to prevent the sludge from the eastern reach of the pipe from reentering the cleaned western section. The easternmost 250 feet remains to be delineated and removed. Also there is reportedly a northern branch of similar piping branching from a "T" connection to the north towards the canal for approximately 275 feet. Thus, the total length of pipeline in need of delineation and removal on the BCP Site is estimated at approximately 525 feet, see Figure 2-1.

5.1.2. Removal of Impacted Soil/Fill

In December 2006, during a characterization study of the soil/fill mound for ECIDA, EmpireGeo excavated 23 test pits through the mounded soil/fill. Most test pits extended into the underlying subsurface soil/fill. At six of the 23 test pit locations oily sheen, oil staining, or petroleum odor was noted in the subsurface beneath the mounds. These petroleum impacted area(s) will be delineated and the impacted soil/fill and groundwater will be excavated/removed and disposed off Site prior to Site remediation and redevelopment. The six test pits in which petroleum impacts were observed are TP-4, TP-7, TP-8, TP-10A, TP-13, and TP-14. It is not yet known if these areas of petroleum impact are connected or represent more than one area in need of remediation. Figure 2-1 shows the approximate location of these six test pits.

5.2. Site-Wide Remedial Alternatives

5.2.1. Identification of Remedial Alternatives

Identified Site-wide remedies fall into one of two general categories; those that allow unrestricted Site use and those that result in restricted use of the Site.

Remedies that could result in unrestricted use of the Site include:

- Track 1 excavation and off-site disposal of all impacted on-site soil/fill and replacement with clean fill.
- In-situ or ex-situ treatment of the contaminated soil/fill.

Restricted use remediation of the Site can be accomplished by providing soil cover over all areas of the Site where direct contact will not be precluded by the presence of either buildings or pavement. Off-site disposal of significantly impacted soil/fill through IRMs and select soil/fill material excavated during construction would be completed prior to implementation of this remedy.

Subsection 5.2.2 describes each remedial alternative considered.

5.2.2. Descriptions of Remedial Alternatives

5.2.2.1. Unrestricted Use Remedies

Excavation and Off-Site Disposal

This alternative involves excavation of non-native fill materials and off-site transport and placement in an appropriately permitted secure landfill. This alternative would be considered a Track 1 cleanup if all of the impacted soil/fill was removed or a Track 2 (restricted) cleanup if all soil/fill to a depth of 15 feet below grade was removed leaving impacted soil/fill at depths below 15 feet.

Treatment Technologies

Treatment technologies potentially applicable for the contaminants associated with the Site include:

- Solidification/Stabilization
- Bioremediation
- Phytoremediation
- Chemical Oxidation
- Electro kinetic Separation
- Soil Flushing

Each of these potentially applicable treatment technologies are described below:

Solidification/Stabilization (S/S) involves physically binding or enclosing the Site contaminants within a stabilized mass (solidification), or inducing chemical reactions between the stabilizing agent and the contaminants to reduce their mobility (stabilization). S/S can be applied in-situ or ex-situ. The target contaminant group for in-situ S/S is generally inorganics and thus would not address the PAHs. The In-Situ Vitrification (ISV) process can destroy or remove organics and immobilize most inorganics in contaminated soils, sludge, or other earthen materials. The process has been tested on a broad range of VOCs and SVOCs, other organics including dioxins and PCBs, and on most priority pollutant metals and radionuclides. However, future usage of the Site may "weather" the materials and affect their ability to maintain contaminant stability. Most vitrification processes result in a significant increase in volume (up to double the original volume). In addition, the solidified material may potentially hinder future Site uses. As a result S/S is considered not applicable for remediation of this Site and will not be included for further consideration.

Bioremediation/Bio-augmentation describes the activity of naturally occurring or inoculated microbes stimulated by circulating water-based solutions through the contaminated soils to enhance in situ biological degradation of organic contaminants or immobilization of inorganic contaminants. Nutrients, oxygen, or other admixed materials may be used to enhance bioremediation and contaminant desorption from subsurface materials. The contaminant groups treated most often are PAHs, non-halogenated SVOCs (not including PAHs), and BTEX. Remediation of metals with microbial techniques is in the experimental stage, with limited data/guidance.

Bioleaching uses microorganisms to solubilize metal contaminants either by direct action of the bacteria, as a result of interactions with metabolic products, or both. Bioleaching can be used in-situ or ex-situ to aid the removal of metals from soil. Because of bioremediation’s limited applicability for treating recalcitrant PAHs and metals, and the

potential for the on-site metals concentrations to be toxic to the microorganisms, this treatment technology is not considered to be applicable for remediation of this Site and will not be given further consideration.

Phytoremediation is a process that uses plants to remove, transfer, stabilize, or destroy contaminants in soil, sediment, and groundwater. The mechanisms of phytoremediation include enhanced rhizosphere biodegradation, which takes place in soil or groundwater immediately surrounding plant roots; phytoextraction (also known as phytoaccumulation), the uptake of contaminants by plant roots and the translocation/accumulation of contaminants into plant shoots and leaves; phytodegradation, the metabolism of contaminants within plant tissues; and phytostabilization, the production of chemical compounds by plants to immobilize contaminants at the interface of roots and soil. Phytoremediation applies to all biological, chemical, and physical processes that are influenced by plants (including the rhizosphere) and that aid in cleanup of the contaminated substances. Plants can be used in Site remediation, both through the mineralization of toxic organic compounds and through the accumulation and concentration of heavy metals and other inorganic compounds from soil into aboveground shoots. Phytoremediation may be applicable for the remediation of metals, pesticides, solvents, explosives, crude oil, PAHs, and landfill leachates. Some plant species have the ability to store metals in their roots. As the roots become saturated with metal contaminants, they can be harvested. Hyper-accumulator plants may be able to remove and store significant amounts of metallic contaminants. Currently, trees are under investigation to determine their ability to remove organic contaminants from ground water, translocate and transpiration, and possibly metabolize them either to CO2 or plant tissue. The depth of the treatment zone varies based on the plants used in phytoremediation, but in most cases, it is limited to shallow soils. High concentrations of some contaminants can be toxic to plants. In addition, the process occurs seasonally. Since different planting materials would be required for each group of site contaminants, this process likely requires many seasons to remediate to non-risk concentrations.

Given the nature of the Site, selected plant species may not consistently remove materials from across the Site and with depth; contaminants may potentially be mobilized into groundwater. This treatment technology is not applicable for remediation of this Site and will not be given further consideration.

Chemical Oxidation chemically 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, hypochlorites, chlorine, and chlorine dioxide. This technology can be applied in-situ or ex-situ. In-situ chemical oxidation (ISCO) using permanganate for soil and groundwater treatment has been demonstrated at a number of sites for the following organics: chlorinated solvents (such as trichloroethylene [TCE]), naphthalene, and pyrene. Fenton's Reagent can be used to

treat a wide range of organic contaminants in soil and groundwater, including chlorinated solvents, petroleum hydrocarbons, semi-volatile organic compounds (SVOCs), and pesticides. ISCO has also been used to remediate polyaromatic hydrocarbons (PAHs), petroleum products, and ordnance compounds. Chemical treatment may be used to solubilize contaminants from the most contaminated fraction of the soil. Many processes manipulate the acid/base chemistry of the slurry to leach contaminants from the soil. Oxidizing and reducing agents (e.g., hydrogen peroxide, sodium borohydride) provide yet another option to aid in solubilization of metals since chemical oxidation/ reduction can convert metals to more soluble forms. Finally, surfactants may be used in extraction of the metals from soil. Because different chemicals would be required to treat each contaminant group, and application is limited by the ability of the oxidants to reach the contaminants, this treatment technology is not considered applicable for remediation of this Site and will not be given further consideration.

Electrokinetic Separation relies upon the application of a low-intensity direct current through the soil between ceramic electrodes that are divided into a cathode array and an anode array. This mobilizes charged species, causing ions and water to move toward the electrodes. Metal ions, ammonium ions, and positively charged organic compounds move toward the cathode. Anions such as chloride, cyanide, fluoride, nitrate, and negatively charged organic compounds move toward the anode. The current creates an acid front at the anode and a base front at the cathode. This generation of an in-situ acidic condition may help to mobilize sorbed metal contaminants for transport to the collection system at the cathode. Concentrated (migrated) contaminants are then removed for treatment or can be treated in treatment walls as they migrate. The polarity of the electrodes is reversed periodically, which reverses the direction of the contaminants back and forth through treatment zones. Electrokinetics has been used for decades in the oil recovery industry and to remove water from soils, but in-situ application of electrokinetics to remediate contaminated soil is new. Recently, attention has focused on developing in-situ electrokinetic techniques for the treatment of low permeability soils, which are resistant to remediation with traditional technologies because of their low hydraulic conductivity. Because of its limited effectiveness for non-polar organic contaminants, such as PAHs, this treatment technology will not be given further consideration for remediation of this Site.

In-Situ Soil Flushing is used to mobilize metals by leaching contaminants from soils so that they can be extracted without excavating the contaminated materials. An aqueous extracting solution is injected into or sprayed onto the contaminated area to mobilize the contaminants, usually by solubilization. After being contacted with the contaminated material, the extractant solution is collected using pump-and-treat methods for disposal or treatment and reuse. Common extracting agents include acids/bases, chelating agents, oxidizing/reducing agents and surfactant cosolvents. This process can be applied in-situ or ex-situ (soil washing). The target contaminant groups for soil washing are SVOCs,

fuels, and heavy metals. The technology can be used on selected VOCs and pesticides. The technology offers the ability for recovery of metals and can clean a wide range of organic and inorganic contaminants from coarse-grained soils. However, complex mixtures of contaminants in the soil (such as a mixture of metals, nonvolatile organics, and SVOCs) and heterogeneous contaminant compositions throughout the soil mixture make it difficult to formulate a single suitable washing solution that will consistently and reliably remove all of the different types of contaminants. There is additionally limited data regarding flushing for PAHs. For these reasons, this treatment technology is not considered applicable for remediation of this Site and will not be considered further.

5.2.2.2. Detailed Evaluation of Restricted Use Remedial Alternatives

As described above, unrestricted Site use alternatives are considered not feasible for redevelopment of the Site. Potential restricted use remedial alternatives for the Site are identified and evaluated in this sub-section.

Alternative #1 – Track 1 or Track 2 Soil/Fill Removal and Replacement

To facilitate characterization of potential contaminant impacts to soil/fill materials in the Parcel 2 site area, we have utilized and considered data from the adjacent Parcel 1 to supplement analytical data shown in Tables 2-1 and 2-2. Parcel 1 is located immediately to the south and hydraulically upgradient of the Site.

As shown on summary Tables 5-1, 5-2, 5-3 and 5-4, primary chemicals of potential concern identified in Parcel 1 surface and subsurface soil/fill materials included carcinogenic semi-volatile organic compounds (CPAHs) and metals. On that basis, the excavation and removal of the stockpiled C&D materials currently staged on Site and subsurface soil/fill to an average depth of eight (8’ feet) below ground surface was considered. The depth of excavation is based on the average depth of soil/fill material determined during a previous investigation (Barron and Associates (2001).

This alternative requires the removal of contaminated soil/fill (remaining after implementation of the predevelopment remedial measures completed to remove petroleum impacted soil/fill material associated with the buried pipeline), transport and placement of these materials in an appropriately permitted secure landfill and placement of clean backfill. Excavation of the soil/fill under this Alternative would require the removal of soil/fill material to an average depth of eight feet below ground surface.

A discussion of the evaluation criteria for this alternative follows.

Excavation of impacted fill materials and subsequent backfilling and re-grading would effectively eliminate the contaminant source. Short-term risks of exposure to construction personnel could be adequately managed through the appropriate use of personal protective equipment (PPE), and health and safety protocols. Disposal of the

TABLE 5-1
SUBSURFACE SOIL DATA
ADJACENT SUBPARCEL 1 AREA

ANALYTE	Jan 2000 (MPI)		Jan 1999 (MPI)		1995 (ABB)		1988 (Recra)		NYSDEC TAGM
	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Recommended Soil Cleanup Objectives
VOLATILE ORGANICS (ug/kg)									
2-Butanone	1 / 5	4	NA	NA	1 / 2	18	NA	NA	300
Carbon disulfide	4 / 5	4 - 12	NA	NA	0 / 2	ND	NA	NA	2,700
Toluene	2 / 5	4 - 6	NA	NA	0 / 2	ND	NA	NA	1,500
SEMI-VOLATILE ORGANICS (ug/kg)									
Acenaphthene	1 / 6	65	1 / 18	170	0 / 2	ND	NA	NA	50,000
Anthracene	1 / 6	190	3 / 18	110 - 360	0 / 2	ND	NA	NA	50,000
Benzo(a)anthracene	1 / 6	370	5 / 18	110 - 450	0 / 2	ND	NA	NA	224
Benzo(a)pyrene	1 / 6	310	5 / 18	160 - 470	0 / 2	ND	NA	NA	61
Benzo(b)fluoranthene	2 / 6	450 - 490	5 / 18	220 - 650	0 / 2	ND	NA	NA	224
Benzo(g,h,i)perylene	1 / 6	110	5 / 18	89 - 410	0 / 2	ND	NA	NA	50,000
Benzo(k)fluoranthene	1 / 6	170	1 / 18	150	0 / 2	ND	NA	NA	1,100
bis(2-Ethylhexyl)phthalate	5 / 6	110 - 250	NA	NA	0 / 2	ND	NA	NA	50,000
Carbazole	1 / 6	60	NA	NA	0 / 2	ND	NA	NA	--
Chrysene	2 / 6	340 - 480	5 / 18	160 - 500	0 / 2	ND	NA	NA	400
Dibenzofuran	1 / 6	110	NA	NA	0 / 2	ND	NA	NA	6,200
Fluoranthene	2 / 6	410 - 990	6 / 18	96 - 980	0 / 2	ND	NA	NA	50,000
Fluorene	1 / 6	94	0 / 18	ND	0 / 2	ND	NA	NA	50,000
Indeno(1,2,3-cd)pyrene	1 / 6	110	2 / 18	220 - 330	0 / 2	ND	NA	NA	3,200
2-Methylnaphthalene	0 / 6	ND	3 / 18	96 - 230	0 / 2	ND	NA	NA	36,400
Naphthalene	0 / 6	ND	3 / 18	79 - 150	0 / 2	ND	NA	NA	13,000
Phenanthrene	2 / 6	380 - 890	5 / 18	180 - 1,400	0 / 2	ND	NA	NA	50,000
Pyrene	2 / 6	600 - 860	5 / 18	170 - 1,100	0 / 2	ND	NA	NA	50,000

TABLE 5-1 (cont'd)
SUBSURFACE SOIL DATA
ADJACENT SUBPARCEL 1 AREA

ANALYTE	Jan 2000 (MPI)		Jan 1999 (MPI)		1995 (ABB)		1988 (Recra)		NYSDEC TAGM
	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Recommended Soil Cleanup Objectives
INORGANICS (mg/kg)									
Aluminum (average = 33,784)	6 / 6	9,690 - 45,700	18 / 18	12,200 - 54,000	2 / 2	35,300 - 43,600	NA	NA	144,000 *
Antimony (average = 12.19)	0 / 6	ND	9 / 18	10.3 - 16.6	0 / 2	ND	NA	NA	2.0 *
Arsenic	1 / 6	10	2 / 18	20.4 - 35.6	0 / 2	ND	2 / 2	11	7.5
Barium	6 / 6	109 - 428	18 / 18	89.3 - 416	2 / 2	188 - 464	NA	NA	300
Beryllium	6 / 6	2.1 - 8.2	18 / 18	0.73 - 9.61	2 / 2	3.8 - 6.3	NA	NA	0.16
Cadmium	2 / 6	2.1 - 6.2	4 / 18	1.05 - 8.1	0 / 2	ND	NA	NA	10
Calcium	6 / 6	55,800 - 259,000	18 / 18	37,400 - 296,000	2 / 2	132,000 - 233,000	NA	NA	1,000,000 **
Chromium	6 / 6	4.9 - 19.5	18 / 18	4.36 - 35.2	1 / 2	9.6	2 / 2	4.2 - 23	50
Cobalt	1 / 6	5.8	16 / 18	3.08 - 14	0 / 2	ND	NA	NA	30
Copper	3 / 6	5 - 44.1	18 / 18	5.53 - 42.2	1 / 2	7.3	2 / 2	17 - 28	25
Iron	6 / 6	3,250 - 89,400	18 / 18	4,250 - 209,000	2 / 2	1,780 - 9,450	NA	NA	200,000 **
Lead (average = 52.63)	3 / 6	2.2 - 54.6	15 / 18	9.78 - 175	2 / 2	1.9 - 113	2 / 2	19 - 22	42 *
Magnesium	6 / 6	8,800 - 13,500	18 / 18	5,320 - 26,800	2 / 2	9,220 - 16,700	NA	NA	1,000,000 **
Manganese (average = 2,392)	6 / 6	960 - 2,190	17 / 18	671 - 5,150	2 / 2	2,690 - 2,710	NA	NA	1,280 *
Mercury	0 / 6	ND	5 / 18	0.022 - 0.097	0 / 2	ND	NA	NA	0.1
Nickel	0 / 6	ND	18 / 18	8.71 - 33.5	0 / 2	ND	NA	NA	13
Potassium	6 / 6	1,910 - 6,120	18 / 18	1,080 - 2,970	2 / 2	655 - 1,230	NA	NA	1,000,000 **
Selenium	5 / 6	17.4 - 28.3	0 / 18	ND	0 / 2	ND	NA	NA	0.6 *
Sodium	0 / 6	ND	18 / 18	189 - 746	2 / 2	522 - 1,400	NA	NA	1,000,000 **
Vanadium	2 / 6	12.5 - 12.9	18 / 18	8.4 - 104	1 / 2	13.8	NA	NA	150
Zinc	6 / 6	6.4 - 166	17 / 18	9.05 - 1,670	2 / 2	5.4 - 74.8	NA	NA	20
OTHER (mg/kg)									
Cyanide, total	5 / 6	3.1 - 43	18 / 18	0.99 - 33.2	2 / 2	3.9 - 32.1	NA	NA	--

NA: Not Analyzed.
ND: Not Detected.
--: Not Available.
*: Two times the New York or Eastern United States average background value, from Dragun and Chiasson (1991).
**: Nutrient screening concentration.

TABLE 5-2
SURFACE SOIL DATA
ADJACENT SUBPARCEL 1 AREA

ANALYTE	Jan 2000 (MPI)		Jan 1999 (MPI)		1988 (RECRA)		NYSDEC TAGM
	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Recommended Soil Cleanup Objectives
VOLATILE ORGANICS (ug/kg)							
Benzene	1 / 1	2	NA	NA	NA	NA	60
2-Butanone	1 / 1	27	NA	NA	NA	NA	300
Carbon Disulfide	1 / 1	5	NA	NA	NA	NA	2,700
Chloroform	1 / 1	3	NA	NA	NA	NA	300
Ethylbenzene	1 / 1	2	NA	NA	NA	NA	5,500
2-Hexanone	1 / 1	14	NA	NA	NA	NA	--
1,1,2,2-Tetrachloroethane	1 / 1	3	NA	NA	NA	NA	600
Toluene	1 / 1	8	NA	NA	NA	NA	1,500
Xylenes (total)	1 / 1	9	NA	NA	NA	NA	1,200
SEMI-VOLATILE ORGANICS (ug/kg)							
Acenaphthene	NA	NA	5 / 18	74 - 400	NA	NA	50,000
Acenaphthylene	NA	NA	2 / 18	130 - 200	NA	NA	41,000
Anthracene	NA	NA	8 / 18	78 - 530	NA	NA	50,000
Benzo(a)anthracene	NA	NA	16 / 18	75 - 3,700	NA	NA	224
Benzo(a)pyrene	NA	NA	17 / 18	73 - 5,100	NA	NA	61
Benzo(b)fluoranthene	NA	NA	17 / 18	120 - 6,400	NA	NA	224
Benzo(g,h,i)perylene	NA	NA	13 / 18	95 - 4,100	NA	NA	50,000
Benzo(k)fluoranthene	NA	NA	8 / 18	250 - 1,900	NA	NA	1,100
Chrysene	NA	NA	17 / 18	82 - 3,300	NA	NA	400
Dibenz(a,h)anthracene	NA	NA	3 / 18	170 - 960	NA	NA	14
Fluoranthene	NA	NA	17 / 18	83 - 2,000	NA	NA	50,000
Indeno(1,2,3-cd)pyrene	NA	NA	8 / 18	430 - 3,700	NA	NA	3,200
2-Methylnaphthalene	NA	NA	6 / 18	65 - 210	NA	NA	36,400
Naphthalene	NA	NA	6 / 18	65 - 130	NA	NA	13,000
Phenanthrene	NA	NA	13 / 18	78 - 1,500	NA	NA	50,000
Pyrene	NA	NA	15 / 18	110 - 5,200	NA	NA	50,000
PHENOLIC COMPOUNDS (mg/kg)	ND	ND	ND	ND	1 / 5	1.5	30
ADJACENT SUBPARCEL 1 AREA							
PESTICIDES/PCBs (mg/kg)							
Aroclor 1242	NA	NA	NA	NA	2 / 5	0.15 - 0.37	1
Aroclor 1254	NA	NA	NA	NA	2 / 5	0.35 - 1.3	1
Aroclor 1260	NA	NA	NA	NA	1 / 5	0.074	1

TABLE 5-2 (cont'd)
SURFACE SOIL DATA
ADJACENT SUBPARCEL 1 AREA

ANALYTE	Jan 2000 (MPI)		Jan 1999 (MPI)		1988 (RECRA)		NYSDEC TAGM
	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Frequency of Detection	Range of Detected Concentrations	Recommended Soil Cleanup Objectives
INORGANICS (mg/kg)							
Aluminum (average = 24,717)	NA	NA	18 / 18	16,300 - 45,700	NA	NA	144,000 *
Antimony (average = 9.43)	NA	NA	12 / 18	6.99 - 15.1	NA	NA	2.0 *
Arsenic	NA	NA	3 / 18	15.4 - 61.7	5 / 5	14 - 32	7.5
Barium	NA	NA	18 / 18	80.7 - 365	NA	NA	300
Beryllium	NA	NA	18 / 18	1.44 - 7.45	NA	NA	0.16
Cadmium	NA	NA	5 / 18	0.707 - 8.00	NA	NA	10
Calcium	NA	NA	18 / 18	48,000 - 212,000	NA	NA	1,000,000 **
Chromium	NA	NA	18 / 18	6.89 - 127	5 / 5	22 - 4,700	50
Cobalt	NA	NA	18 / 18	1.89 - 15.7	NA	NA	30
Copper	NA	NA	18 / 18	20.1 - 181	5 / 5	23 - 640	25
Iron	NA	NA	18 / 18	13,700 - 236,000	NA	NA	200,000 **
Lead (average = 408.2)	NA	NA	18 / 18	22.1 - 1,120	5 / 5	21 - 3,300	42 *
Magnesium	NA	NA	18 / 18	5,890 - 38,200	NA	NA	1,000,000 **
Manganese (average = 3,548)	NA	NA	18 / 18	1,900 - 10,400	NA	NA	1,280 *
Mercury	NA	NA	4 / 18	0.025 - 0.21	NA	NA	0.1
Nickel	NA	NA	18 / 18	11.9 - 96.9	NA	NA	13
Potassium	NA	NA	18 / 18	716 - 2,310	NA	NA	1,000,000 **
Silver	NA	NA	18 / 18	191 - 1,170	NA	NA	--
Sodium	NA	NA	18 / 18	6.26 - 66.3	NA	NA	1,000,000 **
Vanadium	NA	NA	18 / 18	63.7 - 1,150	NA	NA	150
Zinc	NA	NA	18 / 18	64 - 1,200	NA	NA	20
OTHER (mg/kg)							
Cyanide, total	NA	NA	18 / 18	2.17 - 28.8	4 / 5	3.2 - 70	--

--: Not Available.
*: Two times the New York or Eastern United States average background value, from Dragun and Chiasson (1991).
**: Nutrient screening concentration.

