PROPOSED REMEDIAL ACTION PLAN
BUFFALO LAKESIDE COMMERCE PARK – PARCEL 4 SITE

Environmental Restoration Project
Buffalo, Erie County, New York
Site No. E-9-15-193

January 2009

Prepared by:
Division of Environmental Remediation
New York State Department of Environmental Conservation

A 1996 Clean Water/Clean Air Bond Act
Environmental Restoration Project

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SECTION 1: <u>SUMMARY AND PURPOSE OF THE PROPOSED PLAN</u>

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Buffalo Lakeside Commerce Park – Parcel 4 Site. The presence of hazardous substances has created threats to human health and/or the environment that are addressed by this proposed remedy.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled, or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated, the property can then be reused.

As more fully described in Sections 3 and 5 of this document, placement of industrial waste fill material has resulted in the disposal of hazardous substances, including filter cake/flue ash with elevated lead concentrations, and soil/fill with elevated metals and semi-volatile organic compounds (SVOCs). These hazardous substances have contaminated the surface and subsurface soil at the site, and have resulted in:

- a threat to human health associated with current and potential exposure to surface and subsurface soil/fill.
- an environmental threat associated with the current and potential impacts of contaminants to terrestrial vegetation and wildlife receptors that may directly contact shallow soil/fill or ingest dietary sources that have bio-accumulated contaminants.

To mitigate these threats, the Department proposes to remove discrete solid waste materials, to install a cover system over the entire Site and implement a Site Management Plan (SMP) and an environmental easement with periodic certification.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the October, 2008 "Site Investigation/Remedial Alternatives Report (SI/RAR)", and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Buffalo & Erie County Public Library
JP Dudley Branch
2010 So. Park Avenue
Buffalo, New York 14220
(716) 823-1854

Hours of Operation:
M/F/Sat 10:00 am - 6:00 pm
Tue: 12:00 pm - 8:00 pm
W: Closed
Th: 12:00 pm - 8:00 pm
Sun: 1:00 pm - 5:00 pm

The list below identifies names, addresses and phone numbers of contact people within the Department and NYSDOH who can answer questions and address public concerns about the Site:

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Buffalo, New York 14202
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The Department seeks input from the community on all PRAPs. A public comment period has been set from January 29 to March 15, 2009 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for February 17, 2009 at the Valley Community Center, 93 Leddy Street, in Buffalo beginning at 7 PM.

At the meeting, the results of the SI/RAR will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Locey at the above address through March 15, 2009.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Buffalo Lakeside Commerce Park (BCLP) occupies over 200 acres at the southern edge of the City of Buffalo. Approximately 113 acres of the BLCP was formerly referred to as the Union Ship Canal or Hanna Furnace Site. The BCLP is bordered to the west by New York State Route 5 (Fuhrmann Boulevard), to the south by Lackawanna Commerce Park, to the east by several sets of parallel railroad tracks, and to the north by Tifft Street. The BLCP includes the eastern half of the Union Ship Canal. The southern 113 acres of the BLCP, what was once the Hanna Furnace iron foundry, was informally divided into four Parcels for funding, characterization, and development purposes.

The Site, the subject of this PRAP, is limited to Parcel 4 of the former Hanna Furnace property. The Site is an approximately 20-acre parcel located north of Parcel 3 which encircles and includes the Union Ship Canal, see Figure 1. Parcel 3 is another Environmental Restoration Program site (Site #B-00164-9) which is to be remediated and redeveloped as a passive recreational-use greenspace. An abandoned railroad yard lies immediately north of Parcel 4. The northern boundary of the Site is delineated by a paved access road leading to the former Shenango Steel Mold property, which lies to the east. The Shenango site was an inactive hazardous waste disposal site (Site #915175) which was remediated in 2006 under the NY State Superfund program. To the south and southeast of the Site, in Parcels 1 and 2 of the former Hanna Furnace property, on the opposite side of the Union Ship Canal, are the Cobey and Certainteed industrial properties, which were remediated/redeveloped under the Brownfield Cleanup Program (BCP sites C-915202 and C-915185 respectively).

The Site owner, the Buffalo Urban Development Corporation (BUDC) intends to redevelop Parcel 4 consistent with the ongoing light industrial/commercial redevelopment activities taking place on Parcels 1 and 2 and complemented by the passive-use/green space that is planned for Parcel 3 around the canal.

The Site is generally flat with two areas of pronounced fill material in raised fill mounds, see Figure 2. The first mound is located in the approximate center of the Site and is referred to as the “Debris Disposal Pile”. This 3-acre mound is a ramp-like feature that gradually rises to the west to a maximum relief of approximately 20 feet, with a steep western face. The Debris Disposal Pile is composed of native materials including sand, gravel, cobbles and boulders and fill materials including black sand, ash, slag, brick concrete, wire rope (cable), tires, crushed stone, metal debris and various other construction and demolition debris.

The second raised fill area is along the western end of the Site and is called the “Filter Cake/Flue Ash Pile”. This mound of fill is composed entirely of the byproducts from iron production: black fine-grained flue ash, collected from the exhaust of the iron blast furnaces; and filter cake, the solids screened from the wet “scrubbers” which separated impurities from the same furnace exhaust before the combustible gases were recycled back to the furnaces. The surface of the 3.7-acre Filter Cake/Flue Ash (FC/FA) pile is “hummocky”; actually best characterized as several smaller, connected mounds with a maximum height of approximately 15 feet.

Overall, the geology of the Site can be characterized as a 25 to 30 foot-thick cover of natural and man-made overburden materials over a relatively flat shale bedrock surface. Natural overburden materials encountered include, in ascending order, glacial deposits (till), clay, and peat. The fill materials encountered varied from disturbed, natural materials including clay to boulders, dredged sediments and shale rock to raw materials and byproducts of the iron and steel production including; filter cake/flue ash, slag, iron ore, limestone and construction/demolition debris. The fill unit was encountered at every soil boring location on Site and ranged in thickness from approximately 10 feet to 25 feet, where it was the exclusive overburden unit in the southwestern portion of the Site.

Soil borings were advanced to bedrock refusal at seven locations along the northern and southern Site boundaries. Bedrock beneath the overburden deposits is a dark gray shale of the Levanna member of the Middle Devonian Skaneateles Formation. The natural dip of the bedrock in the region is to the south/southeast at approximately 50 feet per mile. Elevations of the eroded bedrock surface beneath the Site slope toward the east/southeast at a slope of 0.32 feet vertical per 100 feet horizontal.

Groundwater was encountered at depths between one and seven feet with the shallowest groundwater found along the northern Site boundary and adjacent to the south side of the Debris Disposal Pile, where standing surface water is present. The groundwater beneath the Site flows generally southward over the entire Site except in the raised area of the Debris Disposal Pile where there is localized radial flow. Between the Site and the Union Ship canal to the south, the groundwater appears to be influenced by the canal's north wall and/or by the railroad beds which once bordered the canal. North of the western half of the north canal wall, where the wall is intact, the groundwater flows parallel to the canal towards the east until it reaches the eastern end of the canal where the wall is weathered and its concrete cap partially absent. In this area, the groundwater discharges southward into the canal.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The southern portion of what is now the BLCP was purchased by the Buffalo Union Steel Corporation in 1900. Soon after, the Union Ship Canal was constructed to provide the pig iron manufacturing operations access to barges with raw materials transported via Lake Erie. Pig iron manufacturing commenced during the period of 1900 to 1915 with the construction of the blast furnaces. Following the construction of the blast furnaces, the Hanna Furnace Company acquired the property from Buffalo Union Steel. The National Steel Company subsequently purchased the property in 1929, and the new corporate entity became known as the Hanna Furnace Corporation.

Topographic maps and aerial photographs were reviewed from the period 1901 to present. Pre-development topographic maps, circa 1901, show the overall area of the Hanna Furnace site as a lake margin swamp. Post-development aerial photos from 1926 show that the area north of the canal, including the Parcel 4 Site, remained a pond, or basin, bordered by railroad tracks that ran along the north retaining wall of the canal and looped to the north of the Site. Between 1926 and 1965 the pond had been partially filled in from east to west. Aerial photos and topographic maps dated 1965 indicate that additional backfilling had commenced around the perimeter of the pond area, and along the railroad. Aerial photos from 1978 show that the majority of the area had been filled, with the exception of the central portion of the Site, which was still ponded. The last aerial photo, from 1994, shows the Site completely backfilled.

The Pennsylvania Railroad first owned the land north of the canal, the parcel that includes the Site. The Hanna Furnace Corporation purchased this property from the Pennsylvania Railroad in 1960. Swampy ponds with depths up to 15 feet occupied much of Parcel 4 at the time. Based on an examination of soils and fill uncovered in the environmental investigations, it would appear that Parcel 4 had been filled over the decades with a mix of slag, ash and demolition debris from the Hanna Furnace and perhaps other steel and iron foundries in the Buffalo area.

The Hanna Furnace Corporation ceased all operations in 1982. The City of Buffalo acquired the113-acre property in the 1990s after subsequent 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 furnace property 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 informally subdivided it into four parcels, which reflected the diverse industrial usage by the previous owners of the property. Parcel 4, the Site, was used primarily as a fill area, receiving substantial quantities of ash, slag and demolition debris from the iron blast furnaces. Parcel 1 was used primarily as a railroad yard and surface storage area. Parcel 2 was the heavy production area and included the furnaces and numerous buildings. Parcel 3 was used primarily for loading and unloading functions and included the ship canal. DDI/BUDC acquired Parcels 1, 2 and 4 from the City of Buffalo in 2002.

3.2: <u>Remedial History</u>

Over the past 25 years, there have been at least 16 separate environmental investigations conducted on the former Hanna Furnace Site by 12 different public or private entities. Of these 16 studies, only six included the area of Parcel 4 and none focused solely on the Site. The six studies that included the Site were performed by; the US Geological Survey in 1982, RECRA Environmental, Inc. in 1988, the Department in 1994, ABB Environmental Services, Inc. in 1995, the US Environmental Protection Agency (USEPA) in 2001, and Malcolm Pirnie, Inc. in 2003.

These previous studies included the collection of samples primarily from the two raised fill mounds at the Site, the Filter Cake/Flue Ash (FC/FA) Pile and the Debris Disposal Pile. The following is a collective summary of the previous investigation work performed in these two areas of Parcel 4.

3.2.1 Filter Cake/Flue Ash Pile

Historically, a total of seventeen surface soil and five subsurface soil samples were collected from the FC/FA area. All of the samples were analyzed for metals and a limited number were analyzed for organic compounds. Groundwater samples were collected from two wells on the adjacent Parcel 3, in the presumed downgradient direction of Parcel 4.

Ash Samples
Concentrations of lead were generally higher than those detected in the soil/fill of Parcels 1, 2 and 3, ranging from 230 to 18,250 ppm. The concentration of lead in one of the ash samples was elevated to the level that is considered a hazardous waste. This area was subsequently delineated and fenced to limit access to the elevated lead concentrations.

Groundwater Samples
Groundwater samples were collected from two wells in Parcel 3, located between the FC/FA pile and the canal. The information from these downgradient wells may be indicative of the quality of the groundwater beneath Parcel 4. Analytical results for these samples indicate elevated concentrations of arsenic, cyanide, iron, selenium and sodium in at least one of the groundwater samples. Lead was not detected in either sample. The pH was reported to be greater than 11 in the western end of Parcel 3.

3.2.2 Debris Disposal Pile

Historically, a total of eleven surface soil, nine subsurface soil, three surface water, three sediment and one groundwater sample were collected from on and near the Debris Disposal Pile. Notable results are as follows:

Soil/Fill Samples
The pesticide silvex was detected in one of the USEPA samples, but at a concentration significantly below the limit for classification as a hazardous waste. The concentrations of other contaminants were generally below current standards, criteria and guidance values (SCGs) with the exception of surface soil samples collected in 1994 by the Department; the concentrations of barium in these samples were significantly higher than what was found in the same area during a subsequent 1995 Preliminary Site Assessment of the Hanna Furnace property (ABB Environmental Services).

Surface Water/Sediment Samples
Surface water and sediment samples were collected by RECRA Environmental in 1988 from a pond which was located between the FC/FA and Debris Disposal piles. PCBs were detected in the water sample at a concentration of 2.2 ppb, the sediment contained 0.17 ppm PCBs. Subsequent investigations would later fail to detect PCBs in either groundwater or Site soils at concentrations exceeding SCGs. None of the metals tested exceeded their respective SCGs in either the surface water or sediment sample.

Samples were also collected in 1995 from two smaller pits on the south side of the pile, the pond having been completely backfilled by that time. There were no PCBs or any other organics found in the sediments and the concentrations of metals were below the SCGs for soils. Traces of acetone were the only organic compound found in the water samples, the aluminum concentration was above the Class C surface water quality standard in one sample and lead exceeded its SCG in the other sample.

Groundwater Samples
Three semi-volatile organic compounds (SVOCs), all of which were phenolic compounds, were detected at concentrations above the Department's groundwater quality standards in a monitoring well located along the southern edge of the pile. Elevated concentrations of cyanide, iron, manganese, and sodium were also detected. The pH of the sample was 12.3.

SECTION 4: <u>ENFORCEMENT STATUS</u>

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. The BUDC will assist the state in its efforts by providing all information to the state which identifies PRPs. The BUDC will also not enter into any agreement regarding response costs without the approval of the Department.

SECTION 5: <u>SITE CONTAMINATION</u>

The Buffalo Urban Development Corporation (BUDC) has recently completed a site investigation/remedial alternatives report (SI/RAR) to determine the nature and extent of any contamination by hazardous substances at this environmental restoration site.

5.1: <u>Summary of the Site Investigation</u>

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site. The SI was conducted between January 2006 and January 2007. The field activities and findings of the investigation are described in the SI report.

The Site investigation included the following field tasks:

- Site survey for creation of a to-scale Site base map with Site features, topography, and well and sample locations.
- Drilling and sampling of 20 soil borings.
- Installation and development of seven groundwater monitoring wells.
- Excavation and sampling of 11 test pits.
- Groundwater Infiltration Testing.
- Collection and analysis of surface soil, subsurface soil/fill, solid waste, and groundwater samples for laboratory analysis.
- Completion of an x-ray fluorescence (XRF) analytical pilot study of lead content in the filter cake/flue ash.
- Hydraulic conductivity testing of the seven new groundwater monitoring wells.
- Groundwater elevation measurement and mapping.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the Department's Cleanup Objectives. Surface and subsurface soil/fill data were compared to 6 NYCRR Subpart 375-6 Soil Cleanup Objectives (SCOs) unrestricted use, December 2006.

Based on the SI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the SI report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the SI report, many soil and groundwater samples were collected to characterize the nature and extent of contamination. As summarized in Tables 1, 2 and 3 the main categories of contaminants that exceed their SCGs are semi-volatile organic compounds (SVOCs) and inorganics (metals). For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and organics in soil. Inorganics in soil are reported in parts per million (ppm). Tables 1, 2 and 3 summarize the degree of contamination for the contaminants of concern in surface soil, subsurface soil and groundwater and compare the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste Materials

Four distinct waste materials were identified during the SI, these include:

- Filter cake/flue ash
- Blue fill
- Debris disposal pile
- Miscellaneous solid waste piles

Characterization of each of these waste types is provided below:

Filter Cake/Flue Ash - The filter cake/flue ash is a fine grained black ashy material with silver mica-like reflective flecks present. A large pile of this material is present in the western end of the Site and is known to contain elevated lead concentrations. This material was sampled for total lead at five locations from a depth of between 0.5 and 1.0 feet below surface. Also, this material was present in other areas of the Site at the surface and in the subsurface and was sampled at the surface at well boring MW-403A (0-0.5') and in the subsurface at well boring MW-402B (8-10'). These two samples are evaluated along with the five samples collected from the western flue ash pile. Total lead concentrations were as high as 11,000 ppm from the pile. Because of this high value, the five samples collected from the pile were analyzed for lead by the Toxicity Characteristic Leachate Procedure (TCLP). The same sample (FA-02) that was highest in total lead content was above the TCLP limit of 5 ppm of lead extract at which it would be considered a hazardous waste. The TCLP lead concentration of that sample was 11.7 ppm. Analytical results of the flue ash samples are summarized in Table 4.

Blue Fill – A deep blue-colored layer of fill that was encountered during the excavation of one of the infiltration test trenches (IT-B), located near the center of the southern Site property boundary, see Figure 2. The material was composed of wood chips approximately 1/8 inch in size but stained a deep indigo blue color. The composition and color of this fill material indicates that it may be a byproduct of coal gasification from an off-site source. The extent of this material was defined using multiple extended trenches which were subsequently backfilled. This material was sampled for SVOCs, pesticides, PCBs, metals, cyanide, and "free" cyanide (i.e. the more toxic forms of cyanide, not bound or complexed with metals). Analytical results of this sample of blue fill are included on Table 2. One SVOC (dibenzo-a,h-anthracene) and one metal (arsenic) were present at concentrations slightly above SCOs. Cyanide was also present at 918 ppm which is significantly higher then the SCO of 27 ppm.

Debris Disposal Pile- The large, ramp-shaped mound of soil/fill mixed with solid waste debris is present in the north central area of the Site. During the SI, test pits were excavated on and into the debris disposal pile and samples collected to characterize its composition. None of the samples collected from the debris disposal pile during the SI contained silvex or any other pesticide at concentrations above SCOs. A significant percentage of the pile is solid waste materials including, brick, scrap metal, concrete and other solid debris. Some of this solid waste material will require removal to allow Site redevelopment.

Miscellaneous Solid Waste Piles – Because the Site is abandoned and somewhat isolated, significant trespassing and random dumping takes place. Many piles of various solid wastes were observed scattered throughout the entire Site during the SI. Waste materials include scrap lumber, auto tires, kitchen appliances, cars, roofing shingles, house siding, yard waste, concrete, and brick. These solid waste materials will require removal to allow Site redevelopment. Waste identified during the SI/RAR will be addressed in the remedy selection process.

Surface Soil/Fill

Twenty surface soil/fill samples were collected from the 0 to 6" depth from 13 soil borings (SB-401 to SB-413) and six monitoring well borings (MW-401, 402, and 404 to 407), see Figure 2 for sample locations. Surface soil/fill samples were analyzed for polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), the target analyte list of metals (TAL metals), and cyanide. Analytical results for surface soil/fill samples are summarized in Table 1 and compared to the SCOs for unrestricted use. Analytical results that exceeded the SCOs for both unrestricted use and restricted commercial use are discussed below and depicted in Figure 3.

Seven PAHs were present in surface soil/fill at the Site at concentrations in excess of the 6 NYCRR Subpart 375-6 SCOs for unrestricted use in seven of the twenty surface soil/fill samples collected. Only five of these PAHs were present at levels in excess of the SCOs for restricted commercial use. All five of these PAHs are known carcinogenic PAHs, however, only one of these, benzo(a)pyrene, was present above the typical range found in urban soils. All other PAHs detected were within or below the typical urban background concentrations for PAHs.

All twenty of the surface soil/fill samples contained one or more metals at concentrations greater than the 6 NYCRR Subpart 375-6 SCOs for unrestricted use. Only seven of the samples contained metals at concentrations exceeding the restricted commercial use. These metals included arsenic, lead, and manganese. Surface soil contamination identified during the SI/RAR will be addressed in the remedy selection process.

Subsurface Soil/Fill

One subsurface soil/fill sample was collected from each of the 20 soil borings at the depth exhibiting the greatest evidence of potential contamination, or directly above the saturated zone if no evidence of contamination was observed. Samples were analyzed for VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide. Three samples collected near the southwestern portion of the Site (MW-405B, SB-404B, and SB-409B) were also analyzed for free cyanide based on historic data in that area of the Site. One of the 20 samples (MW-402B) consisted of flue ash. The location of subsurface soils containing constituents greater than SCOs or urban background concentrations was well distributed across the Site; these concentrations are likely characteristic of the general soil/fill material underlying the Site rather than a former or current on-site point source. Analytical results for subsurface soil/fill samples are summarized in Table 2 and compared to the SCOs for unrestricted use. Analytical results that exceeded the SCOs for both unrestricted use and restricted commercial use are discussed below and depicted in Figure 4.

Acetone, a common laboratory VOC contaminant, was detected in five of the twenty soil/fill samples at a concentration in excess of its SCO for unrestricted site use. However, no VOCs were detected at concentrations exceeding the SCOs for restricted commercial use in any of the soil/fill samples.

Only one sample, SB-408B (5'-6') contained PAHs above the SCOs for unrestricted use. The two PAHs found, benzo(a)pyrene and benzo(b)flouranthene, are known carcinogens. Only benzo(a)pyrene was detected at a concentration exceeding its SCO for restricted commercial site use;1100 ppb was found, which is slightly above the SCO of 1000 ppb.

Arsenic, copper, and lead were detected in one or more samples at concentrations above but within the same order of magnitude of the respective SCOs. The samples containing metals at concentrations in excess of SCOs and eastern United States background concentrations were generally well distributed across the Site with no one concentrated area of contamination observed. Sample SB-402B was one notable exception; lead was detected at a concentration of 2,970 ppm, which was higher than most other samples and above the 63 ppm and 1,000 ppm SCOs for unrestricted and restricted commercial use respectively. Subsurface soil contamination identified during the SI/RAR will be addressed in the remedy selection process.

Groundwater

Groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, inorganics (metals), total cyanide and pH. Monitoring wells MW-307 and MW-406 were sampled a second time and analyzed for both total cyanide and free cyanide. The analytical results of the groundwater samples are presented in Table 3. Analytical results that exceeded the SCGs are discussed below and depicted in Figure 5.

Few VOCs were detected and only two were present at concentrations above the groundwater standards. Acetone was present at a concentration of 210 ppb in the off-site well MW-307, located on Parcel 3. A similar concentration of acetone was initially detected in this same well during the previous environmental investigation of Parcel 3, but when the well was resampled and analyzed there was no acetone detected at that time. Acetone is a common laboratory contaminant and it was concluded that the initial detection was incorrect. Benzene was also present in well MW-406 at a concentration of 1.2 ppb, slightly above the groundwater standard of 1 ppb. Other VOCs were detected in groundwater samples but at very low concentrations and below groundwater standards.

Several SVOCs were detected, most at very low concentrations, and only three compounds were detected at concentrations above their respective groundwater standards. All three SVOCs were phenolic compounds: 2,4-dichlorophenol, pentachlorophenol and phenol. One or two of these compounds were present in 5 of the 12 wells sampled. The highest concentration of 2,4 dichlorophenol found was 5.4 ppb, its groundwater standard is 5 ppb. A groundwater standard of 1 ppb has been established for the sum of the pentachlorophenol and phenol concentrations; the highest combined concentration found was 21.6 ppb in well MW-307 located off-site on the adjacent Parcel 3, whereas the highest concentration on the Site was 5.8 ppb in well MW-405.

No pesticides or PCBs were detected in any of the groundwater samples.

Several metals were present at concentrations above groundwater standards in one or more samples. Iron and sodium exceeded groundwater standards in nearly every well sampled. Other metals and inorganic compounds, including arsenic, copper, and lead were detected at concentrations similar to those found in the adjacent parcels of the BLCP. Notable exceptions were two relatively high concentrations of cyanide. Well MW-406, located in close proximity to the cyanide-contaminated blue fill material, contained 6,390 ppb of total cyanide. Off-site well MW-307, located on Parcel 3, contained 5,710 ppb of total cyanide. Both wells were resampled and analyzed for both total cyanide and free cyanide. Groundwater from MW-406 contained 5,970 ppb of total cyanide and 4,100 ppb of free cyanide. The groundwater from MW-307 contained 196 ppb of total cyanide, all of which was free cyanide. The groundwater standard for total cyanide is 200 ppb. There is no NY State standard for free cyanide, but the USEPA has recommended a risk-based concentration limit of 730 ppb for free cyanide in drinking water. The groundwater from well MW-406 exceeded this limit; however, the assumed source, the nearby cyanide-contaminated blue fill material, would be removed as part of any proposed site remedy.

The pH of the groundwater samples was measured in the field at the completion of each boring and during the purging process prior to sample collection. However, the field instrumentation had been calibrated with a solution of pH 4; pH readings on the higher end of the scale were considered approximate. Samples were therefore re-analyzed in the lab for pH. The average groundwater pH measured in the field for the twelve wells sampled was 10.6, in the lab it averaged 9.3. The highest pH was found at monitoring wells located at the western end of the Site and the western end of Parcel 3; lab pH measurements of 12 were recorded for groundwater sampled from wells MW-401, -402 and -405. The high pH is likely attributed to the leaching of lime from the slag present throughout the Site and found in larger quantities at its western end.

Historic surface water data from the Union Ship Canal, to which the area's groundwater discharges, found low concentrations of just a few organic compounds, and most of the metals detected were below their respective surface water quality standards. Historic sediment data from the canal found it to be contaminated with some of the same metals found at elevated concentrations in the groundwater, but other metals and organic compounds which were not. The concentrations of the common contaminants were also significantly higher in the sediments than in the surrounding soil/fill found on Parcel 3. The Parcel 3 site investigation report suggested several possible sources for the evident impact to the canal sediments, primarily historic, i.e. the spillage of materials and wastewater discharge that occurred during the operation of the Hanna Furnace facility and when the canal was actively used for shipping.

The earlier investigation of Parcel 3 also found that, in the area between the Parcel 4 Site and the canal, groundwater was encountered in test pits, borings and wells at depths which varied several feet, often over very short distances. Groundwater elevations monitored in the wells north of the canal were typically 5 to 7 feet above the elevation of the water in the canal, leading to the conclusion that there was a poor interconnection between the groundwater in the soils/fill material and the water in the canal. This poor interchange may be partially isolating the groundwater contaminants found on the Parcel 4 Site, allowing for some attenuation to occur of those organic compounds susceptible to natural degradation such as the phenols and traces of other organic compounds that were encountered.

As discussed in the SI/RA report and summarized below in Section 5.4 of this PRAP, the discharge of Site contaminants in groundwater is most likely a minor contributor to the potential for risks to aquatic receptors in the canal. Consideration must also be taken of the Site's location within a currently urban and historically industrial area of Buffalo. The Site groundwater is not a current or likely future source of drinking water. Any future development of the site, being within the City of Buffalo, would receive supplied water. Based on the findings of the site investigation and the assessments made here, no remedial alternatives were evaluated for groundwater.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR. There were no IRMs performed at this site during the SI/RAR.

5.3: <u>Summary of Human Exposure Pathways</u>:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6 of the SI report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

At this site, contamination exists in surface and subsurface soils, and to a limited extent in site groundwater. For a complete exposure pathway to occur, persons would have to come into contact with the soil or groundwater. Currently, trespassers who access the site without permission can be exposed to site related contamination. There is evidence of trespassing (e.g. dumping of household and construction/demolition waste and recreational vehicle use) occurring at the site and this will likely continue to occur until site remediation and development is complete. Likely current exposure routes include dermal contact, incidental ingestion, and inhalation of site related contaminated in surface and subsurface soils, fill, blue fill, and filter cake/flue ash. Fishing occurs in the nearby Union Ship canal and will most likely continue in the future, although there is no conclusive evidence that site related contaminants impact the surface waters or aquatic organisms found in the canal to create a complete exposure pathway. Currently, the only completed route of exposure is for soil. There are no homes in the area, and businesses in the area are connected to public water supply.

Complete exposure pathways could occur in the future during subsurface construction activities, or by use of groundwater. After site remediation, construction and utility workers could be exposed to residual site related contamination during subsurface activities such as excavation and maintenance through dermal contact, incidental ingestion, and inhalation of contaminants.

In summary, under the current site use scenario, the possibility of contact with contaminated soils exists, while the possibility of contact with contaminated groundwater is minimal and unlikely.

5.4: <u>Summary of Environmental Assessment</u>

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the SI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

A conceptual Site model (CSM) describes the pathways through which ecological receptors are potentially exposed to chemicals of potential ecological concern (COPECs) at or near the Site. Figure 6 illustrates the various exposure pathways, or migration pathways from COPECs in impacted media to potential ecological receptors at or near the Site. The primary source of COPEC exposure is on-site soil that has been impacted by historical Site activities. Due to the depth to shallow groundwater (1 to 7' below ground surface) at the Site, it is not likely that wildlife receptors will have direct contact with groundwater. Burrowing wildlife may encounter groundwater, but will abandon flooded dens. For this reason, groundwater is only evaluated for the potential for ecological risk to aquatic receptors following discharge of groundwater to the Union Ship Canal.

Potential for Ecological Risk due to COPECs in Shallow Soil/Fill
This analysis indicates there is the potential for adverse ecological health effects as a result of potential exposure to COPECs identified in shallow soil/fill on the Site. The footprint of the blue fill is limited to the central-southern boundary of the Site, and the footprint of the filter cake/flue ash pile is thought to be limited to the western corner of the Site. Therefore, the potential for ecological risks as a result of exposure to COPECs in blue fill and flue ash may be limited to terrestrial vegetation and wildlife with localized home ranges, such as soil invertebrates, small mammals, and burrowing mammals. The planned redevelopment of the Site would result in the entirety of Parcel 4 being covered with pavement, clean soil and landscaped vegetation, or commercial/office buildings. Redevelopment would thereby limit the direct contact exposure of terrestrial vegetation and wildlife to COPECs in soil, limit uptake into the food web, and effectively eliminate the potential for ecological risks that were identified for shallow soil/fill.