TABLE 5-3
SOIL/FILL PILES DATA
ADJACENT SUBPARCEL 1 AREA

ANALYTE	Feb 2000 (MPI)		NYSDEC TAGM
	Frequency of Detection	Range of Detected Concentrations	Recommended Soil Cleanup Objectives
VOLATILE ORGANICS (ug/kg)			
Benzene	1 / 20	11	60
2-Butanone	1 / 20	12 - 19	300
Carbon disulfide	2 / 20	2	2,700
Chloroform	11 / 20	2 - 7	300
Chloromethane	1 / 20	16	--
cis-1,2-Dichloroethene	1 / 20	5	--
Ethylbenzene	1 / 20	33	5,500
4-Methyl-2-pentanone	3 / 20	2 - 4	1,000
Styrene	1 / 20	20	--
1,1,2,2-Tetrachloroethane	1 / 20	59	600
Tetrachloroethene	2 / 20	1 - 2	1,400
Toluene	19 / 20	2 - 60	1,500
Trichloroethene	1 / 20	220	700
Xylenes (total)	2 / 20	2 - 28	1,200
SEMIVOLATILE ORGANICS (ug/kg)			
Acenaphthene	10 / 20	47 - 690	50,000
Acenaphthylene	6 / 20	66 - 210	41,000
Anthracene	14 / 20	62 - 2,500	50,000
Benzo(a)anthracene	18 / 20	51 - 3,700	224
Benzo(a)pyrene	19 / 20	57 - 4,200	61
Benzo(b)fluoranthene	18 / 20	89 - 5,400	224
Benzo(g,h,i)perylene	15 / 20	89 - 3,000	50,000
Benzo(k)fluoranthene	17 / 20	39 - 1,600	1,100
bis(2-Ethylhexyl)phthalate	20 / 20	41 - 650	50,000
Butylbenzylphthalate	3 / 20	130 - 790	50,000
Carbazole	10 / 20	40 - 570	--
Chrysene	19 / 20	66 - 3,800	400
Dibenz(a,h)anthracene	4 / 20	110 - 950	14
ADJACENT SUBPARCEL 1 AREA	9 / 20	47 - 670	6,200
Di-n-butylphthalate	4 / 20	47 - 120	8,100
2,6-Dinitrotoluene	1 / 20	120	1,000
Fluoranthene	19 / 20	53 - 8,500	50,000
Fluorene	9 / 20	69 - 900	50,000
Indeno(1,2,3-cd)pyrene	15 / 20	170 - 2,700	3,200
2-Methylnaphthalene	5 / 20	83 - 430	36,400
4-Methylphenol	1 / 20	120	900
Naphthalene	8 / 20	42 - 720	13,000
Phenanthrene	19 / 20	43 - 6,000	50,000
Pyrene	19 / 20	78 - 9,700	50,000

TABLE 5-3
SOIL/FILL PILES DATA
ADJACENT SUBPARCEL 1 AREA

ANALYTE		Feb 2000 (MPI) Frequency of Detection	Feb 2000 (MPI) Range of Detected Concentrations	NYSDEC TAGM Recommended Soil Cleanup Objectives
PESTICIDES / PCBs (ug/kg)				
Aldrin		3 / 20	2.6 - 500	41
alpha-Chlordane		2 / 20	29.3 - 500	540
gamma-Chlordane		1 / 20	2.1	540
4,4'-DDE		5 / 20	3.9 - 13.8	2,100
4,4'-DDT		6 / 20	4.7 - 32	2,100
Heptachlor		1 / 20	3.2	20
Aroclor 1254		1 / 20	1,200	1,000
Aroclor 1260		1 / 20	3,820	1,000
INORGANICS (mg/kg)				
Aluminum	(average = 9,318)	20 / 20	2,950 - 28,600	144,000 *
Antimony	(average = 7.16)	1 / 20	7.2	2.0 *
Arsenic		15 / 20	3.0 - 22.9	7.5
Barium		20 / 20	40.2 - 327	300
Beryllium		8 / 20	0.73 - 5.3	0.16
Cadmium		19 / 20	1.4 - 19.9	10
Calcium		20 / 20	14,200 - 209,000	1,000,000 **
Chromium		20 / 20	8.2 - 193	50
Cobalt		15 / 20	5.0 - 15.9	30
Copper		20 / 20	9.4 - 504	25
Iron		20 / 20	7,910 - 244,000	200,000 **
Lead	(average = 140.7)	20 / 20	15.2 - 766	42 *
Magnesium		20 / 20	3,070 - 23,600	1,000,000 **
Manganese	(average = 882.0)	20 / 20	194 - 3,320	1,280 *
Mercury		11 / 20	0.12 - 0.67	0.1
Nickel		18 / 20	7.74 - 84.8	13
Potassium		20 / 20	657 - 4,970	1,000,000 **
Selenium		19 / 20	2.3 - 35.9	0.6 *
Sodium		5 / 20	230 - 675	1,000,000 **
Thallium		3 / 20	2.4 - 4.8	--
Vanadium		19 / 20	8.7 - 44.2	150
Zinc		20 / 20	63.8 - 2,380	20
OTHER (mg/kg)				
Cyanide, total		6 / 20	1.7 - 12.7	--

--: Not Available.
*: Two times the New York or Eastern United States average background value, from Dragun and Chiasson (1991).
**: Nutrient screening concentration.

TABLE 5-4
CHEMICALS OF POTENTIAL CONCERN
ADJACENT SUBPARCEL 1 AREA

ANALYTE	SUBSURFACE SOIL	SURFACE SOIL	SOIL/FILL PILES	GROUNDWATER
VOLATILE ORGANICS				
Chloromethane	ND	ND	X	ND
cis-1,2-Dichloroethene	ND	ND	X	ND
2-Hexanone	ND	X	ND	*
4-Methyl-2-pentanone	ND	ND	*	X
Styrene	ND	ND	X	ND
SEMI-VOLATILE ORGANICS				
Benzo(a)anthracene	X	X	X	ND
Benzo(a)pyrene	X	X	X	ND
Benzo(b)fluoranthene	X	X	X	ND
Benzo(k)fluoranthene	*	X	X	ND
Carbazole	X	ND	X	ND
Chrysene	X	X	X	ND
Dibenz(a,h)anthracene	ND	X	X	ND
Indeno(1,2,3-cd)pyrene	*	X	*	ND
PESTICIDES/PCBs				
Aldrin	ND	ND	X	ND
Aroclor 1254	ND	X	X	ND
Aroclor 1260	ND	*	X	ND
INORGANICS				
Aluminum	*	*	*	X
Antimony	X	X	X	ND
Arsenic	X	X	X	ND
Barium	X	X	X	*
Beryllium	X	X	X	ND
ADJACENT SUBPARCEL 1 AREA	*	*	X	ND
Chromium	*	X	X	ND
Copper	X	X	X	*
Iron	X	X	X	X
Lead	X	X	X	*
Manganese	X	X	*	X
Mercury	*	X	ND	ND
Nickel	X	X	X	ND
Selenium	*	ND	*	*
Silver	ND	X	X	*
Thallium	ND	ND	X	X
Vanadium	*	X	*	ND
Zinc	X	X	X	*
OTHER				
Cyanide, total	X	X	X	X

X: Selected as a chemical of potential concern (COPC).
*: Detected, but not selected as a COPC.
ND: Not Detected.
NA: Not Analyzed.

removed material at an approved off-site facility would effectively eliminate the human health risks posed by the Site and would thus provide a permanent remedy for the site. This alternative does pose a slight potential risk of exposure to the public during transport to the disposal facility if a truck were to spill its contents.

The time to implement this alternative (i.e., excavate and remove the site's contaminated fill/soil) would be reasonable and is not anticipated to appreciably extend the timeline for site development. Excavation of the Site's fill material could be accomplished using standard construction equipment and techniques. Some time would be required to sample and characterize the soil/fill and obtain appropriate approvals for disposal. This alternative would reduce the mobility of the contaminants, but not the toxicity or volume. Under this alternative restricted use SCOs would be achieved and no long-term monitoring or special maintenance of the site would be required.

Table 5-5 presents the estimated capital cost of this alternative. While this alternative is implementable and effective in achieving the remedial action objectives, the cost for this alternative would be prohibitive at approximately $8.4 million dollars.

Alternative #2 – Cover System with Institutional and Engineering Controls

The restricted use remedy of a Site-wide cover system is recommended for this Site as described below:

5.2.3. Preparation of Site Surface

The Site will require grading prior to cover placement activities. Any fill material or debris piles will be graded to a regular topographic surface as planned for redevelopment. Following placement of the cover material, the grading will be completed such that precipitation events will not cause the formation of standing water. All masonry, scrap, debris, pavement, curbs, fences and miscellaneous structures will either be buried, or removed and disposed of off-site at a permitted disposal facility in accordance with solid waste regulations. Prior to placement of the cover soil, all protruding material will be removed from the ground surface. Burning will not be allowed on the Site.

5.2.4. Cover System

5.2.4.1. Soil

In areas that will not receive significant equipment or vehicular use, the minimum cover system will be composed of soil tested in compliance with NYCRR Subpart 375-6.7(d). The completed soil cover will be of a thickness required to maintain sufficient vegetative cover to prevent exposure to the on-site fill material. The soil thickness required must be a minimum of 12-inches and must be verified through pre- and post-development surveys.

Table 5-5
Cost Estimate of Remedial Alternative # 1
Soil/Fill Removal and Replacent Plus Cover System

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ESTIMATED UNIT PRICE	ESTIMATED BID AMOUNT
1	Excavation and Off-Site Disposal of Fill Material (1)	113,400	Tons	$45	$5,103,000
2	Off-Site Backfill Material (2)	73,500	yd^3	$25	$1,837,500
3	Misc. Environmental costs (3)	1	LS	$80,000	$80,000
Sub-Total					$7,020,500
20% Contingency					$1,404,100
Total Project Cost					**$8,424,600**

1) Assumes excavation of elevated stockpiles and soil/fill material excavated to a depth of 8' bgs. Soils assumed to contain non-hazardous concentrations of CPAHs and metals, above the SCOs. Stockpile volume estimated at 7,500 yd^3 or 10,500 tons at 1.4 tn/yd^3

2) Backfilled material characterized in accordance with SFMP.

3) Misc costs include PID screening, health and safety plan development, site safety officer, decontamination units, site access control, NYSDEC coordination, and construction certification report preparation.

In order to reduce the potential for disturbance of the surface cover material, berms or mounds composed of clean soil will be constructed in areas in which trees and shrubs will be planted. The berms or mounds will be of sufficient thickness to allow the excavation of only clean fill deep enough to plant the tree or shrub root ball. Unless additional soil is required for the plantings, the soil cover thickness will be 12 inches. The material used in the berms or mounds will contain sufficient organic material to allow the growth of the trees and/or shrubs and will be of sufficient strength to support trees and/or shrubs at their maximum height. Fill containing lumps, pockets, or concentrations of silt or clay, rubble, debris, wood or other organic matter will not be acceptable. Fill containing unacceptable material shall be removed and disposed appropriately.

Prior to placement of final cover, a demarcation layer between the existing contaminated soil/fill and the clean final cover material will be placed in areas that are not being paved. The demarcation layer will be InterNet ¾-inch polypropylene orange mesh (product number OD-1670).

Topsoil used for the final cover shall meet the following general specifications:

1. Fertile, friable, natural loam surface soil, capable of sustaining plant growth, and free of clods of hard earth, plants or roots, sticks or other extraneous material harmful to plant growth. The topsoil shall be well-graded with the following approximate analysis:

   a.

Sieve Size	**Percent Passing by Weight**
3-inch	100
No. 4	>75
No. 200	>30
0.002 mm	<20

   b. pH 5.5 to pH 7.6.
   c. Minimum organic content of 2.5 percent as determined by ignition loss.
   d. Soluble salt content not greater than 500 ppm.

Before delivery, soil samples will conform to the criteria specified in NYCRR Subpart 375-6.7(d).

Grass seed used for final cover shall meet the following general specifications:

1. The grass seed mixture will be fresh, clean, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America.
2. The entire ground surface disturbed by construction operations shall be seeded with 100 lbs/acre of seed conforming to the following:
3.

   a.

Name of Grass	Application Rate (lbs/acre)	Purity (%)	Germination (%)
Perennial Ryegrass	10	95	85
Kentucky Bluegrass	20	85	75
Strong Creeping Red Fescue	20	95	80
Chewings Fescue	20	95	80
Hard Fescue	20	95	80
White Clover	10	98	75

   b. Germination and purity percentages should equal or exceed the minimum seed standards listed. If it necessary to use seed with a germination percentage less than the minimum recommended above, the seeding rate will be increased accordingly to compensate for the lower germinations.

   c. Weed seed content will be less than 0.25 percent and free of noxious weeds.

   d. All seed shall be rejected if the label lists any of the following grasses:

      1) Sheep Fescue
      2) Meadow Fescue

3) Canada Blue
4) Alta Fescue
5) Kentucky 31 Fescue
6) Bent Grass

4. In addition to the seed mixtures listed above, one bushel per acre of oats or rye seed shall be sowed over the entire area, including drainage ditches, to provide a quick shade cover and to prevent erosion during turf establishment.

A certificate of completion will not be issued by the NYSDEC until the soil cover has established itself. Grading and seeding of the soil cover will occur at the start of a growing season.

5.2.4.2. Asphalt

The cover system in areas that will become roads, sidewalks, and parking lots will consist of a minimum of two inches of asphalt that will be placed over the soil/fill material at the Site. The asphalt will be placed on a minimum four-inch gravel subbase to provide stability for construction and to limit subsidence. Prior to placement of the subbase, all protruding material will be removed from the ground surface and the area regraded to a regular surface.

5.2.4.3. Concrete

The cover system in areas that will become slab-on-grade structures will consist of a minimum of two inches of concrete that will be placed above the soil/fill material. The concrete will be placed on a minimum four-inch gravel sub-base to provide stability for construction and to limit subsidence. A vapor barrier consisting of polyethylene sheeting with a minimum thickness of 8-mils will be installed under all structures to provide additional protection for on-site workers. Concrete may also be used instead of asphalt for roads, sidewalks, and parking lots. Prior to placement of the subbase, all protruding material will be removed from the ground surface and the area regraded to a sufficient regular surface.

5.3. Soil/Fill Management

Although the site investigation will have characterized the overall nature and extent of contamination, the very nature of Site investigations does not result in a 100 percent complete characterization. Therefore, it is possible that some quantity of undocumented contamination may be encountered during redevelopment activities.

During construction activities at the Site, excavation of selected areas of soil/fill material will be necessary for the construction of things such as building footers utility corridors, and for other features. Soil management protocols are necessary to limit the potential for

exposure of on-site workers to contaminated fill material during site development. The soil handling protocols will also be necessary for assisting with the determination of whether soil/fill removed during excavation activities may be reused on-site or must be disposed off-site. If precharacterization of soil/fill is to be performed, a sampling plan will be prepared after the site development plans have been finalized. The precharacterization sampling plan will provide details of sample locations, sample depths, and planned analytical parameters in accordance with the approved Soil/Fill Management Plan provided in Appendix A.

5.4. Institutional and Engineering Controls

Because the Site remedy will be a Track 4 remedy and by definition Track 4 remedies result in a "restricted" site use after application of the remedy, certain institutional and engineering controls will be required.

The institutional and engineering controls for the site will be included in an Environmental Easement that will be signed by the applicant and the NYSDEC prior to issuance of the Certificate of Completion for the project. The Institutional and Engineering controls will likely include one or more of the following:

- Restriction from changing of site use to a "higher" site use such as day care, child care, medical care, etc.
- Regular inspection, repair, and certification of the Site cover system.
- Requirement that pre-approved Soil/Fill management practices be implemented during site excavation and soil handling.
- Prohibition of the use of untreated groundwater from beneath the site for drinking or other uses without prior approval of the NYSDEC.

After completion the site remedy and site construction, a Final Engineering Report (FER) will be prepared to document and certify that the remedy was completed per the requirements of the Remedial Work Plan. Submitted at the same time as the FER, will be a Site Management Plan (SMP). The SMP will contain a copy of the Soil/Fill Management Plan, an Operations, Maintenance and Monitoring Work Plan (OM&MWP) and the Environmental Easement all of which are prepared and implemented to comply with the institutional and engineering controls.

6. ALTERNATIVE ANALYSIS

6.1. Introduction

The following Sections present a detailed analysis of the recommended remedial action alternative (Site-wide cover System with Institutional and Engineering Controls) with respect to the evaluation criteria outlined in 6 NYCRR Part 375-1.10 and the RAOs for the Site.

6.2. Overall Protection of Public Health and the Environment

This threshold assessment addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled. This evaluation allows for consideration of whether the alternative poses any unacceptable short-term or cross-media impacts.

As determined by the site-specific Qualitative Risk Assessment (Malcolm Pirnie, 2001), the placement of asphalt, concrete, and clean soil cover provides adequate protection of public health and the environment and, therefore, achieves the RAO for the site. The cover material, with routine maintenance, will effectively reduce the potential for direct contact with the contaminated soil/fill. Additionally, this RWP includes a Soil/Fill Management Plan (Appendix A) that was created to protect on-site workers, the public, and the environment during site redevelopment. The Soil/Fill Management Plan (S/FMP) also requires the off-site disposal of soil/fill material determined to contain contaminant concentrations above the restricted commercial SCOs.

6.3. Compliance with Standards, Criteria, and Guidance (SCGs)

A Site's remedial program must be designed so as to conform to standards and criteria that are generally applicable, consistently applied, and officially promulgated, that are either directly applicable, or that are not directly applicable but are relevant and appropriate, unless good cause exists why conformity should be dispensed with [6 NYCRR 375-1.0(c)(1)(i)].

While the Site is not a State or Federal hazardous waste site, the proposed remedial program has been developed consistent with the requirements of the National Oil and Hazardous Substance Pollution Contingency Plan of March 8, 1990. The proposed remedial program was developed giving consideration to the following three categories of SCGs:

1. Chemical-specific SCGs are usually health- or risk-based numerical values (standards or criteria) that are applied to environmental media and must be achieved by a remedy for an affected medium or in discharges from the site to the ambient environment. In the absence of such values, chemical-specific SCGs may be derived using methodologies which, when applied to site-specific conditions, result in the establishment of numerical criteria.
2. Action-specific SCGs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous or toxic wastes. These action-specific requirements are not used to determine the remedial alternative; rather, they govern the design and performance of the alternative.
3. Location-specific SCGs are restriction placed on the concentrations of hazardous substances or the conduct of activities solely because they are in specific locations.

Based on the known levels of contamination at the Site, as determined during previous investigations and a qualitative assessment of the risks to the public health and the environment, it was determined that the only exposure route of significance was one of direct contact. It was further determined that for the established level of Site contamination, a soil cover would provide adequate protection for the intended commercial/light industrial use of the Site. To verify protection, any soil/fill materials encountered during redevelopment and determined to be significantly more contaminated than what has been previously characterized would be properly disposed. The SCOs will be used to assess soil/fill excavations or disturbances, define levels for the site contaminants of concern, above which off-site disposal will be required.

Project areas near the subject site encountered high pH groundwater during construction therefore the pH of the water in excavations will be measured using a field pH meter. If similar areas of high pH are encountered during redevelopment the water pumped from excavations will be discharged to the ground surface unless staining or elevated PID measurements are observed in the excavation, if a sheen is present on the water surface, or the pH of the groundwater is less than 6.5 or greater than 8.5. If any of these conditions exist, the water pumped from the excavations may be discharged to the Buffalo Sewer Authority under a discharge permit if the water quality falls within the conditions of the permit. If the water quality is such that the permit requirements will be exceeded, the groundwater removed from the excavation will be containerized and sampled. Containerized water not meeting the Surface Water and Groundwater Quality Standards set forth in 6 NYCRR Part 703.5 will be transported off-site for proper disposal.

During clearing, grading, excavating, and stockpiling of excavated soil, dust suppression and air monitoring will be conducted in accordance with NYSDEC TAGM HWR-89-4031, Fugitive Dust Suppression and Particulate Monitoring Program at Inactive

Hazardous Waste Sites. The program to be implemented at the site is described in Section 2.6 of the Soil/Fill Management Plan (S/FMP) in Appendix A.

Soil/fill material containing analytes above the SCOs will be further classified for disposal purposes with respect to hazardous characteristics, as outlined in 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes. Soil/fill material determined to be a hazardous waste will be handled in accordance with the requirements of: 6 NYCRR Part 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities; and 49 CFR 107-171, DOT Rules for Hazardous Materials Transport.

Redevelopment of the Site is part of the overall redevelopment of the BCLP as a commercial/light industrial park. Review of the New York State Coastal Management Program (19 NYCRR Part 600/601) was performed as part of the Generic Environmental Impact Statement (GEIS) for the Hanna Furnace Site. The redevelopment complies with both State and local coastal zone policies, and is compatible with the Local Waterfront Revitalization Plan.

The Union Ship Canal is designated as a Class C fresh surface water. According to 6 NYCRR Part 701.8, the best usage of Class C waters is fishing. These waters are suitable for fish propagation and survival. The water quality will be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. During redevelopment, surface water will be collected and discharged to the nearest approved storm water drainage system.

6.4. Long-Term Effectiveness and Permanence

This criterion evaluates the long-term protection of human health and the environment at the completion of the remedial action. Effectiveness is assessed with respect to the magnitude of residual risks; adequacy of controls, if any, in managing treatment residuals or untreated wastes that remain at the site; reliability of controls against possible failure; and potential to provide continued protection.

The remedial action alternative will effectively reduce the long-term risk to public health and the environment by eliminating the potential exposure risk of direct contact with soil/fill material through the placement and maintenance of a cover system over the entire Site. Maintenance of the soil cover may include additional soil or replanting of grass to achieve a vegetative cover that will eliminate the potential for soil erosion. Maintenance of the asphalt and concrete cover may include repair of cracks or damage caused by weathering or vehicular use.