Potential for Ecological Risk due to COPECs in Groundwater
COPECs were identified in groundwater. The evaluation of the potential for ecological risks as a result of exposure to COPECs in groundwater that may discharge to surface water accounts for no dilution/attenuation of detected chemicals in groundwater. Conclusions regarding the potential for ecological risk are also limited to the simplistic comparison of maximum detected concentrations to toxicity screening values. A more robust determination of the potential for ecological risk would require further investigation as to the potential toxicity of COPEC concentrations on organisms, populations, and communities potentially present in Union Ship canal. However, consideration is given to the Site's location within a currently urban and historically industrial area of Buffalo. The discharge of COPECs in groundwater from the Site is a relatively minor contributor to the potential for risks to aquatic receptors in surface water of Union Ship Canal based upon surface water sampling which determined that COPECs were at concentrations below their respective surface water quality standards.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND PROPOSED USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to SVOCs, metals, and cyanide in waste material and soil/fill material;

- environmental exposures of flora or fauna to SVOCs, PCBs, metals, and cyanide in shallow soil/fill, waste materials, and groundwater.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements. Potential remedial alternatives for the Buffalo Lakeside Commerce Park - Parcel 4 site were identified, screened and evaluated in the RA report which is available at the document repositories established for the site.

Based on the results of the Site investigation and the findings of both the qualitative human health evaluation and the Fish and Wildlife Impact Analysis, potential risks have been identified to current and future on-site receptors who could be exposed to constituents of potential concern (COPCs) present in the on-site soil/fill and various waste materials.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 15 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 15 years if remediation goals are not achieved.

7.1: <u>Description of Remedial Alternatives</u>

The following potential remedies were considered to address the contaminated soil/fill at the site.

- Alternative #1 – No Action
- Alternative #2 – Institutional Controls
- Alternative #3 – Limited Removal and Cover System with Institutional Controls
- Alternative #4 – Removal and Off-Site Disposal of All Soil/Fill

Alternatives # 1 and # 2 also assume no action with regard to waste materials (blue fill, filter cake/flue ash, debris, and solid waste). Alternatives 3 and 4 assume that the proposed removal actions described for these materials will be implemented.

Alternative 1: No Action

Present Worth: *$0*
Capital Cost: *$0*
Annual Costs: *$0*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. The No Action alternative would involve taking no action to remediate or restrict access and use of the Site.

Alternative #2 – Institutional Controls

Present Worth: *$359,037*
Capital Cost: *$109,330*
Annual Costs: *$22,459*

Institutional controls could be implemented to reduce the potential for exposure to Site chemicals of potential concern (COPCs). Institutional controls could include:

- Environmental Easement – to control future Site uses and activities and to restrict the use of Site groundwater to non-potable uses.
- Periodic groundwater monitoring and Site inspections
- Restrictions to public access (fencing around the flue ash pile, concrete barriers at vehicle access points and warning signage).

The estimated cost of this remedy is approximately $359,000. Table 5 provides a detailed breakdown of work items and costs for this remedy.

Alternative #3- Limited Removal and Cover System with Institutional Controls

Present Worth: *$7,392,168*
Capital Cost: *$7,053,625*
Annual Costs: *$30,450*

The following identified waste materials and Site media were recommended for remediation:

- Blue Fill Material
- Filter Cake/Flue Ash Pile
- Debris Disposal Pile
- Miscellaneous Solid Waste Piles
- On-site Soil/Fill Material

Of these five media recommended for remediation, all but the general soil/fill material are distinct waste materials or waste mixtures, are at or near the surface, and are of defined aerial extent. These waste materials are recommended for removal and off-site disposal as a source removal action.

The blue fill is estimated to be 100 cubic yards (140 tons) of material. The cost for disposal varies substantially, from $16,000 to $55,000 depending on whether or not the material exhibits the reactive characteristic of a hazardous waste.

The volume of the filter cake/flue ash pile is estimated to be between 45,000 and 55,000 cubic yards. Based on limited sampling, approximately 20 percent of the ash is assumed to contain lead at hazardous concentrations. Several remedial options were evaluated in the SI/RA report, each a different combination of chemical stabilization treatment to reduce the mobility of the lead, removal and off-site disposal, and/or covering of the filter cake/flue ash on site. For Alternative 3, the “hot spots”, i.e. ash with hazardous waste concentrations of lead, would be chemically stabilized on site to levels that are considered non-hazardous prior to removal and off-site disposal.

Further delineation and characterization of the filter cake/flue ash would be required as part of the design, to quantify the volumes of hazardous and non-hazardous material. Bench scale and pilot studies of soil/fill stabilization agents would be required. The estimated cost of the treatment and removal action ranges from $4.3 million to $5.2 million, depending on the actual volume of ash requiring treatment and disposal.

As part of the remedial design, a determination would be made as to whether or not it would be feasible to further sort the filter cake/flue ash pile by lead contaminant concentrations. If so, a site-specific cleanup objective for just the flue ash/filter cake would be proposed which would be more cost effective but still protective of the public health and environment for the intended use of the site.

The recommended remedial option for the debris disposal pile involves excavation and sorting of the material to separate the various solid waste materials from the soil/fill that may be useable on site. After the sorting process, the solid wastes that are not planned for on-site backfill would be transported to a permitted solid waste disposal facility. The reusable soil/fill would be staged on site for site redevelopment activities. The estimated volume of the debris disposal pile is 50,000 cubic yards, the quantity of solid waste in the pile that would be disposed off site is estimated to be 50 tons. The estimated cost of this remedial option is $730,000.

The estimated cost for the removal and off site disposal of the miscellaneous solid waste piles, randomly scattered on the surface of the Site, is $50,000.

The total cost of sorting, treating and removing the various waste materials (blue fill, flue ash/filter cake, debris disposal pile and miscellaneous waste piles) is $6,035,000.

The general on-site soil/fill is present at a much greater volume than the four waste materials (blue fill, filter cake/flue ash and debris) and at thicknesses greater than 25 feet. The complete removal of this soil/fill would be very costly and other options were considered.

After removing the waste materials (blue fill, filter cake/flue ash and debris) this alternative would involve installing a cover system over the entire Site using either asphalt or concrete pavement or one foot of documented clean soil. Prior to placement of the Site cover system, a demarcation layer of synthetic fabric would be placed over the existing soil/fill. Soil/fill material excavated during Site redevelopment and maintenance would be managed using a site management plan.

Institutional controls would also be implemented along with this alternative that would reduce the potential for exposure to Site COPCs. Institutional controls would include environmental easements that would control future Site uses, restrict the use of Site groundwater, and require the implementation of a Site Management Plan. The Site Management Plan would include a soil/fill management plan, a site operation and maintenance plan, and an institutional control/engineering control plan.

Table 6 presents an estimate of the capital cost of this alternative. The cost to implement this alternative is approximately $ 7.4 million, including approximately $6 million to remove the various waste materials (blue fill, flue ash, debris disposal pile, and miscellaneous waste piles) and approximately $1.4 million for the actual soil cover system.

Alternative #4 - Removal and Off-Site Disposal of All Soil/Fill

Present Worth: *$64,035,000*
Capital Cost: *$64,035,000*
Annual Costs: *$0*

This alternative involves excavation and removal of all on-site soil/fill material exceeding the Unrestricted SCOs and off-site transport and placement in an appropriately permitted secure landfill. The estimated cost of this remedy is $64 million, including $6 million to remove the various waste materials listed above and $58 million to remove the soil/fill. Table 7 provides a detailed breakdown of work items, assumptions, and costs for this remedy.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of environmental restoration projects in New York A detailed discussion of the evaluation criteria and comparative analysis is included in the SI/RA report.

The first two evaluation criteria are termed “threshold criteria” and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative’s ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The next five “primary balancing criteria” are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 8.
This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the SI/RAR reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative #3, Limited Removal and Cover System with Institutional Controls, as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the SI and the evaluation of alternatives presented in the RA.

Alternative 3 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing the defined waste materials that create the most significant threat to public health and the environment, remove risk exposure pathways to Site users by a protective cover system and ensures continued protection through institutional controls. Waste materials including; the blue-colored fill, filter cake/flue ash, the debris disposal pile, and miscellaneous wastes would be removed, treated (if necessary) and disposed off-site at a permitted solid waste disposal facility. Alternatives 1 and 2 would not comply with the threshold selection criteria, the contamination would not be reduced or the hazards mitigated and the Site could not be redeveloped as planned. Because Alternatives 3 and 4 both satisfy the threshold criteria, the five balancing criteria were particularly important in selecting a final remedy for the Site.

The short-term risks associated with Alternative #3 could be adequately managed through the use of personal protective equipment (PPE) and appropriate health and safety protocols. Short-term risk of exposure to Site workers and trespassers during construction activities would be addressed through covering stockpiled soil/fill, temporary seeding of graded soil/fill areas and Site security. Once the construction is complete and the Site is fully covered, the risk to on-site workers and the public will be eliminated and sustained through adequate protections and maintenance of the cover systems. Exposure risks to future construction workers would be adequately managed through the Site Management protocols and appropriate health and safety protocols. Standard readily available construction equipment and techniques would be utilized. This alternative would reduce the mobility and volume of the contaminants, but not their toxicity. The resulting Site condition would not pose a potential risk to human health provided the cover systems are appropriately maintained.

Although Alternative 4 would remove the potential risks posed by the COPCs in the soil/fill, this alternative is not feasible because of the prohibitive cost to remove and dispose of the large volume of the soil/fill, dewatering operations, and backfill.

Both Alternative 3 and 4 would provide sufficient short-term protection of exposure to construction workers and site users. Alternative 4 would remove the contamination from the Site and thus be considered a permanent remedy whereas Alternative 3 would rely on long-term maintenance and management practices to be effective in the long-term prevention of exposure to contaminants. Alternative 4 would reduce the mobility and volume of contaminants on the site whereas Alternative 3 would reduce only the mobility of the contaminants by removing the direct contact pathway and mitigating surface erosion. Alternative 3 could be readily implemented with standard construction equipment and techniques. Alternative 4 would not be as easy to implement, as it involves excavation of a much larger volume of soil, a significant portion of which is below the water table which would require dewatering of the work area.

Alternative #3 (limited removal and cover system with institutional controls) is the recommended remedial alternative. This alternative provides long-term effectiveness and overall protection to human health and the environment; and unlike alternative #4, alternative #3 can be completed at a reasonable cost.

The estimated total present worth cost to implement the remedy is $7,392,168.
The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. The filter cake/flue ash pile would be extensively sampled and analyzed to segregate that portion of the material which exhibits hazardous waste characteristics from the material which does not. The hazardous waste portion would be chemically stabilized on site before being disposed off site in a permitted landfill. As part of the remedial design, a determination would be made as to whether or not it would be feasible to further sort the filter cake/flue ash pile by lead contaminant concentrations. If so, a site-specific cleanup objective for just the flue ash/filter cake would be proposed which would be more cost effective but still protective of the public health and environment for the intended use of the site.

3. The estimated 100 cubic yards of cyanide-contaminated, blue-colored fill would be excavated, tested for hazardous waste characteristics and properly disposed at an off-site permitted landfill. The limits of the excavation would be initially determined on the basis of visual evidence. After the blue-colored fill has been removed, samples of the remaining soil/fill in the excavation would be tested and the excavation extended if necessary until test results indicate total cyanide concentrations are less than the 27 ppm soil cleanup objective of 6 NYCRR Part 375.

4. The Debris Disposal pile would be excavated and the debris separated from the soil/fill for disposal at a permitted solid waste facility. The soil/fill within the pile would sampled and analyzed in accordance with a soil management plan; soil/fill with contaminant concentrations below the Part 375 soil cleanup objectives for commercial site use would be staged on site and used as subgrade backfill for site redevelopment. Soil/fill with contaminant concentrations in excess of the Part 375 cleanup objectives for restricted commercial site use, would be disposed off site at a permitted landfill.

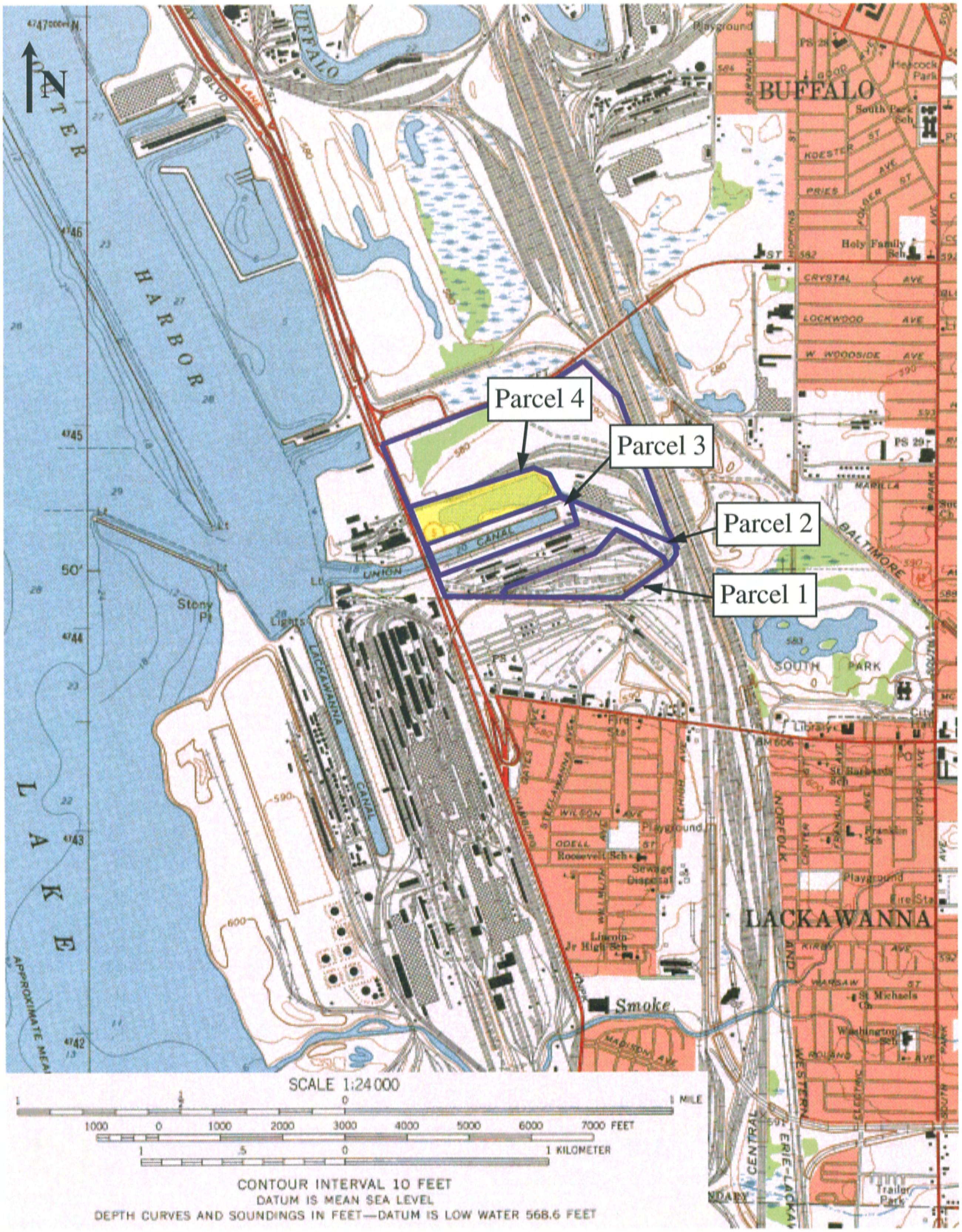
5. All other surface debris would be removed and the Site graded to the required elevations for

redevelopment. Prior to placement of the Site cover system, a demarcation layer of synthetic fabric would be placed over the existing soil/fill . The clean final soil cover would be a minimum of twelve inches thick. In those areas of the Site that would be covered by buildings or become roads, sidewalks or parking lots, the cover system would consist of a minimum of eight inches of pavement.