The poor quality habitat that exist at the site prior to redevelopment activities will be destroyed; however, the clean soil cover will reduce the potential for direct contact by

animals and the new vegetation will provide a higher quality habitat. Leaving contaminated soils in-place presents an ecological risk for burrowing animals; however, the presence of human activities will inhibit significant use of the Site by these animals.

The contaminants that will remain in the soils at the Site following redevelopment will be of relatively low concentration and covered with a clean cover system. In addition, the contaminants are generally immobile and, therefore, do not pose a threat via migration to adjacent properties via groundwater flow.

In addition, the industrial/commercial use of the Site will be controlled through City zoning, land use and design guidelines, and deed restrictions. Therefore, with proper maintenance, the cover system will provide long-term effectiveness and permanence in achieving the RAOs for the Site.

6.5. Reduction of Toxicity, Mobility, or Volume with Treatment

This evaluation criterion addresses the preference for selecting a remedial action alternative that permanently and significantly reduces the volume, toxicity, and/or mobility of the hazardous wastes and/or constituents. This preference is satisfied when the treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media. The following is the hierarchy of remedial technologies ranked from most preferable to least preferable:

1. Destruction
2. Separation/Treatment
3. Solidification/Chemical Fixation
4. Control and Isolation

The proposed remedial action alternative will effectively reduce the mobility of the contaminants through control and isolation of the on-site fill material. The contaminants present at the site are generally immobile and are present mostly at concentrations below the SCOs. Placement of a properly maintained cover system will eliminate contaminant mobility due to soil erosion. As discussed in the Qualitative Risk Assessment (Malcolm Pirnie, 2001), the proposed remedial action alternative is sufficient to be protective of public health and the environment. Therefore, other remedial action alternatives (e.g., destruction, separation/treatment, and solidification/ chemical fixation) are unwarranted.

If concentrations of contaminants detected in soils during redevelopment are higher than the SCOs, the impacted soil/fill material will be removed from the Site and properly disposed, thereby decreasing the toxicity and volume of contamination at the Site.

6.6. Short-Term Effectiveness

The effectiveness of alternatives in protecting human health and the environment during construction and implementation of the remedial action is evaluated under this criterion. Short-term effectiveness is assessed by protection of the community, protection of workers, environmental impacts, and time until protection is achieved.

Initially, the restriction of access to the Site in its present condition will reduce the risks posed by the Site to the general public. The construction of a cover system composed of clean soil, asphalt, and concrete will effectively reduce the risk to public health and the environment in the short-term by covering the soil/fill material. The material used for the cover system will be certified clean material and its presence will limit the potential for exposure of the public to on-site soil/fill material. Although the remedial activities will require the covering of all habitat at the Site with clean soil, asphalt, or concrete, the existing habitat is of such poor quality that the immediate impact is negligible.

This RWP includes a S/FMP that was created to protect on-site workers, the public, and the environment during site redevelopment activities, Appendix A. During redevelopment activities, workers engaged in subsurface construction or maintenance activities will be required to implement a site-specific, activity specific Health and Safety Plan. A Health and Safety Plan is included as part of the RWP in Appendix B.

In the short-term, the redevelopment activities will be effective and the impact to human health and the environment will be negligible. The proposed remedy should achieve the RAOs for the Site in approximately one year.

6.7. Implementability

A feasible remedy is one that is suitable to site conditions, is capable of being successfully carried out with available technology, and considers, at a minimum, implementability.

The proposed remedial action alternative for the Site is suitable to current and future conditions and uses. Materials and equipment for clearing, grading, and placing and maintaining the cover system are readily available. The cover system will be easily implementable since all structures, debris, and vegetation will be removed; the Site will be graded to a regular topographic surface for redevelopment; and access to the Site is good.

Operation, maintenance, and monitoring (OM&M) of the cover system will be the responsibility of the property owner. Erosion of the soil cover system will be reduced by maintaining a good vegetative cover. In order to reduce the potential for disturbance of the soil cover material, berms or mounds composed of clean soil will be constructed in

areas in which trees and shrubs will be planted. Asphalt roadways, sidewalks, and parking lots will be sealed regularly and cracks will be filled.

6.8. Community Acceptance

Redevelopment of Buffalo Lakeside Commerce Park (BLCP) is a key step in the City of Buffalo's plan for redevelopment of South Buffalo. These redevelopment efforts will create positive economic benefits for the City of Buffalo and Western New York. Previous redevelopment efforts (Certainteed, Cobey, and Sonwil) on the BLCP have been met with wide-spread community support. In fact, no public comments have been received on the previous Remedial Action Plans and construction documentation reports prepared for these redevelopment efforts.

7. HEALTH AND SAFETY

Invasive work performed at the Site will be performed in accordance with all applicable local, state, and federal regulations to protect worker health and safety. All contractors performing redevelopment or maintenance activities involving intrusive work at the Site are required to prepare a site-specific, activity-specific Health and Safety Plan. In order to facilitate the creation of an appropriate Health and Safety Plan by the contractor(s) performing work, the ranges of concentrations of contaminants detected in soil and groundwater samples collected during previous site investigations are shown in Table 2-1 and 2-2, respectively. Additionally, copies of the reports detailing the procedures and findings of these site investigations are available at the offices of the NYSDEC and Malcolm Pirnie, Inc. These reports are included in the List of References (Section 11.0).

When on Site for investigation, remediation, and construction oversight purposes, Malcolm Pirnie personnel will follow the provisions of their own Site-Specific Health and Safety Plan.

8. CITIZEN PARTICIPATION

As required in the Brownfield Cleanup Agreement, a Citizen Participation Plan has been prepared by Malcolm Pirnie and was approved by the NYSDEC. The CPP has been sent to the public document repository for public availability.

9. SCHEDULE

A primary goal of the applicant is to receive a Certificate of Completion (COC) from the NYSDEC and place the new facility into service during the 2011 calendar year. The schedule for investigation, remediation and redevelopment of the 200 Ship Canal Parkway Site is provided in Figure 9-1.

MALCOLM PIRNIE

FIGURE 9-1

BROWNFIELD CLEANUP PROGRAM SCHEDULE
SITE REMEDIATION AND REDEVELOPMENT UNDER THE BCP
200 SHIP CANAL PARKWAY SITE
BUFFALO, NEW YORK

			2010												2011											
	Brownfield Cleanup Program /Site Redevelopment Tasks	**Completed**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1	Submittal of Draft Remedial Work Plan	✓																								
2	NYSDEC Review of Draft RWP	✓																								
3	Forty Five Day Public Comment Period	✓																								
4	NYSDEC Comments to RWP Received and Addressed	✓																								
5	Submittal of Final RWP (NYSDEC Approval of RWP by 1/29/10)																									
7	Pre-Construction Characterization Plan (Preparation, submittal, review, and approval)																									
8	Subcontractor Solicitation / Procurement/Mobilization for characterization and remedial Field work																									
9	Characterization/remediation field work (start on or before April 1, 2010)																									
10	Site Redevelopment/Construction																									
11	Site Management Plan (preparation, submittal, review, and approval)																									
12	Environmental Easement package (preparation, submittal, review, and approval)																									
13	Preparation of Final Engineering Report (Submittal of FER by 1/28/11)																									
14	DEC Review of FER - (COC issued by July 29, 2011)																									
15	New facility placed in service in 2011.																									

NYSDEC review
Malcolm Pirnie
Field work (Malcolm Pirnie and subcontractors)
Savarino
Milestone date

Revised 122109 jjr

10. REFERENCES

ABB Environmental Services. *Preliminary Site Assessment.* November 1995.

Barron & Associates, P.C., Preliminary Subsurface Exploration and Geotechnical Engineering Recommendations Report for Proposed South Buffalo Redevelopment Plan, Phase I Union Ship Canal. April 3, 2001.

EmpireGeo Services, Inc., 2007, Summary of Test Pit Explorations, Existing Fill Stockpiles – Buffalo Lakeside Commerce Park.

Malcolm Pirnie, Inc. *Qualitative Human Health and Ecological Risk Assessment, Hanna Furnace Site, Former Railroad Yard (Parcel 1).* 2001.

Malcolm Pirnie, Inc. *Supplemental Investigation Report*. January 2001.

O'Brien and Gere, Engineers. *Site Investigation Report, Hanna Furnace Site (Parcel 2).* June 2002.

O'Brien and Gere, Engineers. *Remedial Action Work Plan, Hanna Furnace Site: Subparcel 2, Buffalo, New York.* November 2002.

Recra Environmental. *Site Characterization and Environmental Assessment*. August 1988.

New York State Department of Environmental Conservation, 2006, Subpart 375-6: Remedial Program Soil Cleanup Objectives.

200 Ship Canal Parkway, LLC
Remedial Work Plan

Appendix A

Soil/Fill Management Plan

6210-001

MALCOLM PIRNIE

200 Ship Canal Parkway, LLC

26 Mississippi Street • Suite 100 • Buffalo, New York 14203

SOIL/FILL MANAGEMENT PLAN

December 2009

Report Prepared By:

Malcolm Pirnie, Inc.

50 Fountain Plaza
Suite 600
Buffalo, New York 14202
716/667-0900

6210-001

MALCOLM PIRNIE

Contents

Attachments

1. Introduction

1.1. Background

The 200 Ship Canal Parkway Site (Site) is a vacant industrial property located in South Buffalo. The Site encompasses approximately 5.7 acres of the 113-acre Hanna Furnace Site. The Site lies entirely within Parcel 2 of the Buffalo Lakeside Commerce Park (BLCP).

A Brownfield Cleanup Agreement (BCA) was signed by the applicant (200 Ship Canal Parkway, LLC and the New York State Department of Environmental Conservation (NYSDEC). The BCP program allows for redevelopment of the property for commercial and industrial purposes. The current development plan for the Site includes commercial office space.

1.2. Purpose

The purpose of this Soil/Fill Management Plan (S/FMP) is to provide protection of human health and the environment during and subsequent to redevelopment of the Site.

Previous studies have investigated and assessed the surface and subsurface soil/fill and groundwater in the vicinity of the Site. While significant investigation of the subsurface has occurred, and more is planned during Site remediation, the nature of subsurface investigations does not allow for 100 percent complete or accurate investigation. Therefore, it is possible that some quantity of unsuspected subsurface soil/fill contamination may be encountered during redevelopment activities and/or after the completion of the voluntary cleanup.

Unsuspected contamination may be encountered during future redevelopment and infrastructure improvements or routine maintenance activities such as construction of waterlines, sewers, electric power distribution, natural gas piping, road construction, foundation construction, Site grading and other activities requiring the movement of soils within the Site.

This S/FMP was created to provide known Site background information and to discuss the handling procedures for subsurface contamination, if encountered. The S/FMP provides protocols during the following events for redevelopment and infrastructure improvements:

- Sampling, handling, excavation and grading of on-Site soils.

- Soil/fill acceptability of off-Site sources for on-Site backfill, subgrade fill, or cover material.
- Erosion and dust control.
- Installation of fencing and other Site access control devices.
- Deed or other land use restrictions.
- Health and safety procedures for Site construction work.

As an appendix to the Remedial Work Plan, this S/FMP is incorporated into and is an enforceable part of the Brownfield Cleanup Program Agreement. Any disturbance, excavation, grading, or other movement of soils on the Site will be conducted in accordance with this S/FMP.

2. Soil/Fill Management

2.1. Excavation of On-Site Soil/Fill

No excavation, grading or disturbance of the final vegetated soil cover or existing subgrade soil/fill shall be initiated prior to a minimum of three working days notification to the NYSDEC Region 9, Division of Environmental Remediation. A Professional Engineer with remedial investigation experience, representing the Site owner or developer will monitor soil/fill excavations or disturbances. The excavation activities will be conducted in accordance with the protocols detailed in Attachment I and in the sections below.

During excavation, the soil/fill will be inspected for staining and will be field screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). Stained soil is soil that is discolored, tinted, dyed, unnaturally mottled, or contains a sheen. Attachment II contains a Standard Operating Procedure for Soil Screening. Excavated soil/fill that is visibly stained or produces elevated PID readings (i.e., sustained 10 ppm or greater) will be considered potentially contaminated and stockpiled on-Site for further assessment. The potentially contaminated soil/fill will be stockpiled (maximum 20 cubic yard piles) on polyethylene sheeting and then sampled for reuse, treatment, or disposal. The stockpiled potentially contaminated soil/fill will also be completely covered using polyethylene sheeting to reduce the infiltration of precipitation and the entrainment of dust. Sampling and analysis will be completed in accordance with the protocols delineated in Section 2.2. Soil/fill containing one or more constituents in excess of the restricted commercial Soil Cleanup Objectives as detailed in NYCRR Subpart 375-6.8 (SCOs) will be transported off-Site to a permitted waste management facility. Soil/fill awaiting analytical results or awaiting transportation will be stored on-Site under polyethylene sheeting.

Any soil/fill with a pH higher than 12.5 is considered hazardous and therefore must be properly disposed off-Site. Additionally, any soil/fill with a pH greater than 9.0 but less than 12.5 may be reused on-Site but only to fill in areas of grade below the final cover system. This soil/fill may not be used as backfill in utility trenches or to create berms or other above grade mounds. This soil/fill must also be covered with clean material in accordance with Section 5.2.4 of the Remedial Work Plan.

If buried drums or underground storage tanks are encountered during soil excavation activities, excavation will cease and the NYSDEC will be immediately notified. All drums and/or underground storage tanks encountered will be evaluated and the contractor will submit a removal plan for NYSDEC approval. Appropriately trained personnel will

excavate all of the drums and/or underground storage tanks while following all applicable federal, state, and local regulations. Removed drums and underground storage tanks will be properly characterized and disposed off-Site. The soil/fill surrounding the buried drums or underground storage tanks will be considered as potentially contaminated and will be stockpiled and characterized.

All excavations or disturbances must be backfilled as soon as the work allows. Backfilled excavations must be covered with suitable cover material within ten working days of backfilling or as otherwise approved by the NYSDEC. The cover system is discussed in the Remedial Work Plan.

Excavated or disturbed backfill may be used as subgrade or excavation subgrade backfill following characterization performed in accordance with Section 2.2.

2.2. Soil/Fill Sampling and Analysis Protocol

All excavated and stockpiled soil/fill with evidence of contamination will be sampled and classified for reuse or disposal. Initially, one composite soil sample and a duplicate sample will be will be collected for each 100 cubic yards of stockpiled soil. The composite sample will be collected in the manner described in the Standard Operating Procedures (SOPs) included in Attachment II from five locations within each stockpile. PID measurements will be recorded for each of the five composite sample locations, and one grab sample and one duplicate sample will be collected from the location with the highest PID measurement of the five composite locations. The composite sample will be analyzed by a NYSDOH ELAP-certified laboratory for Target Compound List (TCL) semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs), and the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver plus cyanide using current NYSDEC Analytical Services Protocols (ASP). Additionally, pH will be analyzed using SW-846 Method 9045. The grab sample will be analyzed for TCL volatile organic compounds (VOCs).

Excavated soil/fill that exhibits no evidence of contamination (staining or elevated PID measurements) will also require characterization prior to use as subgrade or excavation subgrade backfill at the Site. Characterization samples will be collected and analyzed at a frequency of not less than one sample for 2000 cubic yards of soil/fill, and a minimum of one sample will be collected for volumes less than 2000 cubic yards. The characterization samples will be collected in accordance with the protocols described above; the sampling efforts shall consist of discrete samples for VOCs and composite samples collected from five locations for the remaining analytes.

Any soil/fill that has been characterized and found to meet the SCOs may be reused as subgrade or excavation subgrade backfill. If the analysis of the soil/fill samples reveals unacceptably high levels of any analytes (i.e., greater than one or more SCOs), additional

analyses will be necessary to further classify the material for hazardous characteristics for disposal purposes. At a minimum, the duplicate sample will be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) for the particular analytes that were detected at concentrations exceeding the SCOs. The duplicate sample may also be analyzed for RCRA Characteristics including reactivity, corrosivity, and ignitability. If the analytical results indicate that concentrations exceed the standards for either TCLP or RCRA Characteristic analysis, the material will be considered a hazardous waste and must be properly disposed off-Site at a permitted disposal facility within 90 days of excavation. Additional characterization sampling for off-Site disposal may be required by the disposal facility. To potentially reduce off-Site disposal requirements/costs, the owner or Site developer may also choose to characterize each stockpile individually.

2.3. Subgrade Material

Subgrade material used to backfill excavations or placed to increase Site grades or elevation shall meet the following criteria:

- Excavated on-Site soil/fill shall either exhibit no evidence of contamination (staining and/or elevated PID measurements) or, if evidence of contamination is present, analytical results of the soil/fill indicate that the contaminants are present at concentrations below the SCOs.
- Off-site borrow soils will be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.
- Off-site soils intended for use as Site backfill cannot otherwise be defined as a solid waste in accordance with 6NYCRR Part 360-1.2(a).
- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.
- Virgin soils should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver plus cyanide. The soil will be acceptable for use as backfill provided that all parameters meet the SCOs.
- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-Site non-virgin soil source area and both samples of the first 1,000 cubic yards meet the SCOs, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the SCOs.

2.4. Final Cover

Surface coverage over the entire redeveloped parcel or subparcels will be required by the developer or owner as a pre-condition of occupancy. The purpose of the surface cover is to eliminate the potential for human contact with fill material. Surface coverage will consist of clean soil with vegetative cover, asphalt or concrete paving, or buildings with concrete floors.

Prior to placement of final cover, a demarcation layer between the existing contaminated soil/fill and the clean final cover material will be placed in areas that are not being paved. The demarcation layer will be InterNet ¾-inch polypropylene orange mesh (product number OD-1670).

The cover soil material shall meet the following criteria:

- Excavated on-Site soil/fill shall not be used as cover material.
- Off-site borrow soils will be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.
- Off-site soils intended for use as Site cover cannot otherwise be defined as a solid waste in accordance with 6NYCRR Part 360-1.2(a).
- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.
- Virgin soils should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and TAL metals plus cyanide. The soil will be acceptable for use as cover material provided that all parameters meet the Allowable Constituent Levels for Imported Fill or Soil, provided as Appendix 5X of Draft DER-10 (March 2008).
- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-Site non-virgin soil source area and both samples of the first 1,000 cubic yards meet the NYSDEC restricted commercial use SCOs, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the restricted commercial use SCOs.

- To reduce the potential for disturbance of the soil cover material, berms or mounds composed of clean soil will be constructed in areas in which trees and shrubs will be planted.
- Verification that the final clean cover thickness be verified and documented by surveys conducted both before and after placement of the material. The clean final cover thickness must be a minimum of 12 inches thick.

A certificate of completion will not be issued by the NYSDEC until the clean soil cover has been seeded and vegetation has established itself. The grading and seeding of the soil cover will occur at the start of a growing season.

2.5. Erosion Controls

2.5.1. General Guidelines

When the remedial actions require the disturbance of more than one acre of land, federal and state laws[1] require that the project obtain coverage under the NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities that are classified as "Associated with Industrial Activity", Permit #GP-0-08-001 (Construction Storm Water General Permit). Requirements for coverage under the Construction Storm Water General Permit include the submittal of a Notice of Intent Form and the development of a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP will be prepared for the Site in accordance with "Chapter Four: the Storm Water Management and Erosion Control Plan" in Reducing Impacts of Storm Water Runoff from New Development, NYSDEC, 1992. The SWPPP will provide the following information:

- A background discussion of the scope of the construction project.
- A statement of the storm water management objectives.
- An evaluation of post-development runoff conditions.
- A description of proposed storm water control measures.
- A description of the type and frequency of maintenance activities required to support the control measure.

The SWPPP will also address issues such as erosion prevention, sedimentation control, hydraulic loading, pollutant loading, ecological protection, physical Site characteristics that impact design, and Site management planning. The SWPPP will also include a contingency plan to be implemented in the event that heavy rain events are determined to be impacting water quality in the Union Ship Canal due to redevelopment activities. All descriptions of proposed features and structures at the Site will include a description of

[1] The Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. Seq.) and the New York State Environmental Conservation Law: Article 17, Titles 7 and 8 and Article 70.

structure placement, supporting engineering data and calculations, construction scheduling, and references to established detailed design criteria.

The erosion and surface water control plan will provide details of the methods of erosion control that must be followed during Site redevelopment activities. The use of appropriate temporary erosion control measures such as silt fencing and/or hay bales will be required around all soil/fill stockpiles and unvegetated soil surfaces during redevelopment activities. These methods are described below. Stockpiles shall be graded and compacted as necessary for positive surface water runoff and dust control. Stockpiles of soil/fill will be placed a minimum of ten feet from the property boundary.

2.5.2. Temporary and Permanent Erosion Control Measures

2.5.2.1. Temporary Control Measures

Temporary erosion and sedimentation control measures and facilities will be employed during active construction stages. Prior to any construction activity, temporary erosion and sediment control measures shall be installed and maintained until they are no longer needed, or until such time that permanent erosion control measures are installed and effective. Additional sediment control measures may also be necessary. Structural measures, as described below, will be designed and installed to provide the required sediment and erosion control. The following temporary measures will be incorporated into construction activities:

- Silt fencing.
- Straw bales.
- Temporary vegetation/mulching.

Silt Fencing

Regrading and capping activities may result in sheet flow to various areas of the Site; therefore, silt fencing will be used as the primary sediment control measure. Prior to extensive clearing, grading, excavation, and placement of cover soils, silt fences will be installed along all construction perimeter areas to prevent sedimentation in low areas and drainage areas. The location and orientation of silt fencing to be used during redevelopment operations will be field determined. There may be breaks and overlaps in the silt fencing to allow construction vehicles access to the construction areas.

Intermediate silt fencing will be used upslope of perimeter areas where phased construction activities are occurring. This measure will effectively lower sheet flow velocities and reduce sediment loads to perimeter fencing. In addition, silt fencing around soil stockpiles will be employed.

As sediment collects along the silt fences, they will be cleaned to maintain desired removal performance and prevent structural failure of the fence. Removed sediment will be disposed on-Site as general fill in a designated area. The perimeter silt fences will remain in place until construction activities in the area are completed and vegetative cover or other erosion control measures are adequately established. Silt fences will be provided and installed in accordance with the details presented in Attachment III.

Straw Bales

Straw bales will be used to intercept sediment-laden runoff from storm water channels as needed during various phases of construction. Additional straw bale dikes may be necessary in some areas during some phases of construction.

Use of straw bales will be limited to swales and/or diversion ditches where the anticipated flow velocity will not be greater than 5 feet per second (fps). Where flows may eventually exceed 5 fps along a swale or diversion ditch, an intermediate straw bale barrier will be installed upgradient of the final bale barrier. The intermediate bale barrier will effectively reduce flow velocities and sediment load to the final barrier.

As with the silt fencing, sediment will be removed to maintain performance and prevent overtopping or failure of the straw bale barrier. Removed sediment will be disposed of on-Site as general fill in a designated area. Sediment laden straw bales that have lost their structural integrity and/or effectiveness will be disposed of off-Site as a solid waste. Straw bale barriers will remain in place until construction activities contributing sediment to the barrier are complete and vegetative cover or other erosion control measures are adequately established. Straw bales will be provided and installed in accordance with the details presented in Erosion and Surface Water Control Plan.