6. Imposition of an institutional control in the form of an environmental easement that would require (a) limiting the use and development of the property to commercial or industrial use; (b) compliance with the approved site management plan; © restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

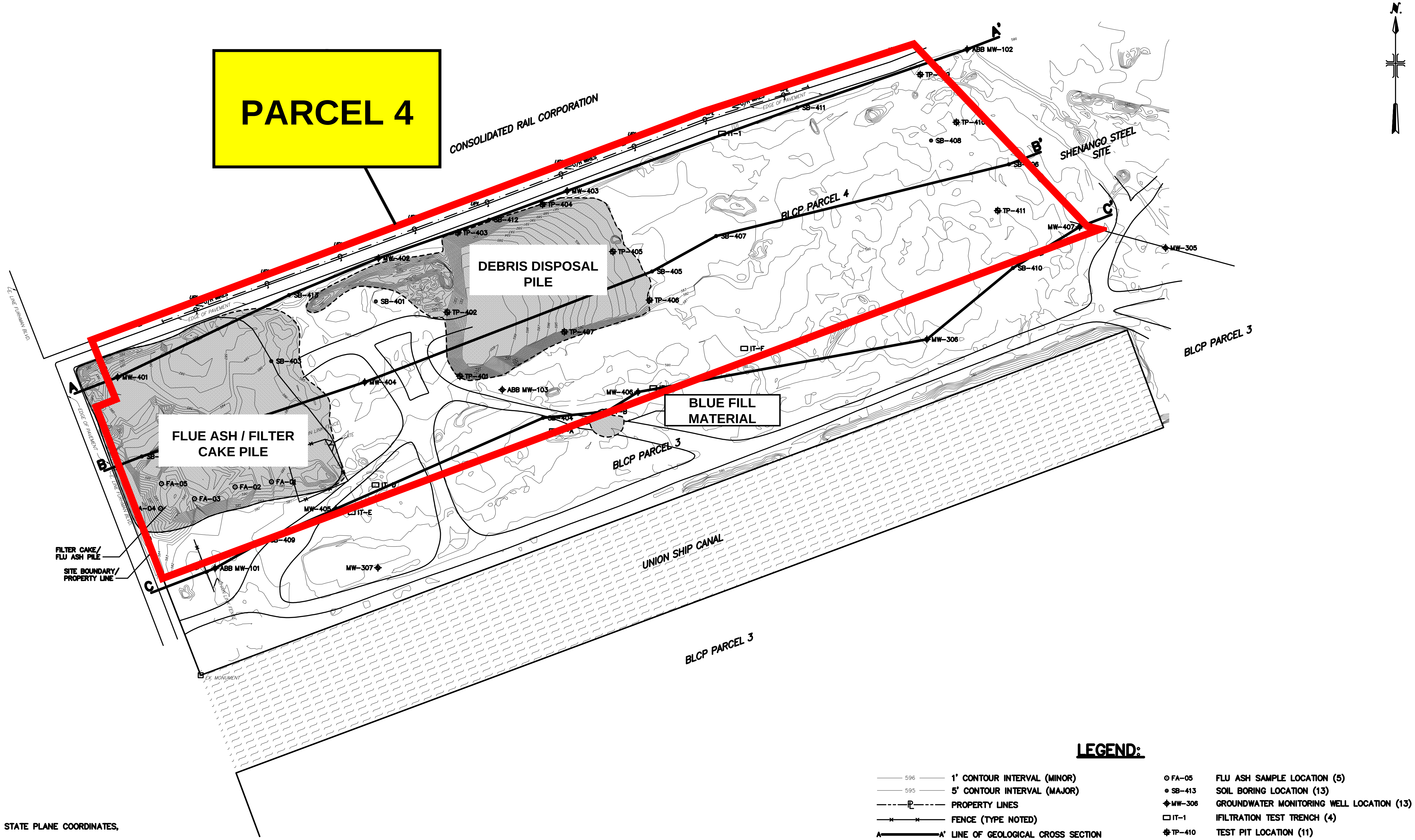
7. Development of a site management plan which would include the following institutional and engineering controls: (a) management of the final cover system to restrict excavation below the soil cover's demarcation layer, pavement, or buildings and ensure that excavated soil would be tested, properly handled to protect the health and safety of workers and the nearby community, and would be properly managed in a manner acceptable to the Department; (b) identification of any use restrictions on the site; and (c) provisions for the continued proper operation and maintenance of the components of the remedy.

8. The property owner would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.



MALCOLM PIRNIE AUG 2006 4080-004	**BUFFALO LAKESIDE COMMERCE PARK (PARCEL 4)** BUFFALO, NEW YORK	**FIGURE 1** **SITE LOCATION MAP**

Adapted from figure found in *Site Investigation / Remedial Alternatives Report, Buffalo Lakeside Commerce Park-Parcel 4*, Malcolm Pirnie Inc., Oct.2008



LEGEND:

596	1' CONTOUR INTERVAL (MINOR)	FA-05	FLU ASH SAMPLE LOCATION (5)
595	5' CONTOUR INTERVAL (MAJOR)	SB-413	SOIL BORING LOCATION (13)
PL	PROPERTY LINES	MW-306	GROUNDWATER MONITORING WELL LOCATION (13)
x	FENCE (TYPE NOTED)	IT-1	IFILTRATION TEST TRENCH (4)
A — A'	LINE OF GEOLOGICAL CROSS SECTION	TP-410	TEST PIT LOCATION (11)
	SITE ROADS (APPROXIMATE LOCATIONS)	IP	IRON PIN/PIPE
	DISTINCT FILL AREAS		

50 0 50 100

SCALE: 1" = 100'

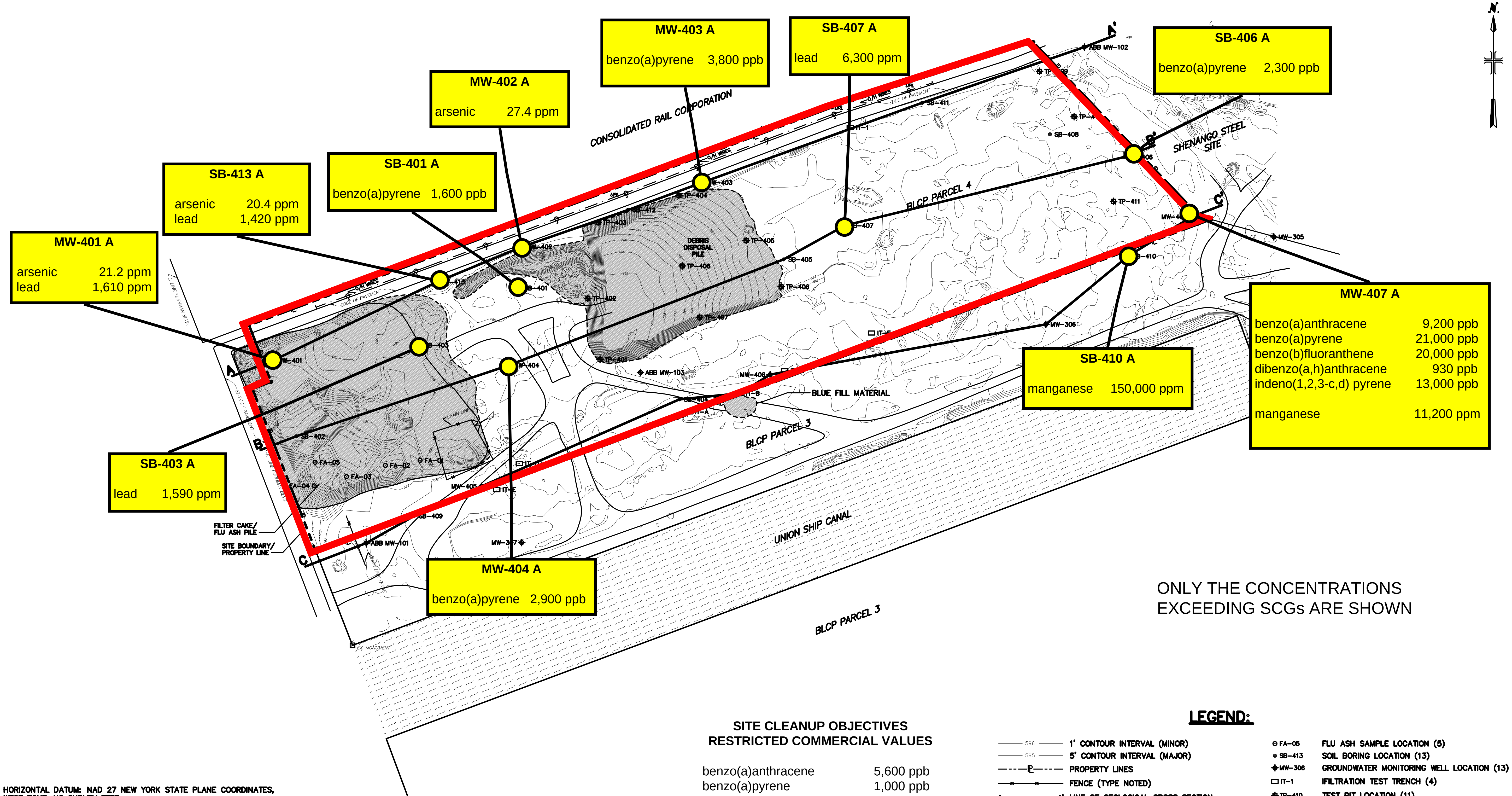
NOTES:

1. HORIZONTAL DATUM: NAD 27 NEW YORK STATE PLANE COORDINATES, WEST ZONE, US SURVEY FEET
2. VERTICAL DATUM: NGVD29
3. UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN IN THEIR APPROXIMATE LOCATION AND MAY NOT BE SHOWN IN THEIR ENTIRETY VERIFICATION IS REQUIRED PRIOR TO CONSTRUCTION.
4. TOPOGRAPHIC INFORMATION SHOWN ON THIS MAP WAS SURVEYED AND PREPARED BY WENDEL DUCHSCHERER FROM FIELD DATA GATHERED BETWEEN JANUARY 25 & JANUARY 30, 2006.

Adapted from figure found in *Site Investigation / Remedial Alternatives Report, Buffalo Lakeside Commerce Park-Parcel 4*, Malcolm Pirnie Inc., Oct.2008

BUFFALO LAKESIDE COMMERCE PARK
PARCEL 4 SITE
BUFFALO, NEW YORK

FIGURE 2
SITE MAP



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4. TOPOGRAPHIC INFORMATION SHOWN ON THIS MAP WAS SURVEYED AND PREPARED BY WENDEL DUCHSCHERER FROM FIELD DATA GATHERED BETWEEN JANUARY 25 & JANUARY 30, 2006.

SITE CLEANUP OBJECTIVES
RESTRICTED COMMERCIAL VALUES

benzo(a)anthracene	5,600 ppb
benzo(a)pyrene	1,000 ppb
dibenzo(a)anthracene	560 ppb
indeno(1,2,3-c,d)pyrene	5,600 ppb
arsenic	16 ppm
lead	1,000 ppm
manganese	10,000 ppm

LEGEND:

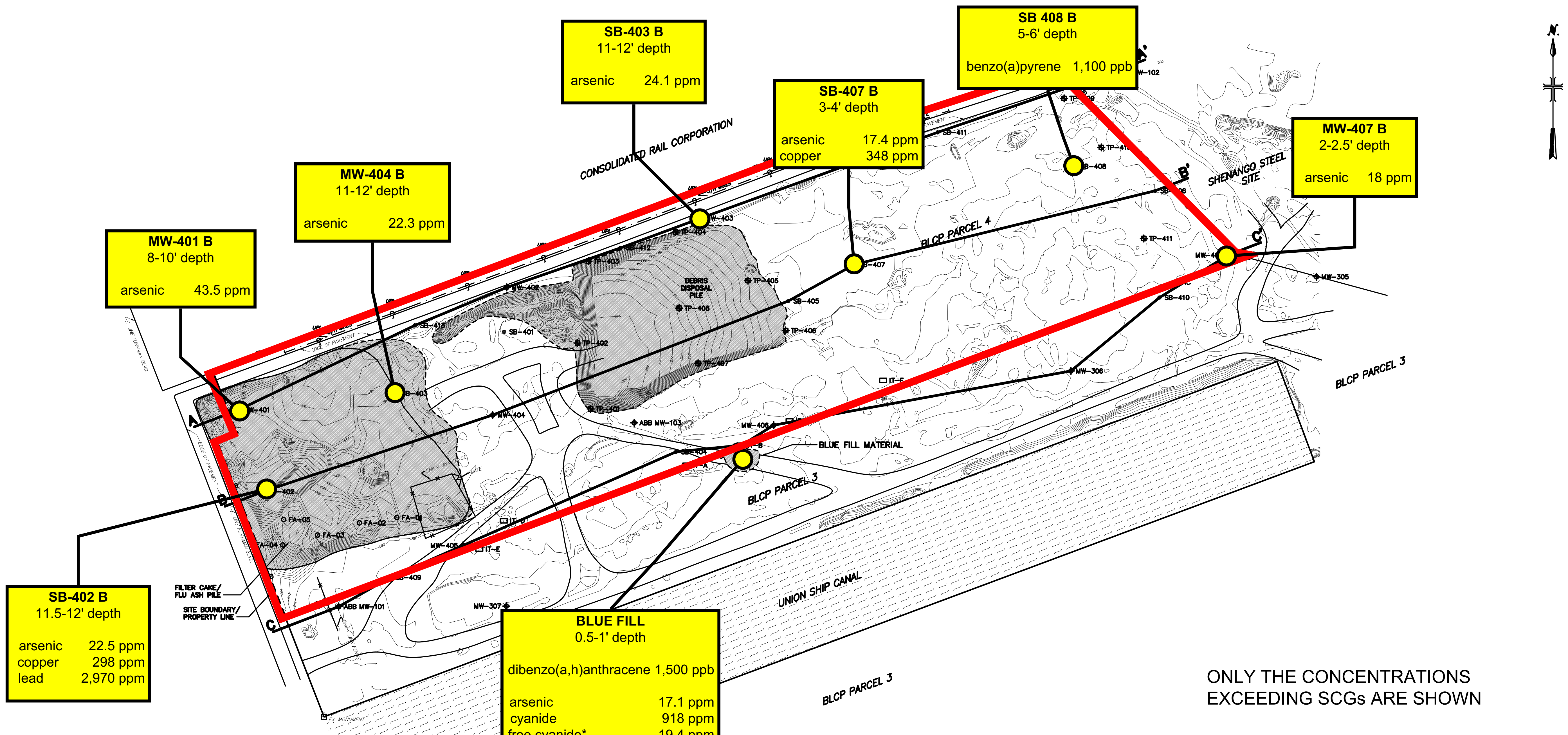
- 1' CONTOUR INTERVAL (MINOR)
- 5' CONTOUR INTERVAL (MAJOR)
- PROPERTY LINES
- FENCE (TYPE NOTED)
- A—A' LINE OF GEOLOGICAL CROSS SECTION
- SITE ROADS (APPROXIMATE LOCATIONS)
- DISTINCT FILL AREAS
- FA-05 FLU ASH SAMPLE LOCATION (5)
- SB-413 SOIL BORING LOCATION (13)
- MW-306 GROUNDWATER MONITORING WELL LOCATION (13)
- IT-1 IFILTRATION TEST TRENCH (4)
- TP-410 TEST PIT LOCATION (11)
- IP IRON PIN/PIPE

50 0 50 100
SCALE: 1" = 100'

Adapted from figure found in *Site Investigation / Remedial Alternatives Report, Buffalo Lakeside Commerce Park-Parcel 4*, Malcolm Pirnie Inc., Oct.2008

BUFFALO LAKESIDE COMMERCE PARK
PARCEL 4 SITE
BUFFALO, NEW YORK

FIGURE 3
ANALYTICAL RESULTS
SURFACE SOIL/FILL



ONLY THE CONCENTRATIONS EXCEEDING SCGs ARE SHOWN

SOIL CLEANUP OBJECTIVES
RESTRICTED COMMERCIAL VALUES
(6 NYCRR SUBPART 375-6)

benzo(a)pyrene	1,000 ppb
dibenzo(a)anthracene	560 ppb
arsenic	16 ppm
cyanide	27 ppm
free cyanide*	1,200 ppm
copper	270 ppm
lead	1,000 ppm

*USEPA recommended preliminary remediation goal for residential settings

LEGEND:

- 1' CONTOUR INTERVAL (MINOR)
- 5' CONTOUR INTERVAL (MAJOR)
- PROPERTY LINES
- FENCE (TYPE NOTED)
- LINE OF GEOLOGICAL CROSS SECTION
- SITE ROADS (APPROXIMATE LOCATIONS)
- DISTINCT FILL AREAS
- FA-05 FLU ASH SAMPLE LOCATION (5)
- SB-413 SOIL BORING LOCATION (13)
- MW-306 GROUNDWATER MONITORING WELL LOCATION (13)
- IT-1 IFILTRATION TEST TRENCH (4)
- TP-410 TEST PIT LOCATION (11)
- IP IRON PIN/PIPE

50 0 50 100
SCALE: 1" = 100'

NOTES:

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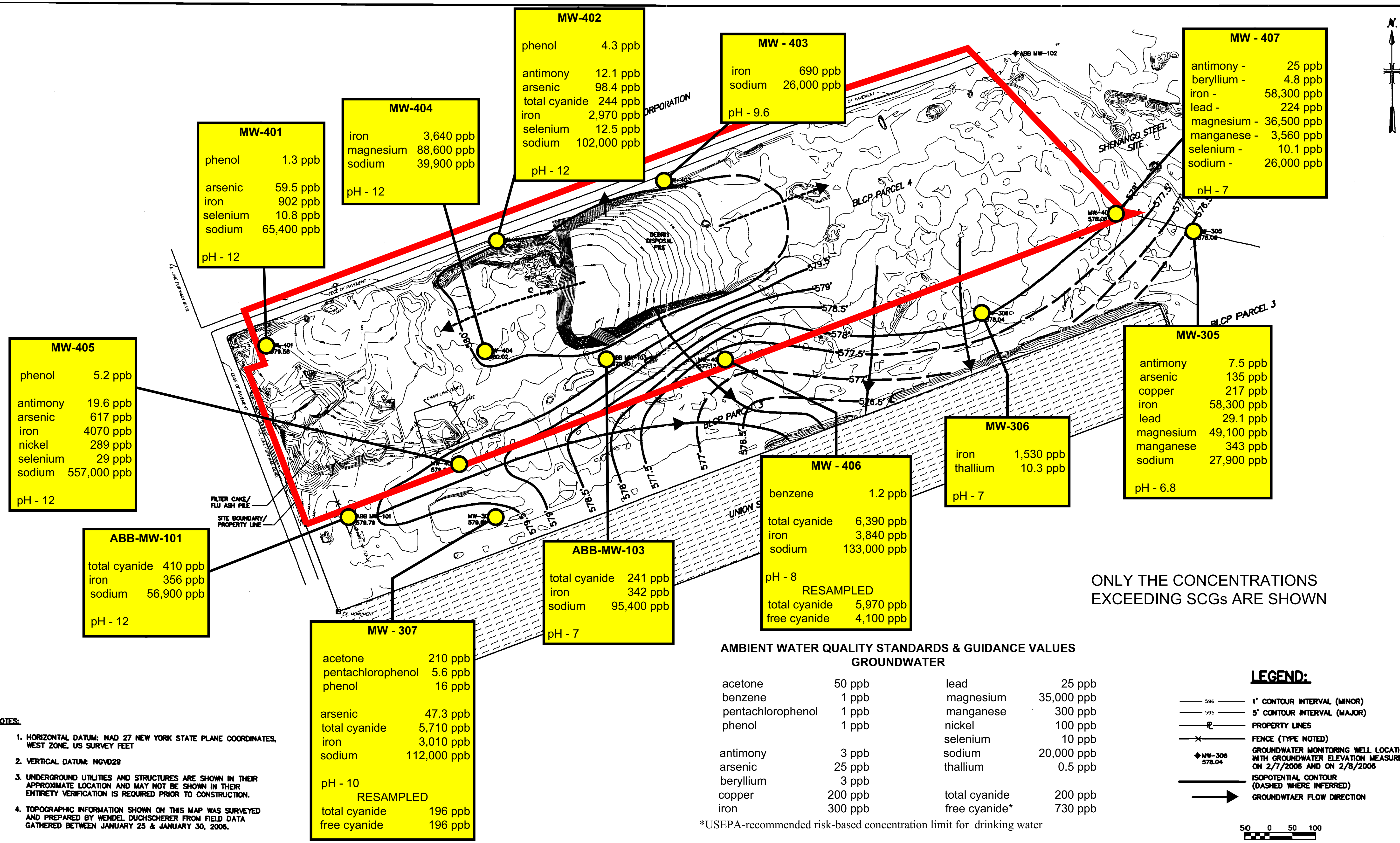
BUFFALO LAKESIDE COMMERCE PARK
PARCEL 4 SITE
BUFFALO, NEW YORK

FIGURE 4
ANALYTICAL RESULTS
SUB-SURFACE SOIL/FILL



AMBIENT WATER QUALITY STANDARDS & GUIDANCE VALUES GROUNDWATER

acetone	50 ppb	lead	25 ppb
benzene	1 ppb	magnesium	35,000 ppb
pentachlorophenol	1 ppb	manganese	300 ppb
phenol	1 ppb	nickel	100 ppb
		selenium	10 ppb
antimony	3 ppb	sodium	20,000 ppb
arsenic	25 ppb	thallium	0.5 ppb
beryllium	3 ppb		
copper	200 ppb	total cyanide	200 ppb
iron	300 ppb	free cyanide*	730 ppb

*USEPA-recommended risk-based concentration limit for drinking water

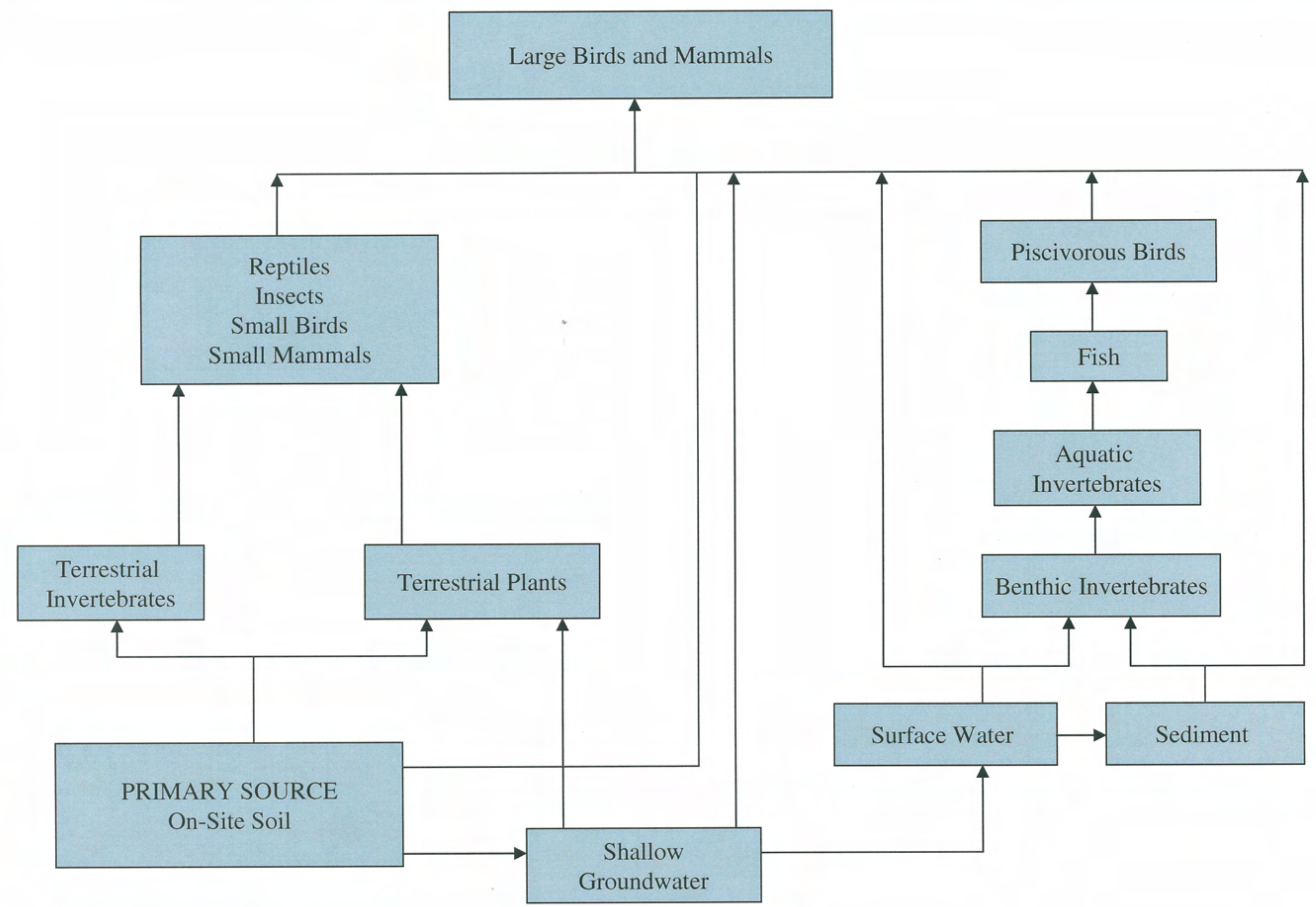
NOTES:

1. HORIZONTAL DATUM: NAD 27 NEW YORK STATE PLANE COORDINATES, WEST ZONE, US SURVEY FEET
2. VERTICAL DATUM: NGVD29
3. UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN IN THEIR APPROXIMATE LOCATION AND MAY NOT BE SHOWN IN THEIR ENTIRETY VERIFICATION IS REQUIRED PRIOR TO CONSTRUCTION.
4. TOPOGRAPHIC INFORMATION SHOWN ON THIS MAP WAS SURVEYED AND PREPARED BY WENDEL DUCHSCHERER FROM FIELD DATA GATHERED BETWEEN JANUARY 25 & JANUARY 30, 2006.