Temporary Vegetation and Mulching

As a result of phased construction and split construction schedule, portions of the Site may be left in intermediate/incomplete conditions. Intermediate areas may include rough graded areas awaiting finer grading or areas awaiting topsoil placement. Intermediate areas where activities will not resume for a period in excess of two weeks shall be seeded with a quick germinating variety of grass or covered with a layer of straw mulch.

The temporary cover will act to stabilize the soil and reduce erosion. As construction progresses, areas containing temporary vegetation or straw mulch can be covered without removal of the temporary vegetation or mulch.

2.5.2.2. Permanent Control Measures

Permanent erosion control measures and facilities will be incorporated during cover construction and during Site redevelopment for long-term erosion protection. Permanent measures and facilities will be installed as early as possible during construction phases.

Parking and building systems associated with redevelopment shall not include dry wells or other subsurface injections/disposal piping or facilities.

Design Features

The remedial construction activities will involve the installation of cover system including asphalt, concrete, or clean fill over the entire Site. Permanent erosion control measures incorporate a combination of design features to limit overall erosion and sediment problems to practical design limits, and the placement of permanent facilities during Site restoration for long term erosion protection. The soil cover system will be designed based on the following criteria:

- Maximum slope of 33% (3H: 1 V) to limit erosion.
- Minimize the potential contact with, and migration of, waste fill.
- Provide a medium for the growth of vegetation to control erosion.

Design features incorporated into the construction plans to control erosion will include limiting steep slopes, routing runoff to surface water collection channels, limiting flow velocities in the collection channels to the extent practical, and lining collection channels, where appropriate. In areas where flow will be concentrated (i.e.; collection channels) the channel slopes and configuration will be designed to maintain channel stability.

Construction Features

Any final slopes greater than 33 percent will be reinforced or have a demarcation layer under the clean cover to indicate if erosion has extended into the subgrade. Following the placement of final cover soils over regraded areas, a revegetation program will be implemented to establish permanent vegetation. Vegetation serves to reduce erosion, enhance evapotranspiration, and improve runoff water quality. The areas to be grassed will be seeded in stages as construction in is completed with 70 lbs./acre of seed conforming to the mix included in 3.2.1 of the Remedial Work Plan. In addition to the above seed mixture, mulch, mulch blankets, or synthetic fabric will be placed to prevent erosion during turf establishment. Mulch will be placed on all slopes less than 15% and a mulch blanket on all slopes greater than 15%. Synthetic erosion control fabric will be placed in drainage ditches and swales. As an aid to turf establishment, seeded areas will be fertilized with a starter fertilizer.

2.6. Dust Control

The surface of unvegetated or disturbed soil/fill areas will be wetted at all times with water or other dust suppressive agents to control dust during construction. There shall be no visible dust generated during redevelopment activities. Any subgrade material left exposed during extended interim periods (greater than 90 days) prior to placement of final cover shall be covered with a temporary cover system (i.e., tarps, spray type cover

system, etc.) or planted with vegetation to control fugitive dust to the extent practicable. Particulate monitoring will be performed along the downwind occupied perimeter of parcels during subgrade excavation, grading, and handling activities in accordance with the Community Air Monitoring Plan further detailed in Section 4.2. Weekly submittal of all air/dust monitoring collected during intrusive construction activities (i.e., when soil/fill is being excavated and/or graded) to the NYSDEC is required.

Dust suppression techniques will be employed at the Site in accordance with NYSDEC TAGM 4031 (Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites). This TAGM describes guidance for dust monitoring, and includes a list of effective dust suppression techniques. Dust monitoring is more fully described in Appendix V (Minimum Requirements for Health and Safety). As per TAGM 4031, dust suppression techniques that may be used at the Site include applying water on roadways, wetting equipment, spraying water on buckets during excavation and dumping, hauling materials in properly covered or watertight containers, covering excavated areas and material after excavation activity ceases, establishing vegetative cover immediately after placement of cover soil, and reducing the excavation size and/or number of excavations. If the reuse of beneficial use determination (BUD) material from water treatment residuals is acceptable to the NYSDEC, dust suppression techniques will also be constantly employed during soil blending. The use of atomizing sprays is recommended so that excessively wet areas will not be created but fugitive dust will be suppressed. The entire Site will be completely covered with buildings, paved surfaces, or clean fill that is vegetated via hydroseeding to limit dust generation

2.7. Fencing and Access Control

Access to soil/fill on parcels adjacent to occupied on- or off-Site parcels must be controlled until final cover is placed to prevent direct contact with subgrade materials. To better control Site access, obvious access points will be fenced and gated. All fencing will be posted with “No Trespassing” signs.

2.8. Property Use Limitations

The use of the property will be restricted through verbiage in the Environmental Easement which will reference this and other Plans relating to Site management.

2.9. Notification and Reporting Requirements

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

- The NYSDEC and NYSDOH will be notified that subgrade activities are being initiated a minimum of five working days in advance of construction.

- A construction certification report stamped by a New York State licensed Professional Engineer will be prepared and submitted to the NYSDEC and NYSDOH within 90 days after development of each parcel or subparcel. At a minimum, the report will include:
- An area map showing the parcel or subparcel that was developed and the property's tax map number.
- A topographic map of the developed property showing actual building locations and dimensions, roads, parking areas, utility locations, berms, fences, property lines, sidewalks, green areas, contours and other pertinent improvements and features. The topographic map will be stamped by a New York State licensed surveyor.
- Plans showing areas and depth of fill removal.
- Copies of daily inspection reports.
- Description of erosion control measures.
- A text narrative describing the excavation activities performed, health and safety monitoring performed (both Site specified and Community Air Monitoring), quantities and locations of soil/fill excavated, disposal locations for the soil/fill, soil sampling locations and results, a description of any problems encountered, location and acceptability test results for backfill sources, and other pertinent information necessary to document that the Site activities were carried out properly.
- Plans showing before and after survey elevations on a 100-foot grid system to document the thickness of the clean soil cover system.
- A certification that all work was performed in conformance with the S/FMP.

3. Quality Assurance and Quality Control (QA/QC)

3.1. Analytical Methods

All characterization samples collected during redevelopment activities will be analyzed using EPA-approved analytical methods using the most recent edition of the EPA's "Test Methods for Evaluating Solid Waste" (SW-846). Methods for Chemical Analysis of Water and Wastes "(EPA 600/4-79-020), Standard Methods for Examination of Waste and Wastewater" (prepared and published jointly by the American Public Health Association, American Waterworks Association and Water Pollution Control Federation).

3.2. Laboratory

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

3.3. Data Submittal

The laboratory will perform the analysis of samples in accordance with the most recent NYSDEC Analytical Services Protocol (ASP). Analytical data will be submitted in complete ASP Category B data packs including documentation of laboratory QA/QC procedures that will provide legally defensible data in a court of law. If requested, the Category B data packs will be submitted to the NYSDEC.

Procedures for chain of custody, laboratory instrumentation calibration, laboratory analyses, reporting of data, internal quality control, and corrective actions shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan. Where appropriate, trip blanks, field blanks, field duplicates, and matrix spike, matrix spike duplicate shall be performed at a rate of 10% and will be used to assess the quality of the data. The laboratory's in-house QA/QC limits will be utilized whenever they are more stringent than those suggested by the EPA methods.

3.4. Data Usability Summary Report

After receipt of analytical results, the data package will be sent to a qualified, third party, data validation specialist for evaluation. A Data Usability Summary Report (DUSR) will be prepared. The DUSR will provide a determination of whether or not the data meets the project specific criteria for data quality and data use.

4. Health and Safety Procedures for Intrusive or Maintenance Activities

4.1. Construction Personnel Protection

Contractors engaged in subsurface construction or maintenance activities (e.g., foundation and utility workers) will be required to implement appropriate health and safety procedures. These procedures will involve, at a minimum, donning adequate personal protective equipment, performing appropriate air monitoring, and implementing other engineering controls as necessary to mitigate potential ingestion, inhalation and contact with residual constituents in the soils. A Site-specific, activity-specific health and safety plan will be prepared for the Site by the Contractor (see Appendix IV for the minimum requirements for health and safety). Recommended health and safety procedures include the following:

- While conducting invasive work at the Site, the Contractor will provide working conditions on each operation that shall be as safe and healthful as the nature of that operation permits. The Contractor shall comply with all New York State Department of Labor regulations and published recommendations and regulations promulgated under the Federal Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, as amended, and with laws, rules, and regulations of other authorities having jurisdiction. Compliance with governmental requirements is mandated by law and considered only a minimum level of safety performance. The Contractor shall insure that all work is performed in accordance with recognized safe work practices.
- The Contractor is responsible for the safety of the Contractor's employees, the public and all other persons at or about the Site of work. The Contractor is solely responsible for the adequacy and safety of all construction methods, materials, equipment and the safe prosecution of the work.
- The Contractor shall stop work whenever a work procedure or a condition at a work Site is deemed unsafe by the safety professional or his trained safety representative(s).
- The Contractor shall employ a properly qualified safety professional whose duties shall be to initiate, review and implement measures for the protection of health and prevention of accidents. The Contractor shall also employ safety representative(s) whose duties, working under the direct supervision of the safety professional, shall include the implementation the safety program for the work at the Site.
- Recognition as a safety professional shall be based on a minimum of certification by the Board of Certified Safety Professionals as a Certified Safety Professional and 5

years of professional safety management experience in the types of construction and conditions expected to be encountered on the Site.

- The safety representative(s) who will work under the direction of the safety professional will have appropriate qualifications. The required qualifications shall include a minimum of: five years of relevant construction experience, two years of which were exclusively in construction safety management; successful completion of a 30-hour OSHA Construction Safety and Health training course; 40-hour training as per 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response; and, if confined space entry is required, training as per 29 CFR 1910.146, Permit-Required Confined Spaces.
- The safety professional shall visit and audit all work areas as often as necessary and shall be available for consultation whenever necessary.
- The safety representative(s) must be at the job Site full-time (a minimum of 8 hours per working day) whenever work is in progress. When multiple shift work is in progress more than one safety representative may be required.
- The safety professional and his safety representative(s) shall be responsible for ensuring Contractor compliance with governing laws, rules and regulations as well as of good safety practice.
- The safety staff shall maintain and keep available safety records, up-to-date copies of all pertinent safety rules and regulations, Material Safety Data Sheets, and the Contractors' Site specific health and safety plans (HASPs) and the Site emergency response plan with emergency and telephone contacts for supportive actions.
- The responsible safety professional shall sign and seal the Contractor's written Site-specific HASP and the Plan shall be available to workers on Site. The Contractor shall provide copies of the HASP to the Contractors' insurer, if required.
- The safety professional and/or his trained safety representative(s) shall as a minimum:
  - Schedule and conduct safety meetings and safety training programs as required by law, the health and safety plan, and good safety practice. A specific schedule of dates of these meetings and an outline of materials to be covered shall be provided with the health and safety plan. All employees shall be instructed on the recognition of hazards, observance of precautions, of the contents of the health and safety plan and the use of protective and emergency equipment.
  - Determine that operators of specific equipment are qualified by training and/or experience before they are allowed to operate such equipment.
  - Develop and implement emergency response procedures. Post the name, address and hours of the nearest medical doctor, name and address of nearby clinics and hospitals, and the telephone numbers of the appropriate ambulance service, fire, and the police department.
  - Post all appropriate notices regarding safety and health regulations at locations that afford maximum exposure to all personnel at the job Site.

- Post appropriate instructions and warning signs in regard to all hazardous areas or conditions that cannot be eliminated. Identification of these areas shall be based on experience, on Site surveillance, and severity of hazard. Such signs shall not be used in place of appropriate workplace controls.
- Ascertain by personal inspection that all safety rules and regulations are enforced. Make inspections at least once a shift to ensure that all machines, tools and equipment are in a safe operating condition; and that all work areas are free of hazards. Take necessary and timely corrective actions to eliminate all unsafe acts and/or conditions, and submit to the Engineer each day a copy of his findings on the inspection check list report forms established in the health and safety plan.
- Provide safety training and orientation to authorized visitors to ensure their safety while occupying the job Site.
- Perform all related tasks necessary to achieve the highest degree of safety that the nature of the work permits.
- The Contractor shall have proper safety and rescue equipment, adequately maintained and readily available, for foreseeable contingencies. This equipment may include such applicable items as: proper fire extinguishers, first aid supplies, safety ropes and harnesses, stretchers, water safety devices, oxygen breathing apparatus, resuscitators, gas detectors, oxygen deficiency indicators, combustible gas detectors, etc. This equipment should be kept in protected areas and checked at scheduled intervals. A log shall be maintained indicating who checked the equipment, when it was checked, and that it was acceptable. This equipment log shall be updated monthly and be submitted with the monthly report. Equipment that requires calibration shall have copies of dated calibration certificates on Site. Substitute safety and rescue equipment must be provided while primary equipment is being serviced or calibrated.
- All personnel employed by the Contractor or his subcontractors or any visitors whenever entering the job Site, shall be required to wear appropriate personal protection equipment required for that area. The Contractor may remove from the Site any person who fails to comply with this or any other safety requirement.
- Because water with elevated pH may act as a skin irritant, care must be taken to inhibit dermal contact when handling any groundwater at the Site. Actions to inhibit contact with groundwater may include the use of latex or other waterproof gloves by on-Site workers.
- The minimum Site-specific Health and Safety requirements are presented in Attachment IV.

4.2. Community Air Monitoring Program

Ambient air monitoring will be conducted on a real-time basis during all subsurface construction activities using a minimum of a photoionization detector and a dust meter. Battery charge level for each instrument will be checked at the beginning and end of each day. The instruments will be calibrated at a frequency recommended by the

manufacturer. All air monitoring readings will be recorded in a logbook and will be available for review by the NYSDEC and New York State Department of Health (NYSDOH).

Baseline conditions will be measured at proposed intrusive activity locations prior to commencement of operations. Air quality within the work zone will be monitored in accordance with the Site-specific health and safety plan created by the Site developer or contractor. In addition to monitoring the work area for worker health and safety, volatile organic compounds will be monitored at the downwind perimeter of the work area every hour. If downwind perimeter organic vapor levels exceed five parts per million (ppm) above the upwind work area perimeter concentrations, the Vapor Emission Response Plan will be implemented.

As described in Section 2.6, appropriate dust suppression techniques will be employed at all times during Site redevelopment activities. Using a dust meter, particulates will be continuously monitored immediately downwind in the work area and integrated over a period not to exceed 15 minutes. If the downwind particulate level is more than 150 ug/m^3, then upwind (background) levels must be measured immediately. If the downwind levels are more than 100 ug/m^3 above background, additional dust suppression measures must be taken.

Weekly submittal of all air/dust monitoring data collected during intrusive construction activities (i.e., when soil/fill is being excavated and/or graded) to the NYSDEC is required.

4.2.1. Vapor Emission Response Plan

If the downwind area perimeter air concentrations of organic vapors exceed the upwind work area perimeter concentration by 5 ppm but less than 25 ppm, the following actions will be taken:

- Every 30 minutes monitor the perimeter work area location.
- Every 30 minutes monitor the organic vapor concentration 200 feet downwind of the work area perimeter or half the distance to the nearest receptor, whichever is less. If this reading exceeds the perimeter work area upwind organic vapor concentration by 5 ppm, all work must halt and monitoring increased to every 15 minutes. If, at any time, this reading exceeds the perimeter work area upwind concentration by 10 ppm, the Major Vapor Emissions Response Plan will be initiated.
- If organic vapor levels 200 feet downwind of the perimeter work area or half the distance to the nearest downwind receptor, whichever is less, exceeds by 5 ppm the work area perimeter upwind concentration persistently, then air quality monitoring must be performed within 20 feet of the nearest downwind receptor (20-foot zone). If the readings in the 20-foot zone exceed the perimeter work area upwind concentration

by 5 ppm for more than 30 minutes, then the Major Vapor Emissions Response Plan will be implemented.

- Work activities can resume only after the downwind 200 foot reading and the 20-foot zone reading are less than 5 ppm above the perimeter work area upwind concentration. In addition, the downwind perimeter work area concentration must be less than 25 ppm above the perimeter work area upwind concentration.

4.2.2. Major Vapor Emission Response Plan

If the downwind work area perimeter organic vapor concentration exceeds the upwind work area perimeter concentration by more than 25 ppm, then the Major Vapor Emission Response Plan will be activated. Upon activation, the following activities will be undertaken:

1. All work will halt.
2. All Emergency Response Contacts listed in the Contractor's Health and Safety Plan will be contacted.
3. The NYSDEC, NYSDOH, and the Erie County Health Department will be notified and advised of the situation.
4. The local police and fire department authorities will immediately be contacted by the Safety Officer and advised of the situation.
5. Frequent air monitoring will be conducted at 30-minute intervals within the 20-Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer and work may resume.

200 Ship Canal Parkway, LLC
Soil/Fill Management Plan

Attachment I

Excavation and Handling of Potentially Contaminated Soil/Fill

6210-001

MALCOLM PIRNIE

EXCAVATION AND HANDLING OF POTENTIALLY CONTAMINATED SOIL/FILL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment and incidentals required to perform all excavating, backfilling, filling and grading, and disposing of soil/fill materials as required for construction of structures, manholes, vaults, conduits, pipelines, roads, and other facilities.
   2. Stockpile and characterize soil/fill in which evidence of contamination (staining, odors, elevated pH and/or elevated photoionization detector measurements) is observed. Stained soil is soil that is discolored, tinted, dyed, unnaturally mottled, or contains a sheen.
   3. Prepare all waste disposal applications and shipping manifests and make all arrangements for transportation and disposal of contaminated material.

1.2 QUALITY ASSURANCE

A. Permits and Regulations:
   1. Obtain all necessary permits for work in roads, rights-of-way, railroads, etc. Also obtain permits as required by local, state and federal agencies for discharging water from excavations.
   2. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Reference Standards: Comply with applicable provisions and recommendations of the following.
   1. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.3 SUBMITTALS

A. No excavation, grading or disturbance of the final vegetated soil over or existing subgrade soil/fill shall be initiated prior to a minimum of five working days written notification to the NYSDEC Region 9, Division of Environmental Remediation. The notification will include a description of planned excavation activities and protective measures, and the name of the site supervisor.

B. Provide waste manifests, bills of lading, certified weight scale tickets, or other transportation records for soil/fill material removed from the site, to the NYSDEC, if requested.

C. Test Reports – Characterization of Soil/Fill and Borrow Materials:
   1. Provide NYSDEC analytical results, if requested, for the following :
      a. Tests of soil/fill with evidence of contamination of material removed during excavation.
      b. Tests, if necessary, of off-site material that will be used as fill or cover material at the site.

1.4 JOB CONDITIONS

A. Subsurface Information: Refer to Remedial Work Plan and previous investigation reports on subsurface conditions. Data is not intended as a representation or warranty of continuity of conditions between soil borings nor of groundwater levels at dates and times other than date and time when measured.

B. Existing Structures and Utilities: Due to site history, underground structures and utilities may be present at the site.
   1. CONTRACTOR may need to explore ahead of the required excavation to determine the exact location of all structures and utilities.
   2. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during all operations.
   3. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult piping or utility owner immediately for directions as to procedure. Cooperate with utility owner in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
   4. Should underground storage tanks or drums be encountered, the CONTRACTOR shall notify the NYSDEC immediately. The CONTRACTOR shall also take appropriate measures to protect the health and safety of on-site workers. Any tanks or drums encountered shall be evaluated to the satisfaction of the NYSDEC and properly closed in place or removed and properly disposed.
   5. Should foundations be encountered, the CONTRACTOR shall either remove the foundation in areas necessary to complete the work or modify the work to accommodate the foundations.

D. Protection of Persons and Property: Barricade open excavations occurring as part of the work and post with warning lights, if necessary. Operate warning lights, if necessary, during hours from dusk to dawn each day and as otherwise required.
   1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

E. Dust Control: Conduct all operations and maintain areas of activity, including sweeping and sprinkling of roadways, to minimize creation and dispersion of dust.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 -EXECUTION

3.1 INSPECTION

A. Provide NYSDEC with sufficient notice and with means to examine the areas and conditions under which excavating, filling, and grading are occurring.

3.2 SITE PREPARATION

A. Clear all areas to be excavated of all trees, brush, roots, stumps, logs, wood and other materials and debris. All contaminated waste materials shall be removed from site and properly disposed. Burning will not be permitted unless permitted by the appropriate authorities.

B. If cover material was previously placed in the area to be excavated, the cover material may be stripped from the surface and stockpiled separately for reuse.

3.3 TEST PITS

A. CONTRACTOR may, if necessary, excavate and backfill, in advance of construction, test pits to determine conditions or location of existing facilities. The test pit operations will be conducted in accordance with the excavation procedures outlined below.

3.4 EXCAVATION

A. Perform all excavation required to complete the work as necessary. Excavations shall include earth, sand, clay, gravel, hardpan, boulders not requiring drilling and blasting for removal, decomposed rock, pavements, rubbish and all other materials within the excavation limits.

B. All work shall be completed in accordance with all air quality standards as determined by applicable federal, state, and local regulations.

C. Excavations for structures and utilities shall be open excavations. Provide excavation protection system(s) required by ordinances, codes, law and regulations to prevent injury to workmen and to prevent damage to new and existing structures or pipelines. Unless shown or specified otherwise, protection system(s) shall be utilized under the following conditions.
   1. Excavation Less Than 5 Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.

2. Excavations More Than 5 Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded or shored and braced.
3. All excavations or disturbances must be covered using appropriate cover material within 10 working days of backfilling or as otherwise approved by the NYSDEC.

D. Pumping of water from excavations, if necessary, shall be done in such a manner to prevent the carrying away of particulates, soil/fill, or unsolidified concrete materials, and to prevent damage to the existing subgrade.
   1. Water from the excavations will be disposed properly in accordance with all applicable regulations in such a manner as not to endanger public health, property, or any portion of the work under construction or completed.
   2. In areas of high pH, the pH of the water in excavations will be measured using a field pH meter. Based on the groundwater analytical results, water in the excavations may be discharged to the ground surface unless staining or elevated PID measurements are observed in the excavation, a sheen is present on the water surface or if pH is less than 6.5 or greater than 8.5. If any of these conditions exist, the water pumped from the excavations will be containerized or may be discharged to a POTW under a discharge permit if the water quality falls within the conditions of the permit. If the water quality is such that the permit requirements will be exceeded, the groundwater removed from the excavation will be containerized and sampled. Containerized water not meeting the Surface Water and Groundwater Quality Standards set forth in 6 NYCRR Part 703.5 will be transported off-site for proper disposal.

E. Utility Trench Preparation:
   1. No more than 200 feet of trench may be opened in advance of utility laying.
   2. Trench width shall be minimized to greatest extent practical but shall conform to the following:
      a. Sufficient to provide room for installing, jointing and inspecting utilities.
      b. Enlargements at pipe joints may be made if required.
      c. Sufficient for shoring and bracing, or shielding and dewatering.
      d. Sufficient to allow thorough compaction of backfill adjacent to bottom half of utility.
      e. Do not use excavating equipment that requires the trench to be excavated to excessive width or depth.