Adapted from figure found in *Site Investigation / Remedial Alternatives Report, Buffalo Lakeside Commerce Park-Parcel 4*, Malcolm Pirnie Inc., Oct.2008

BUFFALO LAKESIDE COMMERCE PARK
PARCEL 4
BUFFALO, NEW YORK

FIGURE 5
ANALYTICAL RESULTS
GROUNDWATER



MALCOLM PIRNIE

CONCEPTUAL SITE MODEL
Buffalo Lakeside Commerce Park, Parcel 4
Buffalo, New York

FIGURE 6

Adapted from figure found in *Site Investigation / Remedial Alternatives Report, Buffalo Lakeside Commerce Park-Parcel 4*, Malcolm Pirnie Inc., Oct.2008

TABLE 1
SUMMARY OF ANALYTICAL RESULTS - SURFACE SOIL/FILL SAMPLES
BUFFALO LAKESIDE COMMERCE PARK - PARCEL 4
BUFFALO, NY

Sample Location	SCO Unrestricted Values(1)	SCO Restricted Commercial Values	Urban Background Concentrations (2)(3)	MW401A	MW402A	MW403A	MW-404A	DUP	MW-405A	MW406A	MW407A	SB-401A	SB-402A	SB-403A	SB-404A	SB-405A	SB-406A	SB-407A	SB-408A	SB-409A	SB-410A	SB-411A	SB-412A	SB-413A
Depth (ft bgs)				(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)	(0 - 0.5)
Collection Date				1/9/2006	1/9/2006	1/10/2006	1/11/2006	1/11/2006	1/11/2006	1/10/2006	1/10/2006	1/12/2006	1/12/2006	1/12/2006	1/16/2006	1/17/2006	1/13/2006	1/13/2006	1/17/2006	1/16/2006	1/17/2006	1/19/2006	1/18/2006	1/18/2006
PAHs - Method 8270 (ppb)																								
Acenaphthene	20,000	500,000	-				520 J	520 J			2300 J							90 J					130 J	
Anthracene	100,00	500,000	N/A				1400 J	1400 J			1100 J	860 J	180 J										79 J	
Benzo(a)anthracene	1,000	5,600	169 -59,000			***2200***	***3300***	***3300***		540	***9200***	***1900 J***	320 J		320 J	70 J	***1500***	360 J	150 J				79 J	
Benzo(a)pyrene	1,000	1,000	165 - 220			***3800***	***2900***	***2900 J***		64 J	***21000***	***1500 J***	240 J		250 J	120 J	***2300***	720	240 J			680	***1000***	
Benzo(b)fluoranthene	1,000	5,600	15,000 - 62,000		51 J	***4500***	***4100***	***4100 J***		220 J	***20000***	***2100***	320 J	56 J	350 J	150 J	***3000***	680	310 J			950	***1200***	
Benzo(g,h,i)perylene	100,000	500,000	900 - 47,000			2300	1200 J	1200 J			16000	610 J			96 J		1000	500	120 J			250 J	420 J	
Benzo(k)fluoranthene	800	56,000	300 - 26,000				***1400 J***	***1400 J***			***5800***	670 J			97 J		***1000***						140 J	
Chrysene	1,000	56,000	251 - 640			***2800***	***2900***	***2900***		***3100 D***	***9800***	***1700 J***	270 J		210 J		***2000***	460				600	730	
Dibenz(a,h)anthracene	330	560	-								***930 J***						70 J	82 J						
Fluoranthene	100,000	500,000	200 - 166,000			2000	7200	7200		1300	10000	4800	750 J	80 J	660		1600	400 J				560	680	
Fluorene	30,000	500,000	-				560 J	560 J																
Indeno(1,2,3-cd)pyrene	500	5,600	8,000 - 61,000			***1700 J***	***1200 J***	***1200 J***			***13000***	***710 J***			68 J		***850***	460	80 J			170 J	310 J	
Naphthalene	12,000	500,000	-				390 J	390 J																
Phenanthrene	100,000	500,000	N/A		120 J		5300	5300		270 J	4000 J	3300	800 J	78 J	510		290 J	190 J				130 J	320 J	
Pyrene	100,000	500,000	145 - 147,000			2400	6400	6400		220 J	10000	3800	710 J	78 J	700	100 J	1700	420	200 J			700	820	
TICs			N/A																					
Total PAHs			N/A	0	171	21,700	38,770	38,770	0	5,714	123,130	21,950	3,590	292	3,261	440	15,310	4,362	1,100	0	0	4,040	5,908	0
Total BaP Equivalent(4)			N/A	0	5	4,668	3,803	3,803	0	171	26,306	1,995	307	6	327	142	2,935	957	294	0	0	798	1,168	0
PCBs - Method 8082 (ppb)																								
Aroclor-1254		1,000	N/A	99 PJ	78 PJ							99 PJ		41										
Total PCBs	100		N/A	99	78							99		41		160								
Inorganics / TAL Metals (ppm)																								
Aluminum			33,000	10500 J	6140 J	7200 J	8620	7760	6800	4200 J	6300 J	8830	10700	5320	7140 J	6890 J	4300 J	7020 J	4680 J	3180 J	1640 J	8740 J	6060 J	7320 J
Antimony			N/A	15.1 N*J	118 N*J			20.7 NJ	124 NJ		11.2 N*J		26.4 NJ	137 NJ		92.3 N*J		127 NJ	9.05 N*J	50.4 N*J	80.5 N*J	14.6 NJ	135 NJ	262 NJ
Arsenic	13	16	3-12 **	***21.2 NJ***	***27.4 NJ***	2.56 NJ	7.51 N	7.38 NJ	12.2 NJ	4.39 NJ	10.5 NJ	8.18 N	7.05 NJ	***14.3 NJ***	3.6 N	11.4 N*J	2.7	7.3	6.31 N*J	7.78 N*J	10.1 N*J	6.21	11.9	***20.4***
Barium	350	400	15-600	103 NJ	75.8 NJ	14.8 NJ	155 NJ	152 NJ	87.7 NJ	39.4 NJ	79.9 NJ	240 NJ	119 NJ	64.3 NJ	59.2 J	83.2 J	20.3 J	100 J	46.4 J	26.8 J	34.9 J	66.7 N*J	83.5 N*J	122 N*J
Beryllium	7.2	590	0-1.75	1.46 NJ	1.44 NJ	0.159 NJ	0.701 J	0.764 J	1.31 J	0.715 NJ	0.737 NJ	0.767 J	0.779 J	1.1 J	1.36 J	1.35 J	0.201 J	1.45 J	0.64 J	0.83 J	0.432 J	1.22 J	0.98 J	1.54 J
Cadmium	2.5	9.3	0.1-1	***5.26 NJ***					1.59 NJ		1.24 NJ		0.402 NJ	***6.89 NJ***	0.515 NJ	1.02 N	0.066 J	***5.74***		0.676 N		0.158 NJ	1.09 N	***6.86 N***
Calcium			130 - 35,000 **	60000 J	31800 J	1240 J	51400 J	44600 J	70800 J	203000 DJ	57600 J	57500 J	60100 J	25800 J	199000 DJ	50500 J	3670 J	54900 J	13100 J	39200 J	18400 J	29800 J	28100 J	43200 J
Chromium	1	400	1.5 - 40 **	***54.4 NJ***	***18 NJ***	***8.41 NJ***	***36.2 NJ***	***38.1 NJ***	***67.6 NJ***	***9.44 NJ***	***196 NJ***	***22.6 NJ***	***21.6 NJ***	***184 NJ***	***10.2 J***	***88.1 J***	***9.11 J***	***42.9 J***	***42.8 J***	***22.3 J***	***4 J***	***8.13 NJ***	***56.9 NJ***	***93.7 NJ***
Cobalt			2.5 - 60 **	7.32 NJ	10.2 NJ	0.488 NJ	5.03 NJ	5.06 NJ	5.85 NJ	1.18 NJ	6.43 NJ	5.6 NJ	6.39 NJ	7.24 NJ	0.921 J	6.5 J	1.17 J	4.99 J	4.31 J	3.77 J	6.03 J	2.19 J	5.69 J	6.84 J
Copper	50	270	1 - 50	***124 NJ***	49.4 NJ	6.02 NJ	***75.7***	***91.8***	***121***	27 NJ	***261 NJ***	42.8	44.1	***239***	26.4 N	***156 N***	12.9	***80.6***	***57.6 N***	41.9 N	11.6 N	15.1 N	***158 N***	***165 N***
Cyanide	27	27	N/A	6.05	8.76		3.23	1.42	6.92	7.125	8.48	0.939	12	4.35	17	5.85		3.22	2.86	8.34			4.69	3.94
Iron			2,000 - 550,000	109000 J	217000 D	7990 J	36100 J	50600 J	87700 J	28100 J	107000 J	30000 J	29100 J	190000 DJ	19300 J	107000 J	15600 J	92600	59100 J	51600 J	105000 J	13100 J	83200 J	129000
Lead	63	1,000	200 - 500	***1610 J***	***258 J***	7.31 J	***331 J***	***467 J***	***776 J***	**88.2 J**	***244 J***	***376 J***	***358 J***	***1590 J***	61.6 J	***281 J***	27.9 J	***6300 J***	***120 J***	***328 J***		45.9 N*J	***297 N*J***	***1420 N*J***
Magnesium			100 - 5,000	11600 J	7120 J	535 J	13300 J	10400 J	13400 J	38200 J	6510 J	17200 J	14400 J	5950 J	29300 NJ	7910 NJ	826 J	16900 J	3330 NJ	7330 NJ	9970 NJ	5080 NJ	6110 NJ	9040 NJ
Manganese	1,600	10,000	50 - 5,000	***3820***	***7570***	115	1020	1460	***2000***	1240	***11200 D***	880	955	***2810***	1310 NJ	***3360 NJ***	481 NJ	***2190 NJ***	**1830** NJ	1350 NJ	***150000 DJ***	567 J	**3690** J	***5790 J***
Mercury	0.18	2.8	0.001 - 0.2	0.089 N*	0.036 N*		***0.25 NJ***	***0.354 NJ***	0.05 NJ	0.027 N*	***0.232 N****	***0.573 NJ***	***0.278 NJ***	0.165 NJ	***0.211***	0.077	0.049 N	0.08 NJ	0.067	0.103	0.026	0.04	0.14	0.086
Nickel	30	310	0.5 -25	27 NJ	8.57 NJ	2.3 NJ	18.7 NJ	19.8 NJ	***49.4 NJ***	4.36 NJ	***41.9 NJ***	23.6 NJ	19.1 NJ	***48.7 NJ***	7.29	***42***	3.56 J	16.8	25.9	20.7		9.76	***57.3***	***57.6***
Potassium			8,500 - 43,000 **	2220 NJ	917 NJ	591 NJ	2860 J	1950 J	1540 J	798 NJ	1080 NJ	1950 J	2100 J	693 J	912 N	1320 N	407 J	1040	636 NJ	503 NJ	194 NJ	935	1240	1010
Selenium	3.9	1,500	0.1 - 3.9	3.18 N										***12.6 NJ***	0.92 NJ	1.82 N	1.15 NJ	3.56 NJ	2.94 N	1.78 N	1.69 N	0.678 NJ	0.698 NJ	0.866 NJ
Silver	2	1,500	N/A	***21.3 NJ***	***37.4 NJ***	1.27 NJ	***8.5 N*J***	***14.8 N*J***	***29.7 N*J***	***3.96 NJ***	***21.1 NJ***	***6.22 N*J***	***6.42 N*J***				***2.52 NJ***	***13.9 NJ***					***4.41 J***	***5.63 J***
Sodium			6,000 - 8,000	327 NJ		58.7 NJ	364 NJ	337 NJ	371 NJ	424 NJ	253 NJ	331 NJ	216 NJ	441 NJ	324 NJ	260 NJ	93.7 NJ	382 NJ	58.3 NJ	193 NJ	34.7 NJ	309 NJ	296 NJ	204 NJ
Thallium			N/A	3.52 N				0.833 NJ	3.55 NJ					4.98 NJ						0.681 J				4.03
Vanadium			1-300	28.5 NJ	17.8 NJ	7.27 NJ	18.4 J	18.7 J	20.5 J	5.8 NJ	47.7 NJ	23.5 J	21.8 J	20.6 J	6.18 J	20.3 J	4.96 J	12.2 J	13.2 J	17.1 J	17.5 J	3.46 J	19.3 J	15.8 J
Zinc	109	10,000	9-50	***846***	***921***	7.53	***389 N***	***606 N***	***1040***	***258***	***950***	***360 N***	***459 N***	***4910 N***	***417 J***	***717 J***	76 NJ	***379 NJ***	***327 J***	***475 J***	14.7 J	*64.7* **J**	***706 J***	

Blank space indicates analyte was not detected.
-- Indicates sample was not analyzed for this parameter.
Shaded and framed concentrations exceed restricted commercial SCO values.
Bold/Italic concentrations exceed unrestricted SCO values.
Only those analytes detected at a minimum of one location and greater than the reporting limit are shown.
(1) 6 NYCRR subpart 375-6 soil cleanup objectives, Dec. 2006.
(2) TAL Inorganic Analytes from Eastern USA Background as shown in New York State Dept. of Environmental Conservation TAGM 4046, Dec. 2000.
(3) SVOCs background from Background Soil Concentrations of Poly Aromatic Hydrocarbons (PAHs), Urban Soils (U.S. and other), Toxicological Profile for PAHs, US Dept. of Health and Human Services, August 1995
(4) Total BaP equivalent - Benzo (a) pyrene equivalent is calculated by multiplying the following individual PAH concentrations by their multiplier (#) and summing the results. Benzo (a) pyrene (1.00); Dibenzo (a,h) anthracene (1.00); Benzo (a) anthracene (0.10); Benzo (b) fluoranthene (0.10); Ideno (1,2,3-cd) pyrene (0.10); Benzo (k) fluoranthene (0.01); Chrysene (0.01).
*** New York State background concentration.*

Data Qualifiers
U - The compound was not detected at the indicated concentration.
D - Indicates result from secondary dilution run.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.
** - For dual column analysis, the lowest quantitated concentration is being reported due to coeluting interference.*

TABLE 2
SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOIL/FILL SAMPLES
BUFFALO LAKESIDE COMMERCE PARK - PARCEL 4
BUFFALO, NY