F. Field Screening of Excavated Materials:
   1. The soil/fill removed during excavation will be inspected for staining and will be field screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID).
   2. Excavated soil/fill with no evidence of contamination (no staining or elevated PID measurements) may be used as subgrade or excavation subgrade backfill. However, soils with high pH (8.5 to 12.5) will not be used as backfill in utility trenches or as subsurface material in the construction of berms.
   3. Excavated soil/fill that is visibly stained or produces elevated PID readings (i.e., sustained 10 ppm or greater) will be considered potentially contaminated soil/fill. Potentially contaminated soil/fill will be stockpiled on polyethylene sheeting and then sampled for reuse, treatment or disposal.
      a. Sampling and analysis of soil/fill exhibiting staining and/or elevated PID measurements will be completed in accordance with the protocols delineated in the Soil/Fill Management Plan (S/FMP). Sampling and analysis will also be completed in accordance with the requirements of the disposal facility at which the soil/fill with concentrations of contaminants above the Soil Cleanup Objectives (SCOs) will be disposed.
      b. Soil/fill containing one or more constituents in excess of restricted commercial use SCOs will be transported off-site to a permitted waste management facility.
      c. Excavated or disturbed soil/fill that has been analyzed and found to meet SCOs may be used as subgrade or excavation subgrade backfill.

G. Material Storage:
   1. Stockpile soil/fill with no evidence of contamination (no staining or elevated PID measurements) in approved areas in approximately 50 cubic yard piles, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
      a. Locate and retain soil materials away from edge of excavations.
      b. Dispose of excess soil material and waste materials appropriately.
   2. Stockpile soil/fill with evidence of contamination (staining and/or elevated PID measurements) in approved areas in approximately 50 cubic yard piles, until sample analysis is completed. Place, grade and shape stockpiles for proper drainage. Ensure effective weather proofing of potentially contaminate soil stockpiles.
      a. Locate and retain soil materials away from edge of excavations.
      b. The stockpiled soil/fill will be placed on top of and be completely covered using polyethylene sheeting with a minimum thickness of 8-mil to reduce the infiltration of precipitation and the entrainment of dust. A berm wall shall be constructed around the stockpile using uncontaminated material covered with the same sheeting as the stockpiled material. The stockpile area shall be protected from stormwater runoff. Edges of the sheeting shall overlap a minimum of two feet and duct tape shall be applied along all seams to prevent movement of sheeting and infiltration of precipitation

into the stockpiled soil. Non-soil weights (e.g. tires) may be necessary to inhibit movement of the cover sheeting by wind.

H. Sample Collection and Analysis:
   1. Collect a minimum of one composite sample, and one duplicate sample using five grab samples per 100 cubic yards of potentially contaminated soil as described in the Soil/Fill Management Plan. The characterization samples should be collected from stockpiled potentially contaminated soil/fill within five days of excavation.
   2. Engage the services of a NYSDOH ELAP certified analytical laboratory to analyze samples in order to determine the proper handling and disposal of potentially contaminated soil/fill material as listed below.
   3. Required Analyses:
      a. Target Compound List (TCL) Volatile Organic Compounds (VOCs).
      b. TCL Semivolatile Organic Compounds (SVOCs).
      c. TCL pesticides and polychlorinated benzenes (PCBs) Target Analyte List (TAL) metals and cyanide.
      d. pH by SW-846 Method 9045.
   4. If contaminants are present at concentrations above the SCOs, additional analysis will be required by the disposal facility and will likely include:
      a. Toxicity Leaching Characteristic Procedure (TCLP)
      b. RCRA Characteristics (Ignitability, Corrosivity, and Reactivity).

3.5 LOADING AND TRANSPORTING

A. Furnish all labor, materials, equipment, and incidentals required to load and transport all contaminated soil/fill from the site.

B. Notify the NYSDEC in writing when loading of contaminated soil/fill will occur and include the name and location of the disposal facility to be used. Submit to the NYSDEC, if requested, a full description of the disposal facility, licenses, permits, and compliance status.

C. Do not load and transport contaminated soil and debris until receipt of approval from the disposal facility that the contaminated soil and debris will be disposed in.

D. Conduct all loading and transportation activities in accordance with all applicable federal, state, and local regulations, including but not limited to United States Department of Transportation and USEPA regulations 40 CFR 172-179.

E. Conduct all loading activities to minimize the formation of dust.

F. Obtain and comply with the required permits and authorization for transportation of contaminated soil and debris in accordance with State and local jurisdictions. The contaminated soil and debris shall be transported by a licensed waste hauler.

G. All trucks transporting contaminated soil and debris for off-site disposal shall be lined, covered, and secured in accordance with all federal, State, and local regulations. Any liner that cannot be decontaminated shall be disposed of with the contaminated soil and debris. Trucks used for transportation of contaminated soil and debris shall travel on authorized roads in accordance with all federal, state and local regulations.

H. Contaminated soil and debris shall be transported for disposal in containers that are watertight. Leaking containers shall be unloaded at the site and any leaked liquids cleaned up as spills.

I. Contaminated soil and debris transport containers shall be covered to prevent release of dust and particulates and exposure of the contaminated soil and debris to precipitation.

J. Employ a temporary transport vehicle pad for vehicle loading operations to control and contain contaminated soil and debris spillage.

K. Inspect and clean loaded transport vehicle tires and undercarriage to remove any adhering contaminated soil and debris prior to vehicle departure from the site.

3.6 DISPOSAL OF EXCAVATED MATERIALS

A. Soil/Fill with concentrations of contaminants above the SCOs will be disposed off-site within 90 days of excavation at an appropriate, permitted disposal facility.

B. Prepare all applications for waste disposal at appropriate disposal facilities and waste transportation and disposal manifests and any other documents necessary for the off-site disposal of contaminated soil/fill material. Submit waste transportation and disposal documentation to the NYSDEC, if requested.

C. Prepare a waste transportation and disposal manifest, and all other documents required for waste shipment, for each load of waste material that is transported from the site.

D. Maintain a waste disposal log on-site containing pertinent waste disposal information. If requested, the NYSDEC on-site representative may review the log.

3.7 SOIL/FILL COVER SYSTEM

A. Backfill all excavations as promptly as work permits.

B. Replace cover material within 10 days of backfilling excavations. The cover material shall be consistent with and will be placed in accordance with the Remedial Work Plan.

C. If working conditions require the excavation to remain open for a period greater than ten days, plastic or metal sheeting will be used to cover the entire or portions of the excavation during periods of inactivity.

+ + END OF SECTION + +

200 Ship Canal Parkway, LLC
Soil/Fill Management Plan

Attachment II

Standard Operating Procedures

6210-001

MALCOLM PIRNIE

Appendix ____: Item ____ - ____SCREENING OF SOIL/FILL SAMPLES FOR ORGANIC VAPORS

Applicability: GENERAL____ Revision No.: _____ Date: _____

Prepared By: PIM Date: _____ Approved By:_____ Date:

1.0 INTRODUCTION

This guideline presents a method for screening soil samples. During soil/fill excavation activities, a photoionization detection (PID) or flame ionization detector (FID) will be used to monitor the excavated soils. The monitoring results provide criteria for sampling of soil potentially impacted by volatile organic substances.

2.0 METHODOLOGY

1. During excavation, the excavated soil will be examined for visually contaminated (stained) soils. If present, these areas will be sampled first. If no staining is observed, collect samples from each stockpile at random locations.

2. Place the sample in a labeled wide-mouthed glass jar. Seal the jar with aluminum foil and a screw top cap.

    a. Keep these samples at as near to 70^{o}F as possible.
    b. Check head space of each sample for any organic vapor present by inserting the probe of the PID through the aluminum foil seal.
    c. The soil sample from each excavation location will be noted where VOA's were detected and removal of the contaminated soil will be coordinated per project requirements.

3.0 EQUIPMENT REQUIREMENTS

- 40 ml. precleaned and prelabeled glass VOA vials with teflon-lined septum caps.
- Ice and ice chest.
- Wide mouthed glass jars with screw caps
- Aluminum foil.
- Photoionization detector.

Appendix ____: Item ____ - ____COMPOSITE SAMPLE PROCEDURE FOR NON-VOLATILE ORGANICS ANALYSIS

Applicability: _____ Revision No.: _____Date:

Prepared By: _____Date: _____ Approved By: _____ Date: _____

1.0 INTRODUCTION

This guideline addresses the procedure to be used when soil samples are to be composited in the field.

2.0 METHODOLOGY

1. Transfer equal portions of soil from individual split-spoon samples to a large precleaned stainless steel (or Pyrex glass) mixing bowl.

2. Thoroughly mix (homogenize) and break up the soil using a stainless steel scoop or trowel.

3. Spread the composite sample evenly on a stainless steel tray and quarter the sample.

4. Discard alternate (i.e. diagonal) quarters and, using a small stainless steel scoop or spatula, collect equal portions of subsample from the remaining two (2) quarters until the amount required for the composite sample is acquired. Transfer these subsamples to a precleaned stainless steel (or glass Pyrex) mixing bowl and re-mix.

5. Transfer the composite sample to an appropriate precleaned jars provided by the laboratory and label. Store any excess sample from the stainless steel tray in separate, precleaned, sample containers, and submit to the laboratory for holding in case additional analysis is necessary.

6. Decontaminate all stainless steel (or glass Pyrex) trays, spoons, spatulas, and bowls in accordance with the sampling equipment decontamination procedure provided.

200 Ship Canal Parkway, LLC
Soil/Fill Management Plan

Attachment III

Erosion Control Details

6210-001

MALCOLM PIRNIE

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw or similar material used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes are to be used for no more than three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits:

Constructed Slope	Percent Slope	Slope Length (feet)
2:1	50	25
2-1/2:1	40	50
3:1	33	75
3-1/2:1	30	100
4:1	25	125

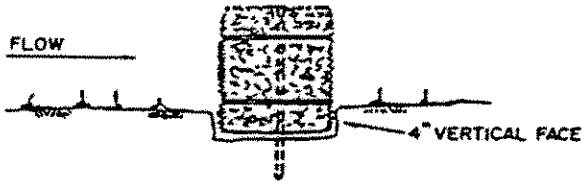
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than one acre and the length of slope above the dike shall be less than 200 feet.

Design Criteria

A design is not required. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 4.3 on page 4.10 or details.

Figure 4.3
Straw Bale Dike Details

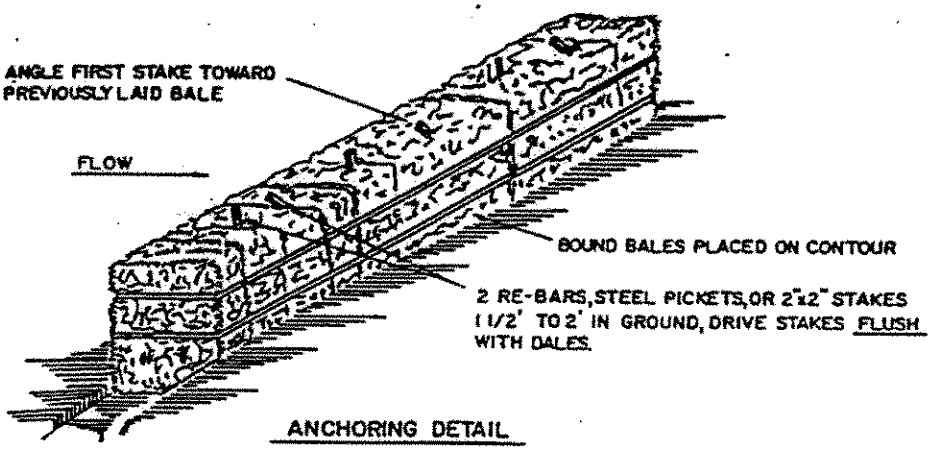


BEDDING DETAIL

STANDARD SYMBOL

SBD

DRAINAGE AREA NO MORE THAN 1/4 ac. PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%



ANCHORING DETAIL

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	STRAW BALE DIKE	STANDARD DRAWING SBD-1

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric (filter cloth) used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used.

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence are:

Slope Steepness	Maximum Slope Length (Ft)
2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

2. Maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required. All silt fences shall be placed as close to the area as possible, and the area below the fence must be undisturbed or stabilized.

A detail of the silt fence shall be shown on the plan, and contain the following minimum requirements:

1. The type, size, and spacing of fence posts.
2. The size of woven wire support fences. (OPTIONAL)
3. The type of filter cloth used.
4. The method of anchoring the filter cloth.
5. The method of fastening the filter cloth to the fencing support.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. See Figure 4.4 on page 4.12 for details.

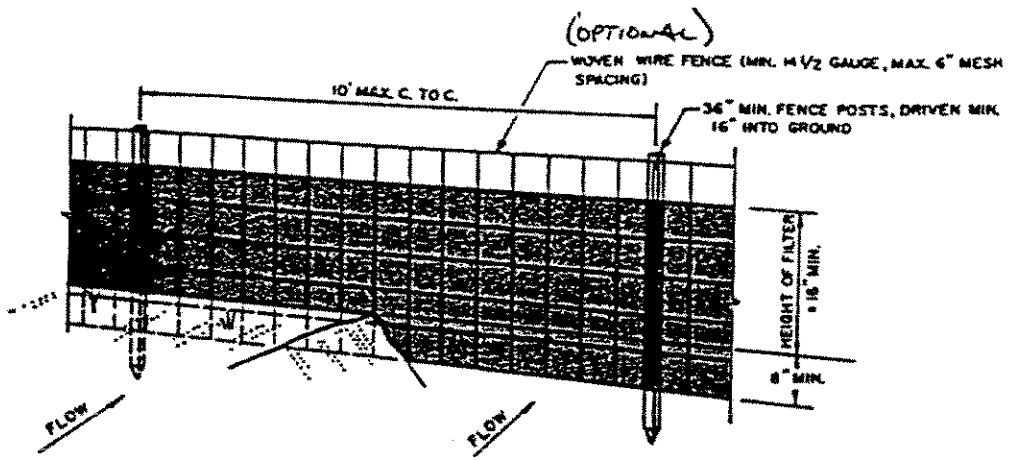
Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance. Statewide acceptability shall depend on in field and/or laboratory observations and evaluations.

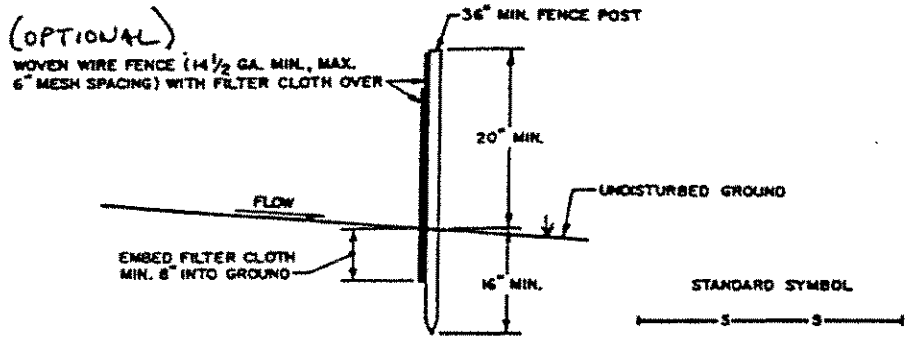
Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Sizw	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.
3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14-1/2 gage with a maximum 6 in. mesh opening, or as approved. (OPTIONAL)
4. Prefabricated Units: Envirofence or approved equal may be used in lieu of the above method providing the unit is installed per manufacturer's instructions.

Figure 4.4
Silt Fence Details



PERSPECTIVE VIEW



SECTION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. (OPTIONAL) WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS: STEEL EITHER T OR U TYPE OR 2" HARDWOOD

FENCE: WOVEN WIRE, 14½ GA. (OPTIONAL) 6" MAX. MESH OPENING

FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	SILT FENCE	STANDARD DRAWING SF-1

STANDARD AND SPECIFICATION FOR TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary Swales are constructed:

1. To divert flows from a disturbed area.
2. Intermittently across disturbed areas to shorten overland flow distances.
3. To direct sediment laden water along the base of slopes to a trapping device.
4. To transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 4.5 on page 4.14 for details.

	Swale A	Swale B
Drainage Area	<5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or Flatter	2:1 or Flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specifications for Waterways on page 4.91.

Stabilization

Stabilization of the swale shall be completed within 10 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

		FLOW CHANNEL	
Type of Treatment	Channel Grade	A ≤5 Ac	B 5-10 Ac
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with Jute or Excelsior; Sod, or lined with 2 in. stone
3	5.1-8.0%	Seed and cover with Jute or Excelsior, Sod line with 2 in. stone	Line with 4-8 in. stone or Recycled Concrete Equivalent
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[1]	Engineering Design

In highly erodible soils, as defined by local approving agency, refer to the next higher slope grade for type of stabilization.

[1] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

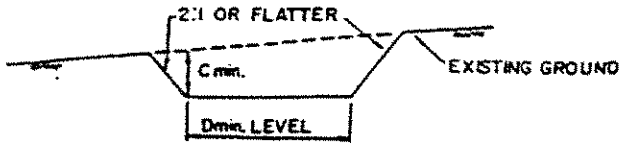
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

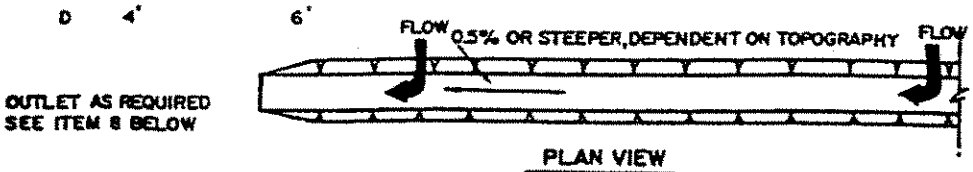
If swale is used to divert flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 4.5
Temporary Swale Detail



CROSS SECTION

	SWALE A	SWALE B
C	1'	1'
D	4'	6'



PLAN VIEW

STANDARD SYMBOL A-2 B-3

CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED ON CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE CHART BELOW:

FLOW CHANNEL STABILIZATION

TYPE OF TREATMENT	CHANNEL GRADE	A (5 AC OR LESS)	B (5 AC - 10 AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1-8.0%	SEED WITH JUTE OR EXCELSIOR; SOD	LINED RIP-RAP 4-8" RECYCLED CONCRETE EQUIVALENT
4	8.1-20%	LINED 4-8" RIP-RAP	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	TEMPORARY SWALE	STANDARD DRAWING TS-1

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 4.16 on page 4.34 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from effected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area - Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres see earth dike; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height - 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike - 2 feet minimum.

Width of swale - 2 feet minimum.

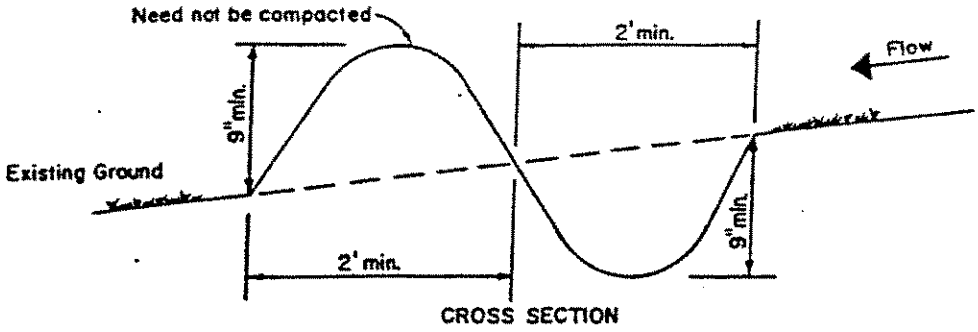
Grade - Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 20 percent.

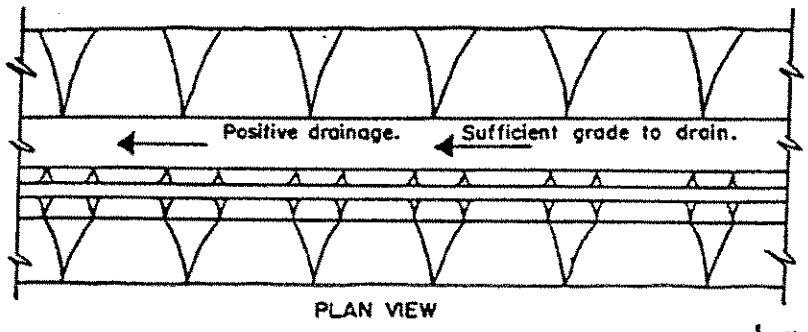
Stabilization - The disturbed area of the dike and swale shall be stabilized within 10 days of installation, in accordance with the standard and specifications for seed and straw mulch or straw mulch only if not in the seeding season.

Outlet

1. Perimeter dike/swale shall have an outlet that functions with a minimum of erosion.
2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.
3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.
4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 4.16
Perimeter Swale Dike Detail





STANDARD SYMBOL

CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTRUBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SEED AND STRAW MULCH, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

Max. Drainage Area Limit: 2 Acres

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PERIMETER DIKE/SWALE	Standard Drawing PDS-1

GENERIC EROSION AND SURFACE WATER CONTROL PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment and incidentals required to perform all excavating, backfilling, filling, and grading for construction of structures, manholes, vaults, conduits, pipelines, roads, and other facilities and all related sediment and erosion controls as specified herein.
   2. Provide positive means of erosion control, such as shallow ditches (see "New York Guidelines for Urban Erosion and Sediment Control" Third Printing 10/91 USDA – Soil Conservation Service), around work areas to remove surface drainage water from excavated areas. Pumping of water from excavations, if necessary, shall be done in such a manner to prevent the carrying away of particulates, soil/fill, or unsolidified concrete materials, and to prevent damage to the existing subgrade.
   3. Water from the excavations will be disposed properly in accordance with all applicable regulations in such a manner as not to endanger public health, property, or any portion of the work under construction or completed. Based on groundwater analytical results for samples collected at the Site, water may be discharged to the ground surface unless staining or elevated PID measurements are observed in the excavation or a sheen is present on the water surface. If any of these conditions exist the water removed from the excavation will be containerized and sampled. Any groundwater not meeting NYSDEC Ambient Water Quality and Guidance Values will be transported and disposed off-site.

1.2 QUALITY ASSURANCE

A. Permits and Regulations:
   1. Obtain all necessary permits for work in roads, rights-of-way, railroads, etc. Also obtain permits as required by local, state and federal agencies for discharging water from excavations.
   2. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Reference Standards: Comply with applicable provisions and recommendations of the following.
   1. NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) SPDES General Permit for Storm Water Discharges from Construction Activities (Permit Number GP-0-08-001).
   2. SOIL AND WATER CONSERVATION SOCIETY (SWCS) - EMPIRE STATE CHAPTER 1991 (or latest version) New York Guidelines for Urban Erosion and Sediment Control.

3. CODES, RULES, AND REGULATIONS OF THE STATE OF NEW YORK
   6 NYCRR Part 700 Definitions, Samples and Tests.
4. 6 NYCRR Part 364 Waste Transporter Permits.
5. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.3 SUBMITTALS

A. The Contractor shall prepare a written Work Plan that details the Contractor's operations and includes all activities that relate to the soil excavation (i.e., excavation plan, sampling plan, etc.). The Work Plan must detail erosion control methods and surface water management procedures that will be implemented by the Contractor throughout the work. The Work Plan shall include:
   1. Procedures for excavating, handling, storing and transporting off-site contaminated soils, hazardous soils and concrete debris including a contingency plan detailing procedures and methods to be employed at no additional cost to prevent, contain, and recover spills during the work.
   2. Description of equipment to be used on site with appropriate safety devices needed to undertake the remediation of the site.
   3. Identification of permits required to conduct the work.
   4. Worksite layout showing, at a minimum, equipment and material staging areas, trailers, decontamination station, and staging procedures.
   5. Identification of proposed haul routes for wastes and backfill.
   6. Detailed construction drawing(s) of the proposed decontamination station.
   7. Provisions for control and prevention of surface runoff.
   8. Procedures and provisions for control of fugitive air emissions and dust control.
   9. Detailed work schedule for all tasks to fulfill the project.
   10. Other requirements necessary to provide security, staging, sampling, testing, removal, and disposal of wastes.
   11. Procedures and provisions for traffic control on public right of ways and private properties.
   12. Procedures and provisions for site winterization, if necessary.
   13. Procedures for collecting, storing, and disposing of decontamination water and other contaminated water generated during the work.
   14. Methods and equipment to be used for compaction of fill materials backfilled in the excavated areas.

1.3.1. STORM WATER MANAGEMENT AND EROSION CONTROL PLAN (SWECP)

A. A SWECP will be included in the Work Plan. The SWECP shall follow guidelines for structure and content contained in SPDES-GP-0-08-001. The SWECP shall include:
   1. Information regarding site background, description of work, analysis of site limitations for storm water facilities, and potential impact to natural resources.
   2. All calculations and assumptions used for the sizing and siting of proposed temporary erosion and sedimentation control facilities.

3. Information regarding maintenance needs and safety considerations of storm water management and erosion and sediment control facilities.
4. Description of the staging of erosion and sedimentation control facilities and construction activities.
5. Description of winterization provisions, if necessary.

1.3.1.1 Storm Water Management Guidelines

A. Control and prevent surface runoff into remediation areas.

B. Control and prevent surface runoff from contaminating a clean area, or recontaminating an area that has been excavated to remove all soil above the cleanup goals. In the event surface runoff is the cause of existing clean areas, or subsequently cleaned areas, becoming contaminated, the affected areas shall be cleaned in accordance with the Remedial Work Plan.

1.3.1.2 Erosion and Sediment Control Guidelines

A. Existing vegetation on the project site shall be retained and protected to minimize soil loss on the project site and to minimize erosion control costs.

B. Sediment control practices and measures, where necessary, shall be designed to protect the natural character of rivers, streams, lakes, coastal waters or other waterbodies in the vicinity of the site and minimize erosion and sedimentation off-site from the start of land disturbance activities to completion of the project.
   1. The off-site impacts of erosion and sedimentation related to land clearing, grading and construction activities shall not be any greater during and following land disturbance activities than under pre-mobilization conditions.
   2. Pursuant to 6NYCRR Part 700.
      a. Toxic and other deleterious substances shall not be discharged in amounts that will adversely affect the taste, color or odor thereof, or impair the waters of the state for their classified usages.
      b. Suspended, colloidal and settleable solids shall not be discharged in amounts that cause substantial visible contrast to natural conditions, or causes deposition or impairs the waters for their classified usages.
   3. Stream reaches downstream of construction areas shall not have substantial visible contrast relative to color, taste, odor, turbidity and sediment deposition from the reaches upstream of the construction area. Impacts such as these which result from construction or developmental activities are a violation of 6 NYCRR Park 700 water quality standards and may be subject to enforcement actions.

C. Erosion and sediment control measures shall be constructed in accordance with an erosion and sediment control plan. The plan shall:
   1. Describe the temporary structural and vegetative measures that will be used to control erosion and sedimentation for each stage of the project from land clearing to the finished stage.
   2. Provide a map showing the location of erosion and sediment control measures.
   3. Provide an implementation schedule for staging temporary and permanent erosion and sediment control facilities.
   4. Provide a maintenance schedule for soil and sediment control facilities and describe maintenance activities to be performed.

D. Erosion and sediment control measures shall be constructed prior to beginning any other land disturbances. The devices shall not be removed until the disturbed land areas are stabilized.

E. Guidance:
   1. Grading: Perimeter grading shall blend with adjoining properties.
   2. Vegetative Protection: Where protection of trees or other vegetation is required, the location of the site to be protected shall be shown on the erosion control plan. The method of protecting vegetation during construction shall conform to the design criteria in SWCS.
   3. Drainage Control:
      a. Surface runoff that is relatively clean and sediment free shall be diverted or otherwise prevented from flowing through areas of construction activity on the project site.
      b. An approved temporary sediment control structure or permanent storm water management structure shall not be created which causes water to pond off-site on adjacent property, without first having obtained ownership or permanent easement for such use from the owner of the off-site or adjacent property.
      c. Natural drainage channels shall not be altered or relocated without the proper approvals. Pursuant to ECL Article 15 a protected stream and the bed and banks thereof shall not be altered or relocated without the approval of the NYSDEC.
      d. Runoff from any land disturbing activity shall not be discharged or have the potential to be discharged off-site or into storm drains or into watercourses unless such discharge is directed through a properly designed, installed and maintained structure, such as a sediment trap, to retain sediment on-site. Accumulated sediment shall be removed when 60 percent of the storage capacity of the sediment retention structure is filled with sediment.
      e. To limit the potential for migration of water with high pH from the site, clay plugs will be installed in the utility corridors at a maximum spacing of 100 feet.
      f. For finished grading, adequate gradients shall be provided so as to prevent water from standing on the surface of lawns for more than 24 hours after

the end of a rainfall, except in a swale flow area which may drain as long as 48 hours after the end of rainfall.

g. Permanent swales or other points of concentrated water flow shall be stabilized with sod, rip rap, paving, or covered with an approved erosion control matting as provided for in the design criteria in SWCS.

h. Surface flows over cut and fill slopes shall be controlled as provided for in the design criteria for vegetating waterways in SWCS.

5. Stream protection:

a. The bed and banks of all on-site and off-site streams that may be impacted by land clearing, grading, and construction activities shall be protected to prevent stream, river, lake or coastal sedimentation, streambank erosion, stream enlargement and degradation or loss of fisheries habitat. Measures for protecting the bed and banks of a stream include: riprap, log cribbing, and vegetative measures.

6. Maintenance:

a. An erosion control plan for the project site shall identify maintenance requirements for erosion and sediment control practices utilized, and it shall provide a maintenance schedule. All erosion and sediment control measures shall be inspected periodically and maintained in conformance with the schedule so as to ensure they remain in effective, operating condition until such times as they are removed.

b. All points of construction ingress and egress shall be protected to prevent the deposition of materials onto traversed public thoroughfare, either by installing and maintaining a stabilized construction entrance, or by washing all vehicle wheels in a safe disposal area. All materials deposited onto public thoroughfares shall be removed immediately. Proper precautions shall be taken to ensure that materials deposited onto public thoroughfares are removed so that they do not enter catch basins, storm sewers, or combined sewers.

c. Accumulated sediment shall be removed when 60 percent of the storage capacity of the retention structure is filled with sediment.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 -EXECUTION

A. The Contractor will provide NYSDEC with sufficient notice and means to examine the areas and conditions under which excavating, filling, and grading are occurring.

B. The Contractor shall strictly adhere to the provisions of the Work Plan and shall control and manage surface water in every area where his/her activities take place.

C. The Contractor shall plan and execute construction and earth work by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
   1. Hold the areas of bare soil exposed at one time to a minimum.
   2. Provide temporary control measures such as berms, dikes and drains.

D. Construct fills and waste areas by selective placement to eliminate surface silts or clays, which will erode.

E. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.

F. Surface water from known areas of contamination shall be collected prior to leaving those areas and properly disposed following all applicable state and federal regulations.

G. In the event that surface runoff is the cause of existing clean areas, or subsequently cleaned areas, becoming contaminated, the affected areas shall be cleaned in accordance with the Remedial Work Plan.

H. Groundwater that is visibly flowing from the excavation shall be collected at each exit point and properly disposed following all applicable state and federal regulations.

+ + END OF SECTION + +

200 Ship Canal Parkway, LLC
Soil/Fill Management Plan

Attachment IV

Health and Safety Plan Requirements

6210-001

MALCOLM PIRNIE

MINIMUM REQUIREMENTS FOR HEALTH AND SAFETY

1.0 Description

The Contractor is responsible and liable for the health and safety of all on-Site personnel and off-Site community impacted by the Site redevelopment activities.

This section describes the minimum health and safety requirements for this project including the requirements for the development of a written Health and Safety Plan (HASP). All on-Site workers must comply with the requirements of the HASP. The Contractor's HASP must comply with all applicable federal and state regulations protecting human health and the environment from the hazards posed by activities during this Site remediation.

2.0 References

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

ACGIH TLVs	Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (Latest Edition)

CODES OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards (Latest Edition)
29CFR 1926	Safety and Health Regulations for Construction (Latest Edition)
40 CFR 262	Standards Applicable to Generators of Hazardous Waste (Latest Edition)
49 CFR 178	Shipping Container Specification (Latest Edition)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 9285.1-30	1992 or latest edition: Standard Operating Safety Guides (Office of Emergency and Remedial Response)
EPA-450	1987 or latest edition: Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)

NATIONAL INSTITUTES FOR SAFETY AND HEALTH (NIOSH)

NIOSH 85-115	1985 or latest edition: Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH, OSHA, USCG, and EPA)
NIOSH 89-127	1989 or latest edition: Manual of Analytical Methods

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

TAGM 4031	1989 Division Technical and Administrative Guidance Memorandum -- Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites

N.Y.S. DEPARTMENT OF LABOR

NYSDOL 28.876	1980 Article 28 Section 876 NYS Labor Law (Right-to-Know Law)

3.0 Basis

The Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (20 CFR 1910 and 1926) and subsequent additions and/or modifications, the New York State Labor Law Section 876 (Right-to-Know Law), the Standard Operating Safety Guidelines by the United States Environmental Protection Agency (EPA), Office of Emergency and Remedial Response and the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH, OSHA, USCG, and EPA) provide the basis for the safety and health program. Additional specifications within this section are in addition to OSHA regulations and reflect the positions of both the EPA and the National Institute for Occupation Safety and Health (NIOSH) regarding procedures required to ensure safe operations at abandoned hazardous waste disposal Sites.

The safety and health of the public and project personnel and the protection of the environment will take precedence over cost and schedule considerations for all project work. The Contractor will notify the NYSDEC and NYSDOH of conditions which may adversely affect the safety and health of project personnel and the community. The NYSDEC or the NYSDOH may stop work for health and safety reasons. If work is suspended for health and/or safety reasons, it shall not resume until approval is obtained from the NYSDEC or the NYSDOH. The cost of work stoppage due to health and safety is the responsibility of the Contractor.

4.0 Health and Safety Definitions

The following definitions shall apply to the work of the redevelopment of the Site:

A. Project Personnel: Project personnel include the Contractor, subcontractor, and Federal, State, and local Representatives working or having official business at the Project Site.

B. Authorized Visitor: The Safety Officer has primary responsibility for determining who is qualified and may enter the Site. The Site Safety Officer will only allow authorized visitors with written proof that they have been medically certified and trained in accordance with 29 CFR 1910.120 to enter the contamination reduction zone and/or exclusion area.

C. Health and Safety Coordinator (HSC): The HSC shall be a Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP) retained by the Contractor. The HSC will be responsible for the development and implementation of the HASP.

D. Safety Officer (SO): The SO will be the Contractor's on-Site person who will be responsible for the day-to-day implementation and enforcement of the HASP.

E. Health and Safety Technicians (HST): The HST(s) will be the Contractor's on-Site personnel who will assist the SO in the implementations of the HASP, in particular, with air monitoring in active work areas and maintenance of safety equipment.

F. Medical Consultant (MC): The MC is a physician retained by the Contractor who will be responsible for conducting physical exams as specified under the Medical Monitoring Programs in this section.

G. Project Site: The area of the Buffalo Lakeside Commerce Park (BCLP) Site that is undergoing redevelopment, which includes the Contractor Work Area.

H. Contractor Work Area: An area of the project Site including the Support Zone, access road, staging area, and Exclusion Zone.

I. Contractor Support Zone: An area of the Contractor Work Area outside the Exclusion Zone, accessible for deliveries and visitors. No persons, vehicles, or equipment may enter these areas from the Exclusion Zone without having gone through specified decontamination procedures in the adjacent Contamination Reduction Zone.

J. Staging Areas: Areas within the Exclusion Zone for the segregated temporary staging of uncontaminated and contaminated soil and debris.

K. Exclusion Zone: The innermost area within the Contractor Work Area that encloses the area of contamination. Protective clothing and breathing apparatus as specified in the health and safety requirements and in the Contractor's approved HASP must be worn.

L. Contamination Reduction Zone: An area at the Exit Point of the Exclusion Zone through which all personnel, vehicles, and equipment must enter and exit. All decontamination of vehicles and equipment and removal of personal protective clothing and breathing apparatus must take place at the boundary between the Exclusion Zone and the Contamination Reduction Zone.

M. Work: Work includes all labor, materials, and other items that are part of Site redevelopment activities.

N. Monitoring: The use of direct reading field instrumentation to provide information regarding the levels of gases and/or vapor, which are present during remedial action. Monitoring shall be conducted to evaluate employee exposures to toxic materials and hazardous conditions.

5.0 Responsibilities

The Contractor shall:

A. Employ an SO who shall be assigned full-time responsibility for all tasks herein described under this HASP. In the event the SO cannot meet his responsibilities, the Contractor shall be responsible for obtaining the services of an "alternate" SO meeting the minimum requirements and qualifications contained herein. No work will proceed on this project in the absence of an approved SO.

B. Ensure that all project personnel have obtained the required physical examination prior to and at the termination of work covered by the contract.

C. Be responsible for the pre-job indoctrination of all project personnel with regard to the HASP and other safety requirements to be observed during work, including but not limited to (a) potential hazards, (b) personal hygiene principles, (c) personal protection equipment, (d) respiratory protection equipment usage and fit testing, and (e) emergency procedures dealing with fire and medical situations.

D. Be responsible for the implementation of this HASP, and the Emergency Contingency and Response Plan.

E. Provide and ensure that all project personnel are properly clothed and equipped and that all equipment is kept clean and properly maintained in accordance with the manufacturer's recommendations or replaced as necessary.

F. Will perform all Site redevelopment work in a safe and environmentally acceptable manner. The Contractor will provide for the safety of all project personnel and the community for the duration of the redevelopment activities.

G. Have sole and complete responsibility for safety conditions for the project, including safety of all persons (including employees).

H. Be responsible for protecting the project personnel and the general public from hazards due to the exposure, handling, and transport of contaminated materials. Barricades, warning lights (if needed), roped off areas, and proper signs shall be furnished in sufficient amounts and locations to safeguard the project personnel and public at all times.

I. Ensure all OSHA health and safety requirements are met.

J. Maintain a chronological log of all persons entering the project Site. It will include organization, date, and time of entry and exit. Each person must sign in and out.

6.0 Submittals

Health and Safety Plan (HASP)

The HASP is a deliverable product of this project. The Contractor will submit the HASP to the NYSDEC and NYSDOH a minimum of two weeks prior to initiation of redevelopment activities. Agreed upon responses to all comments will be incorporated into the final copy of the HASP. The HASP shall govern all work performed for this contract. The HASP shall address, at a minimum, the following items in accordance with 29 CFR 1910.120(I) (2):

A. Health and Safety Organization
B. Site Description and Hazard Assessment
C. Training
D. Medical Surveillance
E. Work Areas
F. Standard Operating Safety Procedures and Engineering Controls
G. Personal Protective Equipment (PPE)
H. Personnel Hygiene and Decontamination
I. Equipment Decontamination
J. Air Monitoring

K. Emergency Equipment/First Aid Requirements
L. Emergency Response and Contingency Plan
M Spill Containment Plan
N. Heat & Cold Stress
O. Record Keeping
P. Community Protection Plan

The following sections will describe the requirements of each of the above-listed elements of the HASP.

7.0 Health and Safety Organization

The Contractor shall list in the HASP a safety organization with specific names, qualifications, and responsibilities. At a minimum, the Contractor shall provide the services of a Health and Safety Coordinator, SO, and a Medical Consultant.

Health and Safety Coordinator: The Contractor must retain the services of a Health and Safety Coordinator (HSC). The HSC must be an American Board of Industrial Hygiene (ABIH) Certified Industrial Hygienist (CIH) or a Certified Safety Professional (CSP). The HSC must have a minimum of two years experience in hazardous waste Site remediation or related industries and have a working knowledge of federal and state occupational health and safety regulations. The HSC must be familiar with air monitoring techniques and the development of health and safety programs for personnel working in potentially toxic atmospheres.

In addition to meeting the above requirements, the HSC will have the following responsibilities:

A. Responsibility for the overall development and implementation of the HASP.

B. Responsibility for the initial training of on-Site workers with respect to the contents of the HASP.

C. Availability during normal business hours for consultation by the Safety Officer.

D. Availability to assist the Safety Officer in follow-up training and if changes in Site conditions occur.

Safety Officer: The designated SO must have, at a minimum, two years of experience in the remediation of hazardous waste Sites or related field experience. The SO must have formal training in health and safety and be conversant with federal and state regulations governing occupational health and safety. The SO must be certified in CPR and first aid and have experience and training in the implementation of personal protection and air monitoring programs. The SO must be properly trained or have "hands-on" experience with the operation and maintenance

of real-time air monitoring equipment. The SO must be thoroughly knowledgeable of the operation and maintenance of air-purifying respirators (APR) and supplied-air respirators (SAR) including SCBA and airline respirators.

In addition to meeting the above qualifications, the SO will be responsible for the following minimum requirements:

A. Responsibility for the implementation, enforcement, and monitoring of the health and safety plan.

B. Responsibility for the pre-construction indoctrination and periodic training of all on-Site personnel with regard to this safety plan and other safety requirements to be observed during construction, including:

(1) Potential hazards
(2) Personal hygiene principles
(3) PPE
(4) Respiratory protection equipment usage and fit testing
(5) Emergency procedures dealing with fire and medical situations
(6) Conduct daily update meetings in regard to health and safety

C. Responsibility for alerting any State or Federal on-Site representative prior to the Contractor starting any particular hazardous work.

D. Responsibility for informing project personnel of the New York State Labor Law Section 876 (Right-to-Know Law).

E. Responsibility for the maintenance of separation of Exclusion Zone (Dirty) from the Support Zone (Clean) areas as described hereafter.

Health and Safety Technicians: The Health and Safety Technician (HST) must have one year of hazardous waste Site or related experience and be knowledgeable of applicable occupational health and safety regulations. The HST must be certified in CPR and first aid. The HST will be under direct supervision of the SO during on-Site work. The HST must be familiar with the operations, maintenance and calibration of monitoring equipment used in this remediation. A HST will be assigned to each work crew or task in potentially hazardous areas.

Medical Consultant: The Contractor is required to retain a Medical Consultant (MC) who is a physician, certified in occupational medicine. The physician shall have experience in the occupational health area and shall be familiar with potential Site hazards of remedial action projects. The MC will also be available to provide annual physicals and to provide additional medical evaluations of personnel when necessary.

8.0 Site Description and Hazard Assessment

The Contractor shall perform a hazard assessment to provide information to assist in selection of PPE and establish air monitoring guidelines to protect on-Site personnel, the environment, and the public. The Contractor shall provide a general description of the Site, its location, past history, previous environmental sampling results, and general background on the conditions present at the Site.

A. Chemical Hazards: A qualitative evaluation of chemical hazards shall be based on the following:

- Nature of potential contaminants
- Location of potential contaminants at the project Site
- Potential for exposure during Site activities
- Effects of potential contaminants on human health

B. Biological Hazards: A qualitative evaluation of biological hazards consisting of the elements listed for chemical hazards.

C. Physical Hazards: The Contractor shall assess the potential for physical hazards affecting personnel during the performance of on-Site work.

The Contractor shall develop a hazard assessment for each Site task and operation established in the HASP.

9.0 Training

OSHA Training

The Contractor is responsible to ensure that all project personnel have been trained in accordance with OSHA 1910.120 regulations.

The Contractor shall ensure that all employees are informed of the potential hazards of toxic chemicals to the unborn child and of the risks associated with working at the project Site.

The Contractor shall be responsible for, and guarantee that, personnel not successfully completing the required training are not permitted to enter the project Site to perform work.

Safety Meetings

At a minimum, the SO will conduct daily safety meetings that will be mandatory for all project personnel. The meetings will provide refresher courses for existing equipment and protocols, and will examine new Site conditions as they are encountered.

Additional safety meetings will be held on an as-required basis.

Should any unforeseen or Site-peculiar safety-related factor, hazard, or condition become evident during the performance of work at this Site, the Contractor will bring such to the attention of the SO in writing as quickly as possible for resolution. In the interim, the Contractor will take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

10.0 Medical Surveillance

The Contractor shall utilize the services of a Physician to provide, at a minimum, the medical examinations and surveillance specified herein. The name of the Physician and evidence of examination of all Contractor and subcontractor on-Site personnel shall be kept by the SO.

Contractor and subcontractor project personnel involved in this project shall be provided with medical surveillance prior to onset of work. At any time there is suspected excessive exposure to substances that would be medically detectable, all project personnel will be medically monitored. The costs for these medical exams are to be borne by the Contractor.

Physical examinations are required for:

A. Any and all personnel entering hazardous or transition zones or performing work that required respiratory protection.

B. All Contractor personnel on Site who are dedicated or may be used for emergency response purposes in the Exclusion Zone.

C. Contractor supervisors entering hazardous or transition zones, or on-Site for more than 16 hours during the length of the project.

Physical examinations are not required for people making periodic deliveries provided they do not enter hazardous or transition zones.

In accordance with good medical practice, the examining Physician or other appropriate representative of the Physician shall discuss the results of such medical examination with the individual examined. Such discussion shall include an explanation of any medical condition that the Physician believes required further evaluation or treatment and any medical condition which the Physician believes would be adversely affected by such individual's employment at the project Site. A

written report of such examination shall be transmitted to the individual's private physician upon written request by the individual.

The examining Physician or Physician group shall notify the SO in writing that the individual has received a medical examination and shall advise the SO as to any specific limitations upon such individual's ability to work at the project Site that were identified as a result of the examination. Appropriate action shall be taken in light of the advice given pursuant to this subparagraph.