Sample Location	SCO Unrestricted Values(1)	SCO Restricted Commercial Values(1)	Urban Background Concentrations (2)(3)	MW401B	MW402B	MW403B	MW-404B	MW-405B	MW-000B-DUP	MW406B	MW407B	SB-401B	SB-402B	SB-403B	SB-404B	SB-405B	SB-406B	SB-407B	SB-408B	SB-409B	SB-410B	SB-411B	SB-412B	SB-413B	BLUEFILL-01
Depth (ft bgs)				8 - 10	8 - 10	12.5 - 13	(11 - 12)	(24 - 25)	(MW-405B)	24.5 - 25	2 - 2.5	(14 - 14.5)	(11.5 - 12)	(11 - 12)	(8 - 10)	(8 - 9)	(3.5 - 4)	(3 - 4)	(5 - 6)	(10 - 11)	(3 - 4)	(6 - 7)	(2 - 4)	(12 - 13)	(0.5 - 1)
Collection Date				1/9/2006	1/9/2006	1/10/2006	1/12/2006	1/11/2006	1/11/2006	1/10/2006	1/10/2006	1/12/2006	1/12/2006	1/12/2006	1/16/2006	1/17/2006	1/13/2006	1/13/2006	1/17/2006	1/16/2006	1/17/2006	1/19/2006	1/18/2006	1/18/2006	1/19/2006
VOCs - Method 8260 (ppb)																									
1,2-Dichlorobenzene	1,100	500,000	N/A											4.8 J											
2-Butanone			N/A			26 J	38 J			61 J		87 J				27 JB		120 J							
Acetone	50	500,000	N/A	***67 J***	J	***220 J***											***330***								
Benzene	60	44,000	N/A		17 J J						3.4 J		22 J												
Carbon Disulfide			N/A			29 J	51 J	15 J	17 J	110		31 J				23 J				34					
Cyclohexane			N/A	50 J J						20 J												100 J	130 J	110 J	
Ethyl Benzene	1,000	390,000	N/A							5.3 J	4.2 J			3.4 J								18 J	31 J		
Methyl Acetate			N/A																						
Methylcyclohexane			N/A	50 J								5.8 J											230 J	190 J	
Methylene Chloride	50	500,000	N/A			25 JB					30 JB														
Toluene	700	500,000	N/A								5.6 J		28 J				20 J					23 J	34 J	20 J	
m/p-Xylenes			N/A	8.6 J J										17 J								140 J	260 J	110 J	
o-Xylene			N/A	6 J J						5.4 J			3.4 J	14 J								37 J	58 J	26 J	
Total Xylenes	260	500,000	N/A	14.6	0	0	0	0	0	5.4	0	0	3.4	31	0	0	0	0	0	0	0	177	***318***	136	0
TICs			N/A	1345	550		160	34	90	6650		770		2680			3390	12200				2920	400	1759	
Total VOCs			N/A	1526.6	567	300	249	49	107	6851.7	43.2	893.8	53.4	2719.2	0	50	3740	12320	0	34	0	3238	1143	2215	0
SVOCs - Method 8270 (ppb)																									
1,1-Biphenyl			N/A																				82 J		
2-Methylnaphthalene			N/A	160 J J								290 J					210 J								
3+4-Methylphenols			N/A		98 J																				
4-Nitrophenol			N/A																						
Acenaphthene	20,000	500,000	N/A	110 J								250 J			82 J	120 J			100 J						
Anthracene	100,00	500,000	N/A	380 J								450 J	83 J		280 J								81 J		
Benzo(a)anthracene	1,000	5,600	169 -59,000	280 J J		310 J					240 J	540 J	150 J		630	310 J			750				83 J		***1300 J***
Benzo(a)pyrene	1,000	1,000	165 - 220			420 J					260 J	370 J	90 J		400 J	610 J		71 J	***1100 J***						780 J
Benzo(b)fluoranthene	1,000	5,600	15,000 - 62,000	250 J		490					410 J	450 J	250 J		590 J	650 J		76 J	***1400 J***				88 J		***1300 J***
Benzo(g,h,i)perylene	100,000	500,000	900 - 47,000			220 J					100 J	270 J			150 J	340 J			440						
Benzo(k)fluoranthene	800	56,000	300 - 26,000									190 J			160 J	210 J			530 J						
bis(2-Ethylhexyl)phthalate			N/A							120 J															
Carbazole			N/A									260 J													
Chrysene	1,000	56,000	251 - 640	460 J J		390 J					270 J	430 J	250 J		500	200 J			880				130 J		
Dibenz(a,h)anthracene	330	560	N/A																120 J						***1500 J***
Dibenzofuran			N/A									330 J			160 J										
Fluoranthene	100,000	500,000	200 - 166,000	800 J J		290 J					370 J	1600	310 J		1300	200 J		72 J	710				120 J	95 J	3200
Fluorene	30,000	500,000	N/A	290 J								470 J													
Indeno(1,2,3-cd)pyrene	500	5,600	8,000 - 61,000			200 J						270 J	72 J		130 J	210 J		69 J	270 J						
Isophorone			N/A																						
Naphthalene	12,000	500,000	N/A	140 J J								1300					230 J								3200
Nitrobenzene			N/A																						
Pentachlorophenol			N/A																						16000
Phenanthrene	100,000	500,000	N/A	1100 J		130 J				840 J	240 J	2100	270 J		1400								180 J	140 J	3400
Phenol			N/A		170 J																				
Pyrene	100,000	500,000	145 - 147,000	910		330 J					460	1300	270 J		1200	410 J			960				140 J	98 J	2000 J
TICs			N/A	15,000	3,210	2,779	7,500	1,160	1,000	9,680	2,302	19,720	3,830	2,030	3,249	3,020			6,770	3,121	1,400	2,200	3,840	10,360	43,700
Total SVOCs			N/A	19880	3478	5559	7500	1160	1000	10640	4652	30590	5575	2030	10231	6280	440	288	14030	3121	1400	2200	4744	10693	76380
Total BaP Equivalent(4)			N/A	57.6	0	523.9	0	0	0	0	327.7	502.2	139.7	0	541.6	731.1	0	85.5	1476.1	0	0	0	18.4	0	2540
PESTICIDES - Method 8081 (ppb)																									
All Pesticides			N/A	56	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
Endosulfan I	2,400	200,000	-	56 PJ																					
Endrin	14	89,000	-										4.7 PJ												
Endrin aldehyde			-										2.3 J												
PCBs - Method 8082 (ppb)																									
Aroclor-1254			N/A	520 PJ																			43 PJ		
Aroclor-1260			N/A										140												
Total PCBs	100	1,000	N/A	520	0	0	0	0	0	0	0	0	140	0	0	0	0	0	0	0	0	0	43	0	0
Inorganics / TAL Metals (ppm)																									
Aluminum			33,000	21000 J	12800 J	15300 J	10100	9050	10100	14300 J	5820 J	12500	9060	18800	6850 J	4380 J	8650 J	7150 J	3480 J	8930 J	8110 J	12600 J	11500 J	12400 J	40.3 J
Antimony			N/A			84.6 N*J		27.1 NJ			121 N*J		249 NJ		6.13 N*J	54.1 N*J	5.33 NJ	73.2 NJ				13.9 NJ	37.4 NJ	48.9 NJ	10.0 NJ
Arsenic	13	16	3-12 **	***43.5 NJ***	11.8 NJ	12.3 NJ	***22.3 N***	10.6 N	***13.3 N***	2.96 NJ	***18 NJ***	8.96 N	***22.6 NJ***	***24.1 N***	5.66 N	10.4 N*J	1.87	***17.4***	1.58 N	3.12 N	10.7 N	3.61	10	3	***17.1***
Barium	350	400	15-600	147 NJ	77 NJ	115 NJ	133 NJ	44.3 NJ	54.4 NJ	73.5 NJ	65.5 NJ	76.1 NJ	96.3 NJ	189 NJ	61.6 J	57.7 J	17.4 J	95.1 J	12.6 J	8.98 J	79.6 J	51.2 N*J	112 N*J	123 N*J	18.3 N*J
Beryllium	7.2	590	0-1.75	1.64 NJ	0.784 NJ	2.81 NJ	0.786 J	0.767 J	0.81 J	2.3 NJ	0.975 NJ	0.702 J	1.86 J	1.54 J	1.28 J	0.738 J	0.121 J	1.35 J	0.12 J	0.44 J	1.31 J	0.807 J	1.4 J	0.698 J	0.186 J
Cadmium	2.5	9.3	0.1-1	***3.13 NJ***	0.106 NJ								***7.66 NJ***	***3.81 NJ***		0.483 NJ		***3.56***					0.073 NJ		
Calcium			130 - 35,000 **	267000 DJ	20700 J	66800 J	96600 J	24300 J	38400 J	47600 J	36800 J	8490 J	31000 J	243000 DJ	38800 J	25100 J	820 J	35800 J	967 J	51500 J	50200 J	38000 J	51100 J	8050 J	18600 J
Chromium	1	400	1.5 - 40 **	***36.3 NJ***	***19.3 NJ***	***20.8 NJ***	***44.5 NJ***	***18.9 NJ***	***21.4 NJ***	***3.45 NJ***	***23.4 NJ***	***21.2 NJ***	***182 NJ***	***27.5 NJ***	***4.66 J***	***180 J***	***6.95 J***	***104 J***	***5.33 J***	***15.6 J***	***11.5 J***	***15.1 NJ***	***10.6 NJ***	***14.8 NJ***	***4.930 NJ***
Cobalt			2.5 - 60 **	11.6 NJ	7.71 NJ	4.57 NJ	7.49 NJ	12.1 NJ	10.7 NJ	1.6 NJ	7.6 NJ	10.2 NJ	14.1 NJ	11.2 NJ	1.4 J	6.78 J	0.721 J	12.7 J		9.96 J	3.62 J	10.5 J	5.2 J	13.2 J	
Copper	50	270	1 - 50	41.9 NJ	33.5 NJ	45.7 NJ	***109***	24.9	26.3	13 NJ	***62.7 NJ***	38.9	***298***	40.5	***62.5 N***	***205 N***	2.99	***348***	3.02 N	20.4 N	28.3 N	18.3 N	15.7 N	22.8 NJ	2.440 NJ
Cyanide	27	27	N/A		9.27	6.04	13	2.64 J	0.95 J	7.25	8.07		24		6.04	4.56		1.64			5.86				***918***
Cyanide - Amenable			N/A				-	1.1 J				-	-	-								-	-	-	19.4
Iron			2,000 - 550,000	20100 J	33300 J	55900 J	112000 J	114000 J	78600 J	11000 J	186000 DJ	21600 J	244000 DJ	17400 J	39700 J	115000 J	4720 J	212000 DJ	4640 J	19400 J	45700 J	20000 J	39600 J	44100 J	10100 J
Lead	63	1,000	200 - 500	***102 J***	61.2 J	44.7 J	***165 J***		17.7 J	5.98 J	***69 J***	22.8 J	***2970 J***	***126 J***	33.5 J	***218 J***	6.75 J	***434 J***	6.14 J	15.3 J	43.6 J	18.7 N*J	35.3 N*J	5.32 N*J	27.5 N*J
Magnesium			100 - 5,000	4100 J	5300 J	17600 J	6490 J	4410 J	5090 J	4450 J	10400 J	4820 J	8590 J	3110 J	7400 NJ	5600 NJ	231 J	9030 J	299 NJ	5410 NJ	14000 NJ	7090 NJ	10500 NJ	7260 NJ	173 NJ
Manganese	1,600	10,000	50 - 5,000	180	668	***2450***	***1640***	1090	728	544	***4050***	320	***4960***	182	***2270 NJ***	***3120 NJ***	51.2 NJ	***4970 NJ***	46.3 NJ	439 NJ	1030 NJ	576 J	***4830 J***	1350 J	77.2 J
Mercury	0.18	2.8	0.001 - 0.2	0.031 N*	0.031 N*	0.024 N*	***0.231 NJ***	0.014 NJ	0.064 NJ	0.017 N*	0.063 N*	0.05 NJ	***0.292 NJ***	0.023 NJ				0.05 N				0.018	0.064	0.046	
Nickel	30	310	0.5 -25	22.9 NJ	25.7 NJ	16.8 NJ	***34.9 NJ***	23.5 NJ	26.6 NJ	3.1 NJ	12.2 NJ	***37.4 NJ***	***103 NJ***	23 NJ	8.52	***75.6***	0.841 J	***72.2***	2.82 J	***36.3***	8.24	***38.1***	13.6	***31.1***	
Potassium			8,500 - 43,000 **	9520 NJ	9310 NJ	2310 NJ	8030 J	5800 J	7660 J	3700 NJ	1080 NJ	6380 J	2310 J	11000 J	2260 N	1150 N	675	1840	284 NJ	3570 N	1070 N	2520	2290	4810	425 J
Selenium	3.9	1,500	0.1 - 3.9	3.61 N	1.36 NJ	1.05 NJ				1.63 N		1.9 NJ		***6.43 NJ***	1.52 N	2.72 N	0.448 NJ	***5.22 N***		0.832 NJ	1.96 N				1.460 NJ
Silver	2	1,500	N/A	1.75 NJ	***5.45 NJ***	***12.4 NJ***	***34.6 N*J***	***42.1 N*J***	***25.6 N*J***	1.63 NJ	***31.6 NJ***	***2.11 N*J***	***80.4 N*J***				0.811 NJ	***28.2 NJ***					0.772 J	1.23 J	0.278 J
Sodium			6,000 - 8,000	614 NJ	575 NJ	633 NJ	865 NJ	191 NJ	362 NJ	304 NJ	101 NJ	406 NJ	887 NJ	942 NJ	435 NJ	99.5 NJ	200 NJ	555 NJ	117 NJ	141 NJ	191 NJ	172 NJ	220 NJ	138 NJ	208 NJ
Thallium			N/A	1.55 N				2.47 NJ	1.54 NJ				6.92 NJ	2 NJ											
Vanadium			1-300	35.3 NJ	18.5 NJ	10.8 NJ	27.2 J	36.2 J	29.4 J	4.94 NJ	23.9 NJ	28.5 J	28.1 J	42.7 J	7.92 J	22.4 J	5.28 J	25.1 J	3.06 J	11.9 J	12.2 J	10.6 J	10.2 J	20.5 J	
Zinc	109	10,000	9-50	***778 NJ***	***275 NJ***	***341 NJ***	***573 N***	42.9 NJ	***137 NJ***	35.1	***585***	***141 N***	6830 N	***956 N***	***520 J***	***513 J***	6.8 NJ	***895 NJ***	8.93 J	38.1 J	***239 J***	27.6 J	***188 J***	***63.1 J***	17.4 J

Blank space indicates analyte was not detected.
-- Indicates sample was not analyzed for this parameter.
Shaded and framed concentrations exceed restricted commercial SCO values.
Bold/Italic concentrations exceed unrestricted SCO values.
Only those analytes detected at a minimum of one location and greater than the reporting limit are shown.
(1) 6 NYCRR subpart 375-6 soil cleanup objectives, Dec. 2006.
(2) TAL Inorganic Analytes from Eastern USA Background as shown in New York State Dept. of Environmental Conservation TAGM 4046, Dec. 2000.
(3) SVOCs background from Background Soil Concentrations of Poly Aromatic Hydrocarbons (PAHs), Urban Soils (U.S. and other), Toxicological Profile for PAHs, US Dept. of Health and Human Services, August 1995.
(4) Total BaP equivalent - Benzo (a) pyrene equivalent is calculated by multiplying the following individual PAH concentrations by their multiplier (#) and summing the results. Benzo (a) pyrene (1.00); Dibenzo (a,h) anthracene (1.00); Benzo (a) anthracene (0.10); Benzo (b) fluoranthene (0.10); Ideno (1,2,3-cd) pyrene (0.10); Benzo (k) fluoranthene (0.01); Chrysene (0.01).
*** New York State background concentration.*

Data Qualifiers
U - The compound was not detected at the indicated concentration.
D - Indicates result from secondary dilution run.
J - Data indicates the presence of a compound that meets the identification criteria. The result is less than the quantitation limit but greater than zero. The concentration given is an approximate value.
B - The analyte was found in the laboratory blank as well as the sample. This indicates possible laboratory contamination of the environmental sample.
P - For dual column analysis, the percent difference between the quantitated concentrations on the two columns is greater than 40%.
** - For dual column analysis, the lowest quantitated concentration is being reported due to coeluting interference.*