The physical examination shall also include but not be limited to the following minimum requirements:

A. Complete blood profile;

B. Blood chemistry to include: chloride, CO_2, potassium, sodium, BUN, glucose, globulin, total protein, albumin, calcium, cholesterol, alkaline phosphates, triglycerides, uric acid, creatinine, total bilirubin, phosphorous, lactic dehydrogenase, SGPT, SGOT;

C. Urine analysis;

D. "Hands on" physical examination to include a complete evaluation of all organ systems including any follow-up appointments deemed necessary in the clinical judgement of the examining physician to monitor any chronic conditions or abnormalities;

E. Electrocardiogram;

F. Chest X-ray (if recommended by examining physician in accordance with good medical practice);

G. Pulmonary function;

H. Audiometry - To be performed by a certified technician, audiologist, or physician. The range of 500 to 8,000 hertz should be assessed.

I. Vision screening - Use a battery (TITMUS) instrument to screen the individual's ability to see test targets well at 13 to 16 inches and at 20 feet. Tests should include an assessment of muscle balance, eye coordination, depth perception, peripheral vision, color discrimination, and tonometry.

J. Tetanus booster shot (if no inoculation has been received within the last five years); and

K. Complete medical history.

11.0 Site Control

Security

Security shall be provided and maintained by the Contractor.

Vehicular access to the Site, other than to designated parking areas, shall be restricted to authorized vehicles only. Use of on-Site designated parking areas shall be restricted to vehicles of the State or Federal on-Site representative, Contractor, subcontractor, and service personnel assigned to the Site and actually on duty but may also be used on short-term basis for authorized visitors.

The Contractor shall be responsible for maintaining a log of security incidents and visitor access granted.

The Contractor shall require all personnel having access to the project Site to sign in and sign-out, and shall keep a record of all Site access.

All approved visitors to the Site shall be briefed by the SO on safety and security, provided with temporary identification and safety equipment, and escorted throughout their visit.

Site visitors shall not be permitted to enter the hazardous work zone unless approved by the SO with appropriate Site access agreement.

Project Sites shall be posted, "Warning Hazardous Work Area, Do Not Enter Unless Authorized," and access restricted by the use of a snow fence or equal at a minimum. Warning signs shall be posted at a minimum of every 500 feet.

Site Control

The Contractor shall provide the following Site control procedures as a minimum:

- A Site map;
- A map showing Site work zones;
- The use of a "buddy system"; and
- Standard operating procedures or safe work practices.

Work Areas

The Contractor will clearly lay out and identify work areas in the field and will limit equipment, operations and personnel in the areas as defined below:

A. Exclusion Zone (EZ) - This will include all areas where potential environmental monitoring has shown or it is suspected that a potential hazard may exist to workers. The level of PPE required in these areas will be determined by the SO after air monitoring and on-Site inspection has been conducted. The area will be clearly delineated from the decontamination area. As work within the hazardous zone proceeds, the delineating boundary will be relocated as necessary to prevent the accidental contamination of nearby people and equipment. The Exclusion Zone will be delineated by fencing (e.g., chain link, snow fencing, or orange plastic fencing).

B. Contamination Reduction Zone - This zone will occur at the interface of "Hazardous" and "Clean" areas and will provide for the transfer of equipment and materials from the Support Zone to the Exclusion Zone, the decontamination of personnel and clothing prior to entering the "Clean" area, and for the physical segregation of the "Clean" and "Hazardous" areas. This area will contain all required emergency equipment, etc. This area will be clearly delineated by fencing (e.g., chain link, snow fencing, or orange plastic fencing). It shall also delineate an area that although not contaminated at a particular time may become so at a later date.

C. Support Zone - This area is the remainder of the work Site and project Site. The Support Zone will be clearly delineated and procedures implemented to prevent active or passive contamination from the work Site. The function of the Support Zone includes:

(1) An entry area for personnel, material and equipment to the Exclusion Zone of Site operations through the Contamination Reduction Zone;

(2) An exit for decontamination personnel, materials and equipment from the "Decontamination" area of Site operations;

(3) The housing of Site special services; and

(4) A storage area for clean, safety, and work equipment.

12.0 Standard Operating Safety Procedures (SOP), Engineering Controls

General SOP

A. The Contractor will ensure that all safety equipment and protective clothing is kept clean and well maintained.

B. All prescription eyeglasses in use on this project will be safety glasses and will be compatible with respirators. No contact lenses shall be allowed on Site.

C. All disposable or reusable gloves worn on the Site will be approved by the SO.

D. During periods of prolonged respirator usage in contaminated areas, respirator filters will be changed upon breakthrough. Respirator filters will always be changed daily.

E. Footwear used on Site will be covered by rubber overboots or booties when entering or working in the Exclusion Zone area or Contamination Reduction Zone. Boots or booties will be washed with water and detergents to remove dirt and contaminated sediment before leaving the Exclusion Zone or Contamination Reduction Zone.

F. All PPE used in the Exclusion Zone or Contamination Reduction Zone will be decontaminated or disposed of at the end of the workday. The SO will be responsible for ensuring decontamination of PPE before reuse.

G. All respirators will be individually assigned and not interchanged between workers without cleaning and sanitizing.

H. Contractor, subcontractor and service personnel unable to pass a fit test as a result of facial hair or facial configuration shall not enter or work in an area that requires respiratory protection.

I. The Contractor will ensure that all project personnel shall have vision or corrected vision to at least 20/40 in one eye.

J. On-Site personnel found to be disregarding any provision of this plan will, at the request of the SO, be barred from the project.

K. Used disposable outerwear such as coveralls, gloves, and boots shall not be reused. Used disposable outerwear will be removed upon leaving the hazardous work zone and will be placed inside disposable containers provided for that purpose. These containers will be stored at the Site at the designated staging area and the Contractor will be responsible for proper disposal of these materials at the completion of the project.

L. Protective coveralls that become torn or badly soiled will be replaced immediately.

M. Eating, drinking, chewing gum or tobacco, smoking, etc., will be prohibited in the hazardous work zones and neutral zones.

N. All personnel will thoroughly cleanse their hands, face, and forearms and other exposed areas prior to eating, smoking or drinking.

O. Workers who have worked in a hazardous work zone will shower at the completion of the workday.

P. All personnel will wash their hands, face, and forearms before using toilet facilities.

Q. No alcohol, firearms or drugs (without prescriptions) will be allowed on Site at any time.

R. All personnel who are on medication should report it to the SO who will make a determination whether or not the individual will be allowed to work and in what capacity. The SO may require a letter from the individual's personal physician stating what limitations (if any) the medication may impose on the individual.

Engineering Controls - Dust and Air Emissions

The Contractor shall provide all equipment and personnel necessary to monitor and control dust and air emissions.

13.0 Personal Protective Equipment

General

The Contractor shall provide all project personnel with the necessary safety equipment and protective clothing, taking into consideration the chemical wastes at the Site. At a minimum, the Contractor may supply project personnel with the following:

A. Sufficient disposable coveralls;

B. One pair splash goggles;

C. Chemical-resistant outer and inner gloves;

D. Rubber overshoes (to be washed daily);

E. Hard hat;

F. One full-face mask with appropriate canisters for work requiring Level C protection; and

G. For all project personnel involved with Level B protection, a positive-pressure SCBA or a positive-pressure in-line air respirator. A 5-minute escape bottle must be included with the in-line air apparatus.

Levels of Protection

The following sections described the requirements of each level of protection.

A. Level A Protection

(1) PPE:

a. Supplied-air respirator approved by the Mine Safety and Health Administration (MSHA) and NIOSH. Respirators may be:

- Positive-pressure SCBA; or
- Positive-pressure airline respirator (with escape bottle for Immediately Dangerous to Life and Health [IDLH] or potential for IDLH atmosphere).

b. Fully encapsulating chemical-resistant suit.

c. Coveralls.

d. Cotton long underwear.*

e. Gloves (inner), chemical-resistant.

f. Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot.)

g. Hard hat (under suit).*

h. Disposal gloves and boot covers (worn over fully encapsulating suit).

I. Cooling unit.*

j. Two-way radio communications (inherently safe).*

* Optional

(2) Criteria for Selection:

Meeting any of these criteria warrants use of Level A protection:

a. The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on:

. Measures (or potential for) high concentration of atmospheric vapors, gases, or particulates, or

. Site operations and work functions involves high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials highly toxic to the skin.

b. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.

c. Operations must be conducted in confined, poorly ventilated areas until the absence of substances requiring Level A protection is determined.

d. Direct readings on field Flame Ionization Detectors (FID) or Photoionization Detectors (PID) and similar instruments indicate high levels of unidentified vapors and gases in the air.

(3) Guidance on Selection:

a. Fully encapsulating suits are primarily designed to provide a gas- or vapor-tight barrier between the wearer and atmospheric contaminants. Therefore, Level A is generally worn when high concentrations of airborne substances could severely effect the skin. Since Level A requires the use of SCBA, the eyes and respiratory system are also more protected.

Until air surveillance data become available to assist in the selection of the appropriate level of protection, the use of Level A may have to be based on indirect evidence of the potential for atmospheric contamination or other means of skin contact with severe skin affecting substances.

Conditions that may require Level A protection include:

. Confined spaces: Enclosed, confined, or poorly ventilated areas are conducive to the buildup of toxic vapors, gases, or particulates. (Explosive or oxygen-deficient atmospheres are also more probable in confined spaces). Confined-space entry does not automatically warrant wearing Level A protection, but

should serve as a cue to carefully consider and to justify a lower level of protection.

- Suspected/known highly toxic substances: Various substances that are highly toxic, especially skin absorption, for example, fuming corrosives, cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens, and infectious substances may be known or suspected to be involved. Field instruments may not be available to detect or quantify air concentrations of these materials. Until these substances are identified and concentrations measured, maximum protection may be necessary.

- Visible emissions: Visible air emissions from leaking containers or railroad/vehicular tank cars, as well as smoke from chemical fires and others, indicate high potential for concentrations of substances that could be extreme respiratory or skin hazards.

- Job Functions: Initial Site entries are generally walk-throughs, in which instruments and visual observations are used to make a preliminary evaluation of the hazards.

In initial Site entries, Level A should be worn when:

- There is a probability for exposure to high concentrations of vapors, gases, or particulates; and

- Substances are known or suspected of being extremely toxic directly to the skin or by being absorbed.

Subsequent entries are to conduct the many activities needed to reduce the environmental impact of the incident. Levels of protection for later operations are based not only on data obtained from the initial and subsequent environmental monitoring, but also on the probability of contamination and ease of decontamination.

Examples of situations where Level A has been worn are:

- Excavating of soil to sample buried drums suspected of containing high concentrations of dioxin;

. Entering a cloud of chlorine to repair a valve broken in a railroad accident;

. Handling and moving drums known to contain oleum; and

. Responding to accidents involving cyanide, arsenic, and undiluted pesticides.

b. The fully encapsulating suit provides the highest degree of protection to skin, eyes, and respiratory system if the suit material resists chemicals during the time the suit is worn. While Level A provides maximum protection, all suit material may be rapidly permeated and degraded by certain chemicals from extremely high air concentrations, splashes, or immersion of boots or gloves in concentrated liquids or sludges. These limitations should be recognized when specifying the type of fully encapsulating suit. Whenever possible, the suit material should be matched with the substance it is used to protect against.

B. Level B Protection

(1) PPE:

a Positive-pressure SCBA (MSHA/NIOSH approved); or

b. Positive-pressure air line respirator (with escape bottle for IDLH or potential for IDLH atmosphere) MSHA/NIOSH approved;

c. Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls or hooded, one- or two-piece chemical-splash suit; disposable chemical-resistant, one-piece suits);

d. Cotton long underwear;*

e. Coveralls;

f. Gloves (outer), chemical-resistant;

g. Gloves (inner), chemical-resistant;

h. Boots (inner), leather work shoe with steel toe and shank;

i. Boots (outer), chemical-resistant, (disposable);

j. Hard hat (face shield*);

k. 2-way radio communication;* and

l. Taping between suit and gloves, and suit and boots. *Optional

(2) Criteria for Selection:

Any one of the following conditions warrants use of Level B Protection:

a. The type and atmospheric concentration of toxic substances have been identified and require a high level of respiratory protection, but less skin protection than Level A. These atmospheres would:

. Have IDLH concentrations; or

. Exceed limits of protection afforded by an air-purifying mask; or

. Contain substances for which air-purifying canisters do not exist or have low removal efficiency; or

. Contain substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.

b. The atmosphere contains less than 19.5% oxygen

.

c. Site operations make it highly unlikely that the work being done will generate high concentrations of vapors, gases or particulates, or splashes of material that will affect the skin of personal wearing Level B protection.

d. Working in confined spaces.

e. Total atmospheric concentrations, sustained in the breathing zone, of unidentified vapors or gases range from 5 ppm above background to 500 ppm above background as measured by direct reading instruments such as the FID or PID or similar instruments, but vapors and gases are not suspected of containing high levels of chemicals toxic to skin.

(3) Guidance on Selection Criteria:

Level B equipment provides a reasonable degree of protection against splashes and to lower air contaminant concentrations, but a somewhat lower level of protection to skin than Level A. The chemical-resistant clothing required in Level B is available in a wide variety of styles, materials, construction detail, permeability, etc. Taping joints between the gloves, boots and suit, and between hood and respirator reduces the possibility for splash and vapor or gas penetration. These factors all affect the degree of protection afforded. Therefore, the SO should select the most effective chemical-resistant clothing based on the known or anticipated hazards and/or job function.

Level B does provide a high level of protection to the respiratory tract. Generally, if SCBA is required, Level B clothing rather than a fully encapsulating suit (Level A) is selected based on needing less protection against known or anticipated substances affecting the skin. Level B skin protection is selected by:

a. Comparing the concentrations of known or identified substances in air with skin toxicity data;

b. Determining the presence of substances that are destructive to or readily absorbed through the skin by liquid splashes, unexpected high levels of gases, vapor or particulates, or other means of direct contact; and

c. Assessing the effect of the substance (at its measured air concentrations or splash potential) on the small area of the head and neck left unprotected by chemical-resistant clothing.

For initial Site entry at an open Site, Level B protection should protect Site personnel, providing the conditions described in selecting Level A are known or judged to be absent.

C. Level C Protection

(1) PPE

a. Full-face, air-purifying, cartridge- or canister-equipped respirator (MSHA/NIOSH approved) with cartridges appropriate for the respiratory hazards;

b. Chemical-resistant clothing (coveralls, hooded, one-piece or two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls);

c. Coveralls;

d. Cotton long underwear;*

e. Gloves (outer), chemical-resistant;

f. Gloves (inner), chemical-resistant;

g. Boots (inner), leather work shoes with steel toe and shank;

h. Boots (outer), chemical-resistant (disposable);*

I. Hard hat (face shield);*

j. Escape SCBA of at least 5-minute duration;

k. 2-way radio communications (inherently safe);* and

(2) Taping between suit and boots, and suit and gloves.

* Optional

(3) Criteria for Selection

Meeting all of these criteria permits use of Level C protection:

a. Measured air concentrations of identified substances will be reduced by the respirator to, at or below, the substance's Threshold Limit Value (TLV) or appropriate occupational exposure limit and the concentration is within the service limit of the canister.

b. Atmospheric contaminant concentrations do not exceed IDLH levels.

c. Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of the skin left unprotected by chemical-resistant clothing.

d. Job functions do not require SCBA.

e. Total readings register between background and 5 ppm above background as measured by instruments such as the FID or PID.

f. Oxygen concentrations are not less than 19.5% by volume.

g. Air will be monitored continuously.

(4) Guidance on Selection Criteria

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing air-purifying devices. The air-purifying device must be a full-face mask (MSHA/NIOSH approved) equipped with a cartridge suspended from the chin or on a harness. Cartridges must be able to remove the substances encountered.

A full-face, air-purifying mask can be used only if:

a. Oxygen content of the atmosphere is at least 19.5% by volume;

b. Substance(s) is identified and its concentrations(s) measured;

c. Substance(s) has adequate warning properties;

d. Individual passes a qualitative fit-test for the mask; and

e. Appropriate cartridge is used, and its service limits concentration is not exceeded.

An air monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators (Level C). Continual surveillance using direct-reading instruments and air sampling is needed to detect any changes in air quality necessitating a higher level of respiratory protection. Total unidentified vapor/gas concentrations exceeding 5 ppm above background require Level B.

D. Level D Protection

(1) PPE:

a. Coveralls, chemical resistant;

b. Gloves (outer), chemical resistant;

c. Gloves (inner), chemical resistant;*

d. Boots (inner), leather work shoes with steel toe and shank;

e. Boots (outer), chemical resistant (disposable);*

f. Hard hat;

g. Face shield;*

h. Safety glasses with side shields or chemical splash goggles;* and

i. Taping between suit and boots, and suit and gloves.

* Optional

(2) Criteria for Selection:

a. No atmospheric contaminant is present.

b. Direct reading instruments do not indicate any readings above background.

c. Job functions have been determined not to require respirator protection.

(3) Guidance on Selection Criteria:

Level D protection is distinguished from Level C protection in the requirement for respiratory protection. Level D is used for non-intrusive activities or intrusive activities with continuous air monitoring. It can be worn only in areas where there is no possibility of contact with contamination.

E. Anticipated Levels of Protection

It is anticipated that most of the work shall be performed in Level D. A respirator shall be immediately available in the event that air monitoring indicates an upgrade to Level C is required. The determination of the proper level of protection for each task shall be the responsibility of the Contractor. The task specific levels of protection shall be stated in the Contractor's HASP.

Disposable Coveralls

The Contractor shall provide, as necessary, protective coveralls for all project personnel each day with extra sets provided for authorized visitors. The coveralls

shall be of the disposable type made of Tyvek or equivalent material, and shall be manufactured/supplied by Durafab, Koppler, or other appropriate manufacturers. To protect project personnel from exposure to liquids, splash-resistant suits (Saranex suits, from appropriate manufacturers) shall be provided. Ripped suits will be immediately replaced after all necessary decontamination has been completed to the satisfaction of the SO.

Hard Hat

The Contractor shall provide and maintain one hard hat per person on Site (authorized visitors included). The hard hats shall comply with OSHA Health and Safety Standards (29 CFR 1910.135).

Face Shields

The Contractor shall provide and maintain one face shield per person on Site, if necessary. The face shields shall be of the full face type meeting OSHA Health and Safety Standards (29 CFR 1910.133) and shall have brackets for mounting on hard hats. Hard hats and face shields shall be from the same manufacturer to ensure proper fit and shall be manufactured/supplied by Bullard, Norton, or other appropriate manufacturers.

Full Face Organic Vapor Respirator

The Contractor shall provide and maintain a dedicated air-purifying organic vapor respirator per person working in hazardous work and neutral work zones. The respirator shall be of the full-face canister type with cartridges appropriate for the respiratory hazards. Respirators and cartridges shall be MSHA/NIOSH approved, manufactured/supplied by MSA, Scott, or other appropriate manufacturers. The Contractor shall inspect and maintain respirators and canisters in accordance with OSHA regulations (29 CFR 1910.134) and in accordance with manufacturer's instructions. The Contractor shall ensure that proper fit testing training and medical surveillance of respirator users is in accordance with OSHA regulations (29 CFR 1910.134).

Gloves (outer)

The Contractor shall supply a minimum of one pair of gloves per workman in areas where skin contact with hazardous material is possible. Work gloves shall consist of nitrile (NCR) or Neoprene material. Other gloves may be selected if required based on the potential chemical present. Cotton liners will be provided by the Contractor during cold weather.

Gloves (inner)

The Contractor shall supply Latex or equivalent surgical gloves to be worn inside the outer gloves.

Boots (inner)

The Contractor shall supply one pair of safety shoes or boots per workman and shall be of the safety-toe type meeting the requirements of 29 CFR 1910.136.

Boots (outer)

The Contractor shall provide and maintain one pair of overshoes for each on-Site person entering a hazardous work area. The overshoes shall be constructed of rubber and shall be 12 inches high minimum.

14.0 Decontamination

Portable "Boot Wash" Decontamination Equipment

The Contractor shall provide a portable decontamination station, commonly referred to as a "Boot Wash" facility for each hazardous work zone requiring decontamination for project personnel. These facilities shall be constructed to contain spent wash water, contain a reservoir of clean wash water, a power supply to operate a pump for the wash water, a separate entrance and exit to the decontamination platform, with the equipment being mobile, allowing easy transport from one hazardous work zone to the next. An appropriate detergent such as alconox shall be used.

Personnel Decontamination

The Contractor shall provide full decontamination facilities at all hazardous zones. Decontamination facilities must be described in detail in the HASP.

Disposal of Spent Clothing and Material

Contaminated clothing, used respirator cartridges and other disposable items will be put into drums/containers for transport and proper disposal as hazardous waste in accordance with RCRA requirements.

Containers/55-gallon capacity drums shall conform to the requirements of 40 CFR Part 178 for Transportation of Hazardous Materials. The containers containing hazardous material shall be transported by the Contractor to the staging area.

The Contractor is responsible for the proper container packaging, labeling, transporting, and disposal.

15.0 Equipment Decontamination

General

Thoroughly decontaminate all equipment and material used in this project in accordance with established federal and state procedures before it is removed from the project Site. With the exception of the excavated materials, all contaminated materials and clothing that cannot be decontaminated shall be disposed of using a method permitted by appropriate regulatory agencies. All vehicles and equipment used will be decontaminated to the satisfaction of the SO in the decontamination area on Site prior to leaving the project.

Decontamination shall take place within the designated equipment and materials decontamination area. The decontamination shall consist of degreasing (if required), followed by high-pressure, water cleaning, supplemented by detergents as appropriate. Wash units shall be portable, high-pressure with a self-contained water storage tank and pressurizing system (as required). Each unit shall be capable of providing a nozzle pressure of 150 psi.

If the Contractor cannot or does not satisfactorily decontaminate his tools or equipment at the completion of the project, the Contractor will dispose of any equipment which cannot be decontaminated satisfactorily. At the completion of the project the Contractor shall completely decontaminate and clean the decontamination area.

Decontamination Pad

The Contractor shall construct a decontamination station located on-Site. The decontamination station shall be located in the Contamination Reduction Zone and shall be used to clean all vehicles leaving the Exclusion Zone prior to entering the Support Zone or leaving the Site. The Contractor shall install at a minimum a 40 mil polyethylene sealed liner decontamination pad in such a manner that is capable of collecting all decontamination waters with a minimum of six foot corrugated splash walls or curtains to prevent overspray. The decontamination pad shall be able to support vehicles without cracking or becoming damaged. The area is to be properly graded and have no deleterious materials. All decontamination water shall be collected and stored in a holding tank. The Contractor shall clean and dismantle the decontamination pad and properly transport and dispose of the materials at the conclusion of the construction.

16.0 Air Monitoring Program

General

The Contractor shall develop, as part of the HASP, an air monitoring program (AMP). The purpose of the AMP is to determine that the proper level of personnel protective equipment is used, to document that the level of worker protection is

adequate, and to assess the migration of contaminants to off-Site receptors as a result of Site work.

The Contractor shall supply all personnel, equipment, facilities, and supplies to develop and implement the air monitoring program described in this section. Equipment shall include at a minimum: an organic vapor analyzer and real-time aerosol monitors, depending on work activities and environmental conditions.

The Contractor's AMP shall include both real-time and documentation air monitoring (personal and area sampling as needed). The purpose of real-time monitoring will be to determine if an upgrade (or downgrade) of PPE is required while performing on-Site work and to implement engineering controls, protocols, or emergency procedures if Site action levels are encountered.

The Contractor shall also use documentation monitoring to ensure that adequate PPE is being used and to determine if engineering controls are mitigating the migration of contamination to off-Site receptors. Documentation monitoring shall include the collection and analysis of samples for total nuisance dust.

To protect the public in the neighboring residential neighborhood, the Contractor must include in the AMP provisions for suspending work and implementing engineering controls based upon detectable odors, as well as upon instrument monitoring results.

During the progress of active remedial work, the Contractor will monitor the quality of the air in and around each active hazardous operation with real-time instrumentation prior to personnel entering these areas. Sampling at the hazardous work Site will be conducted on a continuous basis. Any departures from general background will be reported to the SO prior to entering the area. The SO will determine when and if operations should be shut down.

Air monitoring (both real time and documentation monitoring) shall be conducted by a minimum of one dedicated person with communication to the foreman whenever intrusive activities (such as excavation) are performed in an exclusion zone. After completion of intrusive activities involving contaminated materials and removal of the exclusion zone, air monitoring may be discontinued.

Air monitoring equipment will be operated by personnel trained in the use of the specific equipment provided and will be under the control of the SO. A log of the location, time, type and value of each reading and/or sampling will be maintained. The NYSDEC of NYSDOH on-Site representative may request copies of daily log sheets.

Real-Time Monitoring

Real-time particulate monitoring shall be conducted using the following equipment:

Photoionization Detectors (PIDs) shall be MiniRAE Plus (PG-76) Professional PIDs as manufactured by RAE Systems Inc., or equal. The Contractor shall provide one PID for each and every hazardous work zone operation, and one Site backup PID. Total particulates shall be measured using a real-time aerosol monitor. The instrument shall be calibrated daily according to the procedure in the user's manual. The meter shall be capable of measuring concentrations in the size range of less than 0.1 to 10 microns with sensitivity down to 0.001 mg/m^3. The monitor shall be Miniram model MIEPDM-3, or equal.

Real-time particulate monitoring will be conducted during any excavation, transportation, or other handling of contaminated soil, scarification, and during the relocation of debris.

Action Levels

The following action levels will be established for work area and perimeter monitoring of particulates, organic vapors, and odors. If the following levels are attained at half the distance between the work zone and the property line, then work will cease until engineering controls bring levels down to acceptable limits. These levels are general and shall be used as minimum action levels. The Contractor shall develop Site-specific perimeter monitoring action levels based on contaminants found in the work areas.

Monitor the air, using the same equipment, for 10-15 minutes upwind of the work Site to establish background level. The background level shall be established before the start of each shift every day. Particulate levels should be integrated over a period not to exceed 15 minutes. In the event that downwind particulates are detected at levels in excess of 150 ug/m^3 or 2.5 times the established background level, whichever is less, at the work Site, immediately re-measure the background concentrations upwind of the work zone also using the same equipment. If the measured particulate level at the work zone(s) is 100 ug/m^3 above the background level, monitor the downwind Site perimeter and implement additional dust controls in the work zone(s). Continue to take hourly measurements of the upwind background concentrations, and compare such concentrations with the particulate level at the work zone(s), until the downwind level at the work zone is less than 100 ug/m^3 above the upwind level.

If at any time the measured particulate level at the work zone(s) is more than 150 ug/m^3, the Contractor shall immediately suspend work at the remediation Site, promptly notify the Safety Officer, and implement suitable corrective action or engineering controls before work resumes. Notify the NYSDEC Division of Air resources in writing within 5 working days including a description of the control measures implemented to prevent further exceedances.

If work activities generate any visible dust in off-Site areas, the Contractor shall immediately suspend work, promptly notify the Safety Officer, and implement suitable corrective action or engineering controls before work resumes. This "no visible dust" requirement in off-Site areas is in addition to the 100/150 ug/m^3 actions levels given above.

The action level for total organic vapors shall be five parts per million above background as measured on the FID or PID. The action level for odors shall be noticeable odors.

Real-time monitoring will also be conducted at half the distance to the Site perimeter including an upwind (background) and a downwind location. A background reading will be established daily at the beginning of the work shift. If the wind direction changes during the course of the day, a new background reading will be made. Downwind readings at half the distance to the Site perimeter will be made when Site action levels have been exceeded at the work zone, if odors are evident, if complaints are received, during periods of higher activity, or at a minimum of twice per work shift.

If Site action levels are exceeded at half the distance to the Site perimeter location for fugitive dust, organic vapors, or noticeable odors, work must be suspended and engineering controls must be implemented to bring concentrations back down to acceptable levels.

Ensure the validity of real-time monitoring through appropriate QA/QC procedures. Include periodic instrument calibration, operator training, daily instrument performance checks, and details of the record keeping plan in QA/QC plans.

Documentation Monitoring

Documentation monitoring will be conducted at the Site perimeter at four locations (north, south, east and west Site perimeter) for total dust. Documentation monitoring will be conducted only during the handling of soil that is potentially contaminated (as per the Remedial Work Plan) or known to be contaminated including excavation, staging, grading, or decontamination activities. Documentation Monitoring will include the following:

A. Total nuisance dust will be collected using a PVC collection filter and personnel sampling pump and analyzed gravimetrically according to NIOSH Method 0500.

B. The perimeter locations will be established and marked with high visibility paint or flagging at approximately equidistant points around the Site. Samples will be collected at a height of 6 feet above ground surface.

C. Documentation samples will be collected continuously during excavation, staging, grading, and decontamination activities, during the normal work hours when activities are occurring on Site. At the end of the week real-time monitoring data will be reviewed and the four samples from one day will be selected by the Contractor and will be analyzed for lead. A maximum of seven days turnaround time is required for all documentation samples.

D. In addition to perimeter monitoring, particulate documentation samples will be collected on Site once a week. On-Site samples will be collected by choosing "high risk" workers to wear appropriate collection media for metals and particulates. "High risk" workers are those workers most likely to encounter contamination on a particular task. At a minimum, two high risk workers will be chosen to wear collection media for a particular day each week and the media will be analyzed with the documentation air monitoring samples.

Install a meteorological station on Site that will be capable of recording, at a minimum, outside temperature, wind velocity, and wind direction.

The documentation sampling submitted shall also identify the "high risk" workers chosen to wear appropriate collection media for contaminants; date media was worn; task involved; analytical results and applicable standards.

Community Air Monitoring (Refer also to: Section 24.0 - Community Protection Plan)

Real-time air monitoring, for particulate levels at the perimeter of the work area is necessary:

A. Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. This requires a minimum of one monitor per station or work zone. If the downwind particulate level is 2.5 times background or 100 ug/m^3 greater than the upwind particulate level, then dust suppression techniques must be employed to reduce the particulates to below these levels. All readings must be recorded and be available for review by NYSDEC and NYSDOH representatives.

As discussed above, the Contractor shall install a meteorological station on Site that will be capable of recording, at a minimum, wind velocity, temperature, and direction.

17.0 Emergency Equipment and First Aid Requirements

Communications

The Contractor shall provide telephone communication at the Site field office. Emergency numbers, such as police, sheriff, fire, ambulance, hospital, NYSDEC, EPA, NYSDOH, and utilities, applicable to this Site shall be prominently posted near the telephone.

The Contractor shall establish a signaling system for emergency purposes.

Emergency Shower and Emergency Eye Wash

The Contractor shall supply and maintain one portable eyewash/body wash facility per active hazardous work zone. The facility shall have a minimum water capacity of 10 gallons and shall conform to OSHA regulations 29 CFR 1910.151. The portable eyewash/body wash facility shall be manufactured/ supplied by Direct Safety Company, Lab Safety Supply Company, or other appropriate suppliers.

Fire Extinguishers

The Contractor shall supply and maintain at least one fire extinguisher in the Contractor's office and one at each hazardous work zone. The fire extinguisher shall be a 20-pound Class ABC dry fire extinguisher with UL-approval per OSHA Safety and Health Training Standards 29 CFR 1910.157. The fire extinguisher shall be manufactured/supplied by Direct Safety Company, Lab Safety Supply Company, or other appropriate suppliers.

First Aid Kit

The Contractor shall supply and locate in his project office and at each and every hazardous work zone one 24-unit (minimum size) "industrial" or "Contractor" first aid kit, required by OSHA requirements 29 CFR 1910.151. The first aid kit shall be manufactured/supplied by Norton, Scott, or other appropriate suppliers.

Emergency Inventory

In addition to those items specified elsewhere, the SO will maintain the following inventory of equipment and protective clothing for use at the Site in the event of emergencies.

A. Washable coveralls;

B. Gloves (outer);

C. Gloves (inner);

D. Face shields;

E. Safety glasses;

F. Respirators and appropriate cartridges;

G. Disposable coveralls;

H. Chemical-resistant boots and latex boot covers;

I. Hard hats; and

J. Rain suits.

18.0 Emergency Responses/Contingency Plan and Procedures

Daily Work

During the progress of work, the Contractor will monitor the quality of the air in and around each active hazardous operation prior to personnel entering these areas. Sampling shall be conducted on a continuous basis. Based on the air monitoring data, the proper level of protection will be chosen by the SO.

Emergency Vehicle Access

In the event that emergency services vehicles (police, fire, ambulance) need access to a location which is blocked by the working crew operations, those operations (equipment, materials, etc.) will be immediately moved to allow those vehicles access. Emergency crews will be briefed as to Site conditions and hazards by the SO. All vehicles and personnel will be decontaminated prior to leaving the Site.

The Contractor shall schedule a Site briefing with the local Fire Department at the completion of mobilization to familiarize emergency response personnel with his/her operations and Site layout.

Personal Injury Response Plan

In cases of personal injuries, the injured person or the crew personnel in charge will notify the SO. The SO will assess the seriousness of the injury, give first aid treatment if advisable, consult by telephone with a physician if necessary, and arrange for hospitalization if required. The SO will arrange for an ambulance if required.

If soiled clothing cannot be removed, the injured person will be wrapped in blankets for transportation to the hospital.

Personnel, including unauthorized personnel, having skin contact with chemically contaminated liquids or soils shall be flushed with water after any wet or soiled clothing has been removed. These personnel should be observed by the SO to

ascertain whether there are any symptoms resulting from the exposure. If there is any visible manifestation of exposure such as skin irritation, the project personnel will refer to a consulting physician to determine whether the symptoms were the result of a delayed or acute exposure, a secondary response to exposure such as skin infection, or occupational dermatitis. All episodes of obvious chemical contamination will be reviewed by the SO in order to determine whether changes are needed in work procedures.

Route to the Hospital

The Contractor shall post in conspicuous places in the Support Zone a map with written directions to the nearest hospital or emergency medical treatment facility.

Fire Service

The Contractor will make arrangements to take immediate fire fighting and fire protection measures with the local Fire Chief. If there is a fire, the crewmen or their person in charge will immediately call the SO. The SO will immediately call the fire personnel.

The air downwind from any fire or explosion will be monitored immediately in order to protect workers and the nearby community. If personal injuries result from any fire or explosion, the procedures outlined in the Personal Injury Response Plan are to be followed.

Master Telephone List

The attached master telephone list will be completed and prominently posted at the field office. The list will have telephone numbers of all project personnel, emergency services including hospital, fire, police, and utilities. In addition, two copies with telephone numbers are to be given to the NYSDEC and NSYDOH for emergency reference purposes.

Emergency Service	Telephone Number
Fire Department (Sloan Fire Dept.)	911
Police Department (Buffalo Police Dept.)	911
Ambulance (Rural Metro)	911
Hospital/Emergency Care Facility (Mercy Hospital)	911/(716) 826-7000
Poison Control Center	(716) 878-7654
Chemical Emergency Advice (CHEMTREC)	(800) 424-9300
Erie County Department of Health	(716) 858-7690 (business hours) (716) 898-4225 (after 5 pm)

NYSDEC Region 9 office (Buffalo)	(716) 851-7220
NYSDEC Division of Environmental Remediation, Albany, NY	(518) 457-9285 (800) 342-9296 (leave a message for next work day response)
NYSDOH Western Regional Office	(716) 847-4385
NYSDOH Headquarters (Albany)	(800)-458-1158
Contractor	

19.0 Confined Space Work

The Contractor will evaluate the work areas and determine if there are any permit-required confined spaces. If the Contractor determines that personnel will not need to enter a permit-required confined space, appropriate measures to prevent personnel from entering such shall be taken. If the Contractor determines that personnel will need to enter a permit-required confined space, develop and implement a written permit-required confined space program.

The written program shall comply with 29 CFR 1910.146 and shall include the following:

A. Implement methods to prevent unauthorized entry;
B. Identify and evaluate the hazards of permit-required confined spaces before personnel entry;
C. Develop and implement procedures for safe permit-required confined space entry;
D. Provide the appropriate equipment to evaluate permit-required confined spaces;
E. Evaluate permit-required confined spaces when entry operations are conducted;
F. Provide at least one attendant outside the permit-required confined space which will be entered;
G. Designate the personnel who will have active roles in entry operations;
H. Develop and implement procedures for obtaining rescue and emergency services;
I. Develop and implement a system for the preparation, issuance, use and collection of entry permits;
J. Develop and implement procedures to coordinate entry operations when personnel from more than one employer are working;
K. Develop and implement procedures for concluding the entry;

L. Review and revise entry operations if measures may not protect personnel; and
M. Review the permit-required confined space program to ensure personnel are protected from the hazards present.

Copies of the permit-required confined space program and employee training certificates shall be included with the HASP.

20.0 On-Site Spill Containment Plan

The Contractor will provide a written on-Site spill containment program that includes the following minimum requirements:

A. Procedures to help prevent spills from occurring;
B. Spill reporting procedure;
C. Spill containment equipment list;
D. Hazard assessment for known or unknown spilled materials;
E. Containment techniques;
F. Air monitoring and sampling requirements;
G. Personal protective equipment requirements;
H. Employee training requirements;
I. Decontamination procedures;
J. Cleanup and disposal methods; and
K. Emergency evacuation procedures.

21.0 Heat Stress Monitoring

Site personnel who wear protective clothing allow body heat to be accumulated with an elevation of the body temperature. Heat cramps, heat exhaustion, and heat stroke can be experienced, which, if not remedied, can threaten life or health. Therefore, an American Red Cross Standard First Aid book or equivalent will be maintained on Site at all times so that the SO and Site personnel will be able to recognize symptoms of heat emergencies and be capable of controlling the problem.

When protective clothing is worn, especially Levels A and B, the suggested guidelines for ambient temperature and maximum wearing time per excursion are:

Ambient Temperature (EF)	**Maximum Wearing Time Per Excursion (Minutes)**
Above 90	15
85 to 90	30

80 to 85	60
70 to 80	90
60 to 70	120
50 to 60	180

One method of measuring the effectiveness of employees' rest-recovery regime is by monitoring the heart rate. The "Brouha guideline" is one such method:

- During a 3-minute period, count the pulse rate for the **last** 30 seconds of the first minute, the **last** 30 seconds of the second minute, and the **last** 30 seconds of the third minute.

- Double each count.

If the recovery pulse rate during the last 30 seconds of the first minute is at 110 beats/minute or less and the deceleration between the first, second, and third minutes is **at least** 10 beats/minute, the work-recovery regime is acceptable. If the employee's rate is above that specified, a longer rest period is required, accompanied by an increased intake of fluids.

In the case of heat cramps or heat exhaustion, "Gatorade" or its equivalent is suggested as part of the treatment regime. The reason for this type of liquid refreshment is that such beverages will return much-needed electrolytes to the system. Without these electrolytes, body systems cannot function properly, thereby increasing the represented health hazard.

This liquid refreshment will be stored in a cooler at the edge of the decontamination zone in plastic squeeze bottles. The plastic bottles will be marked with individual's names. Disposable cups with lids and straws may be used in place of the squeeze bottles. Prior to drinking within the decontamination zone, the project personnel shall follow the following decontamination procedures:

A. Personnel shall wash and rinse their outer gloves and remove them.

B. Personnel shall remove their hard hats and respirators and place on table.

C. Personnel shall remove their inner gloves and place them on table.

D. Personnel shall wash and rinse their face and hands.

E. Personnel shall carefully remove their personal bottle or cup from the cooler to ensure that their outer clothes do not touch any bottles, cups, etc.

F. The used bottle or cups will not be returned to the cooler, but will be placed in a receptacle or container to be cleaned or disposed of.

G. Personnel shall replace their respirators, hard hats, gloves and tape gloves prior to re-entering the hazardous zone.

When personnel are working in situations where the ambient temperatures and humidity are high--and especially in situations where protection Levels A, B, and C are required-the SO must:

- Assure that all employees drink plenty of fluids ("Gatorade" or its equivalent);
- Assure that frequent breaks are scheduled so overheating does not occur; and
- Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 1:00 p.m., and 6:00 p.m. to nightfall).

Cold Stress

Whole-body protection shall be provided to all Site personnel that have prolonged exposure to cold air. The right kind of protective clothing shall be provided to Site personnel to prevent cold stress. The following dry clothing shall be provided by the Contractor as deemed necessary by the SO:

- Appropriate underclothing (wool or other);
- Outer coats that repel wind and moisture;
- Face, head, and ear coverings;
- Extra pair of socks;
- Insulated safety boots; and
- Glove liners (wool) or wind- and water-repellant gloves.

The SO will use the equivalent chill temperature when determining the combined cooling effect of wind and low temperatures on exposed skin or when determining clothing insulation requirements.

Site personnel working continuously in the cold are required to warm themselves on a regular basis in the on-Site hygiene facility. Warm, sweet drinks will also be

provided to Site personnel to prevent dehydration. The SO shall follow the work practices and recommendations for cold stress threshold limit values as stated by the 1991-1992 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices by the American Conference of Governmental Industrial Hygienists or equivalent cold stress prevention methods.

22.0 Logs, Reports and Record Keeping

Security Log

A daily log of security incidents and visitors granted access to the Site will be maintained, as well as a log of all personnel entering and exiting the Site.

All approved visitors to the Site will be briefed by the SO on safety and security, provided with temporary identification and safety equipment, and escorted throughout their visit. Site visitors will not be permitted to enter a hazardous work zone.

Project Site shall be posted, "Warning: Hazardous Work Area, Do Not Enter Unless Authorized," and access restricted by the use of a snow fence.

Safety Log

The Contractor's SO will maintain a bound safety logbook. The log will include all health and safety matters on Site and include, but not be limited to, the following information:

- Date and weather conditions on Site;
- A description of the proposed work for the day;
- Times when Site personnel arrive and depart;
- Air monitoring data;
- Heat and/or cold stress monitoring;
- Decontamination procedures;
- Type and calibration of air sampling/monitoring equipment used;
- Safety meeting summaries; and

. Accidents.

Emergency or Accident Report

Any emergency or accident will be reported immediately to the SO. The NYSDEC and NYSDOH will also be notified. The Contractor will submit a written report immediately to the NYSDEC and the NYSDOH, but no later than 24 hours of its concurrence. The report will include, but not be limited to, the nature of the problem, time, location, areas affected, manner and methods used to control the emergency, sampling and/or monitoring data, impact, if any, to the surrounding community, and corrective actions the Contractor will institute to minimize future occurrences. All spills will be treated as emergencies.

Daily Work Report

The Contractor shall maintain a daily work report that summarizes the following:

- Work performed,
- Level of protection,
- Air monitoring results,
- Safety-related problems, and
- Corrective actions implemented.

23.0 Posting Regulations

The Contractor will post signs at the perimeter of the Exclusion Zone that state "Warning, Hazardous Work Area, Do Not Enter Unless Authorized." In addition, a notice directing visitors to sign in will be posted at the project Site. Also, the Contractor will post a sign stating that any questions about the Site should be directed to the New York State Department of Environmental Conservation.

Safety regulations and safety reminders will be posted at conspicuous locations throughout the project area. The following safety regulations and safety reminders are at a minimum to be posted around the job Site.

SAFETY REGULATIONS

(To be Posted for Project Personnel)

The main safety emphasis is on preventing personal **contact** with gases, soils, sludge and water. Towards that end, the following rules have been established.

Regulations

A. Eating on the Site is PROHIBITED except in specifically designated areas.

B. All project personnel on the Site must wear clean or new gloves daily.

C. If you get wet to the skin, you must wash the affected area with soap and water immediately. If clothes in touch with the skin are wet, these must be changed.

D. You must wash your hands and face before eating, drinking or smoking.

E. Observe regulations on washing and removing boots before entering the dressing room or a clean area and showering before going home.

Recommendations

A. Do not smoke with dirty hands.

B. Check for any personal habit which could introduce soil or water into the body.

Examples: eating food off fingers, wiping face or nose with a dirty hand or running a dirty hand through hair.

C. Check that any regularly worn clothing is clean. Examples include dirty watch bands, neck chains and a dirty liner on your safety helmet.

SAFETY REMINDER FOR TOXIC CHEMICALS

(Post for Project Personnel)

Chemicals can't cause problems unless you breathe them, eat them, or put them on your skin.

Chemicals in Gases, Soils, Sludge, and Water

Don't let chemicals enter mouth, nose, or stay on skin.

Use common personal hygiene.

A. Don't eat or drink on the Site.

B. No smoking in the area of work.

C. Wear protective clothing.

D. Glove liners must be **clean**.

E. Wash your hands whenever practical. Wash before eating, drinking, or smoking.

F. Don't carry chemicals home to your family. (For example, on clothing, mud in the car, dirty hands.)

G. Follow strictly the HASP.

24.0 Community Protection Plan

A. Community Protection Plan

The Contractor shall develop, as part of this HASP, a Community Protection Plan (CPP). The CPP shall outline those steps to be implemented to protect the health and safety of surrounding human population and the environment.

B. Air Monitoring

As part of the Air Monitoring Program, use real-time monitoring and documentation sampling as described in the Subpart "Air Monitoring Program" of this section to determine if off-Site emissions, as a result of the Site work, poses a threat to the surrounding community.

Provide real-time air monitoring for particulate levels at the perimeter of the work area. Including the following:

1. Particulates shall be continuously monitored at the 4 documentation sampling stations for a total of 4 dust monitors. If the downwind particulate level is 150 ug/m^3 greater than the upwind particulate level, dust suppressing techniques shall be employed. All readings shall be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

   Coordinate with local officials to arrange for notification and evacuation of the surrounding community in the event that off-Site emissions pose a threat.

2. Off-Site Spill Response

   Produce as part of the HASP a Spill Response Plan, also coordinated with local officials, in case of an off-Site spill of either liquid or solid wastes. The plan shall include transportation routes and times, as well as the minimum requirements set forth in the Subpart titled "On-Site Spill Containment Plan." The driver shall be supplied with Material Safety Data Sheets (MSDs), a 24-hour emergency phone number, and instructions for reporting emergencies to local agencies and the project Site.