TABLE 3
SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER SAMPLES
BUFFALO LAKESIDE COMMERCE PARK - PARCEL 4
BUFFALO, NY

Sample ID Sampling Date	NYSDEC Class GA Standards[1]	ABB-MW-101 02/08/06	ABB-MW-103 02/07/06	MW-305 02/08/06	MW-306 02/07/06	MW-307 02/07/06	MW-401 02/08/06	MW-402 02/08/06	MW-403 02/08/06	MW-404 02/08/06	MW-405 02/08/06	MW-406 02/07/06	GWDUP-1 02/07/06	MW-407 02/07/06	TB-0207 02/07/06	EQ-BLANK 02/08/06
VOCs - Method 8260 (ppb)																
1,1,1-Trichloroethane	5*															
2-Butanone	50					18.0 J										
4-Methyl-2-Pentanone	NA					2 J										
Acetone	50					**210**	23 J									
Benzene	1					0.55 J				0.75 J		**1.2 J**	**1.3 J**			
Carbon Disulfide	60					5.8						3.3 J	3.5 J			
Tetrachloroethene	5*															1.9 JB
Toluene	5*	0.98 J				1.1 J	0.89 J		0.84 J	0.99 J		1 J	1 J	0.91 J		
Total Confident Conc. VOC	NA	2.68	0.41	2	0	237.45	30.29	180	2.44	3.84	43	5.5	5.8	0.91	0	1.9
Total TICs	NA	0	0	0	0	11.2	0	0	0	26	0	8.9	8.6	0	0	0
SVOCs- Method 8270 (ppb)																
2,4,6-Trichlorophenol	NA											2.3 J			--	
2,4-Dichlorophenol	5*											4.9 J	**5.4 J**		--	
2,4-Dimethylphenol	(50)					1.4 J									--	
2-Methylnaphthalene	NA									1.2 J					--	
3+4-Methylphenols	NA					3.6 J									--	
Acenaphthene	(20)									6.7 J					--	
Anthracene	(50)									1.7 J					--	
Carbazole	NA									16					--	
Dibenzofuran	NA									4 J					--	
Fluoranthene	(50)									2 J					--	
Fluorene	(50)									6.6 J					--	
Naphthalene	(10)	5.2 J	2.5 J				1.7 J	1.5 J		7.2 J		5.7 J	6 J		--	
Pentachlorophenol	1[Ŧ]					**5.6 J**									--	
Phenanthrene	(50)									3.6 J					--	
Phenol	1[Ŧ]					**16**	**1.3 J**	**4.3 J**			**5.2 J**				--	
Total Confident Conc. SVOC	NA	10.2	7.4	6.4	2.3	31.8	8	9.7	3.5	54.1	9.3	16	15	6.7	--	6.6
Total TICs	NA	12.7	15.7	5.8	5.9	126.2	6.5	91.7	26.4	73	40.4	112.2	122.9	6.4	--	12
Pesticides - Method 8081 (ppb)																
All Pesticides	NA														--	
PCBs- Method 8082 (ppb)																
Total PCBs	0.09														--	
TAL Metals, Mercury, & Cyanide- Methods 6010, 7470, 9012 (ppb)																
Aluminum	NA	113 J	101 J	860	225	1870	6760	12400	432	390	3260	220	201	26300	--	50.8 J
Antimony	3			**7.5 J**				**12.1 J**			**19.6 J**			**25.0 J**	--	
Arsenic	25			**135.0**		**47.3**	**59.5**	**98.4**			**617.0**	14.4	13.3	18.2	--	
Barium	1000	65.9 J	28.1 J	497.0	18.8 J	46.4 J	12.3 J	18.2 J	13.1 J	319.0	20.7 J	41.5 J	36.8 J	288.0	--	4.3 J
Beryllium	(3)			0.27 J			0.16 J	0.97 J	0.09 J			0.1 J		**4.8 J**	--	
Cadmium	5													0.6 J	--	
Calcium	NA	199000	49700	144000	75300	180000	24400	27100	20300	72800	13300	126000	113000	175000	--	1290 J
Chromium	50		3.1 J	14.4 J			8.2 J	47.6 J	1.7 J	2.9 J				34.8 J	--	
Cobalt	NA		0.43 J	2.8 J		1.9 J	0.53 J	3.7 J			10.2 J	6.5 J	5.2 J	9.3 J	--	
Copper	200	15.7 J	16.8 J	**217.0**	5.6 J	8.5 J	5.40 J	7.50 J	9.20 J	7.0 J	13.1 J	7.4 J	12.2 J	114.0	--	10.9 J
Cyanide	200	**410.0**	**241.0**		57.0	**5710.0**	163.0	**244.0**	74.0	43.0	72.0	**6390.0 J**	**1380.0 J**	35.0	--	
Iron	300	**356**	**342**	**58300**	**1530**	**3010**	**902**	**2970**	**690**	**3640**	**4070**	**3840**	**3520**	**58300**	--	
Lead	25		4.4 J	**29.1**	5.9		6.6	5.9		17.3				**224.0**	--	
Magnesium	(35,000)	378 J	2500 J	**49100**	17200	483 J	430 J	432 J	2240 J	**88600**		3010 J	3210 J	**36500**	--	256 J
Manganese	300	1.0 J	11.9 J	**343.0**	188.0	10.4 J	25.8	99.8	25.6	191.0	4.8 J	32.8	29.8	**3560.0**	--	0.9 J
Mercury	0.7		0.100 J					0.090 J			0.310			0.140 J	--	
Nickel	100	2.0 J		5.9 J		22.8 J	18.2 J	57.3			**289.0**	7.6 J	6.9 J	22.9 J	--	
Potassium	NA	76600.0 DL	225000.0 DL	1840.0 J	20700.0	727000.0 DL	1220000.0 DL	342000 DL	110000.0	196000.0 DL	547000.0 DL	608000.0 DL	553000.0 DL	33600.0	--	
Selenium	10	3.1 J		5.3 J	8.1 J	7.5 J	**10.8**	**12.5**			**29.0**	4.3 J		**10.1**	--	
Silver	50			1.8 J										2.6 J	--	
Sodium	20,000	**56900 J**	**95400 J**	**27900 J**	11300 J	**112000 J**	**65400 J**	**102000 J**	**26000 J**	**39900 J**	**557000 J**	**133000 J**	**111000 J**	**26000 J**	--	
Thallium	(0.5)				**10.3**										--	
Vanadium	NA	9.2 J		17.0 J		29.0 J	95.6	284.0	4.4 J	9.9 J	478.0	5.2 J	4.7 J	43.3 J	--	0.83 J
Zinc	(2,000)													747.0	--	35.3
Water Quality pH-Method 150.1																
pH (2)	NA	12.4	9.8	6.80	8.1	12.6	12.8	12.8	10.2	7.9	12.8	10.2		10.5	--	
pH (3)	NA	12	7	6.8	7	10	12	12	9.6	7.7	12	8	8	7	--	5.9

Notes:

(1) Class GA Ambient Water Quality Standards and Guidance Values from TOGS series 1.1.1, June 1998, and April 2000 Addendum.

(2) pH values measured in the field immediately prior to sample collection.

(3) pH values measured in the laboratory

Only those analytes detected at a minimum of one location and greater than the reporting limit are shown.

Blank space indicates analyte was not detected.

-- Indicates sample was not analyzed for this parameter.

Shaded and framed concentrations exceed Class GA groundwater standards or guidance values.

Values in ( ) represent Guidance Values.

NA - Not Applicable or Not Available.

Ŧ - applies to the sum of these subsatnces

Data Qualifiers

J - Organics: Indicates and estimated value. Inorganics: The reported value is less than CRDL, but greater than the IDL.

D - Indicates result from secondary dilution run.

B - Indicates analyte was found in the blank as well as the sample result.

TABLE 4
XRF PILOT STUDY ANALYTICAL RESULTS
BUFFALO LAKESIDE COMMERCE PARK - PARCEL 4
BUFFALO, NY

Sample Location	Criteria and		FA-01		FA-02		FA-03		FA-04		FA-05	
Sampling Depth (ft. bgs)	Guidance		(0.5 - 1.5)		(0.5 - 1.5)		(0.5 - 1.5)		(0.5 - 1.5)		(0.5 - 1.5)	
Collection Date	values		1/27/2006		1/27/2006		1/27/2006		1/27/2006		1/27/2006	
Inorganics / TAL Metals (ppm)												
Total Lead (1)	1000		***4440***		***11000***		***1940***		***1470***		***2490***	
TCLP Lead (ppm)												
TCLP Lead (2)	5		0.86		11.7		1.51		0.61		0.85	
Lead - XRF Pilot Study												
Lead est'd concentration (ppm) & XRF reading			2,998	65	4,924	90	1,508	39	1,731	45	1,862	46
			3,102	69	4,718	87	1,443	38	1,487	41	1,640	43
			2,955	66	4,578	83	1,496	39	1,428	43	1,775	45
			3,018	Avg	4,740	Avg	1,482	Avg	1,549	Avg	1,759	Avg

Shaded and framed concentrations exceed SCGs.

(1) 6NYCRR subpart 375-6, soil cleanup objectives for restricted commercial use, December 2006.
(2) Target Compound Leaching Procedure limit, above which is considered hazardous.

TABLE 5

REMEDIAL COST ESTIMATE
BLCP - Parcel 4
ALTERNATIVE 2
Institutional Controls

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	EST. TOTAL
1	Negotiation of Deed Restrictions	1	sum	$5,000	$5,000
2	Annual Site Inspection and reporting (15 yrs)	1	15 yrs	$11,118	$11,118
	($1,000 per year x 15 years, present worth at 4% interest)				
3	Annual Groundwater monitoring (assume 12 wells)	1	15 yrs	$166,776	$166,776
	(40 field hrs/event, 15 samples for metals/SVOCs/pH				
	and report x 15 years at present worth using 4% int.)				
4	Annual maintenance and repair of monitoring well network	1	15 yrs	$11,118	$11,118
	($1,000 per year x 15 years, present worth at 4% interest)				
5	Chain link fence (1600' x 6')	1600	foot	$30	$48,000
6	Concrete Jersey Barriers (8 feet long)	8	each	$500	$4,000
7	Warning signs (one every 50 feet)	32	each	$50	$1,600
	Subtotal				$247,612
8	Engineering and Contingency (35% of sub-total)	35% of subtotal	sum		$86,664
9	Health & Safety and General Requirements (10%)	10% of Subtotal	sum		$24,761
Total					**$359,037**

Assumptions:

1. Institutional controls would include:
   Deed Restrictions to control future site uses, activities, and restrict groundwater to non-potable uses.
   Annual site inspections and monitoring of groundwater quality.
   Restrict public access (fence around the flu ash pile, barriers at vehicle access points, warning signs).

2.Well maintenance assumes minor repairs, e.g. replacement of caps and locks, and painting as necessary

Table 6

REMEDIAL COST ESTIMATE
BLCP - Parcel 4
ALTERNATIVE 3
Limited Removal and Cover System with Institutional Controls

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	EST. TOTAL
1	Removal of blue fill	1		$55,000	$55,000
2	Removal of filter cake/flu ash - Option 3A -max volume	1		$5,200,000	$5,200,000
3	Sorting and removal of waste from debris disposal pile	1		$730,000	$730,000
4	Removal of miscellaneous waste piles	1		$50,000	$50,000
	Sub-Total (total cost of waste removal)				$6,035,000
5	Cut and mulch trees, spread mulch on site	15	acre	$2,500	$37,500
6	Demarcation layer of mesh fabric	100,000	SY	$0.10	$10,000
7	Import and placement of clean soil (labor and material)	32,500	CY	$20	$650,000
8	Negotiation of deed restrictions	1	sum	$5,000	$5,000
9	Annual site inspection and reporting (15 yrs)	1	15 yrs	$11,118	$11,118
	($1,000 per year x 15 years, present worth at 4% interest)				
10	Annual maintenance and repair of cover system (15 yrs)	1	15 yrs	$222,360	$222,360
	($20,000 per year x 15 years, present worth at 4% interest)				
	Sub-Total				$935,978
11	Engineering and Contingency (35% of sub-total)	35% of subtotal	sum		$327,592
12	Health & Safety and General Requirements (10%)	10% of subtotal	sum		$93,598
	Sub-Total (Total cost of soil cover system)				$1,357,168
Total					**$7,392,168**

Major Assumptions:

1. Site cover would be performed after removal of the following:
   - Blue fill
   - Filter cake/flu ash pile
   - Debris disposal pile
   - Other solid waste scattered throughout the site surface (tires, C&D etc.)
2. All on-site treed areas (approx. 15 acres) would be mulched and spread on the site surface.
3. Cover system includes demarcation layer + one foot of clean soil over the entire site (20 acres).
4. Deed restrictions to control future site uses, activities, and restrict groundwater to non-potable uses

Table 7

REMEDIAL COST ESTIMATE
BLCP - Parcel 4
ALTERNATIVE 4
Removal and Off-Site Disposal of Soil/Fill

ITEM NO.	**DESCRIPTION**	**ESTIMATED QUANTITY**	**UNIT**	**UNIT PRICE MAT. & LAB**	**EST. TOTAL**
	Removal of Blue Fill	1		$55,000	$55,000
	Removal of Filter cake/flu ash - Option 3A -max volume	1		$5,200,000	$5,200,000
	Sorting and removal of waste from Debris Disposal Pile	1		$730,000	$730,000
	Removal of Miscellaneous Waste Piles	1		$50,000	$50,000
	Sub-Total (Total cost of waste removal)				$6,035,000
1	Excavation transport and off-site disposal of soil/fill	500,000	CY	$60	$30,000,000
	(Assumed volume is 500,000 CY				
2	Cost for clean soil backfill including placement	500,000	CY	$20	$10,000,000
	Sub-Total				$40,000,000
5	Engineering and Contingency (35% of sub-total)	35% of subtotal	sum		$14,000,000
6	Health & Safety and General Requirements (10%)	10% of subtotal	sum		$4,000,000
	Sub-Total (Total cost of soil/fill removal)				$58,000,000
Total					**$64,035,000**

Assumptions:

The estimated volume of soil/fill at the site is approximately 500,000 CY

Does not include cost of dewatering and water management.

Table 8

REMEDIAL ALTERNATIVE COSTS
BLCP - Parcel 4

Removal and Off-Site Disposal of Soil/Fill

REMEDIAL ALTERNATIVE	CAPITAL COST ($)	ANNUAL COSTS ($)	TOTAL PRESENT WORTH ($)
NO ACTION	0	0	0
INSTITUTIONAL CONTROLS	109,000	22,000	360,000
LIMITED REMOVAL AND COVER SYSTEM WITH INSTITUTIONAL CONTROLS	7,100,000	30,000	7,400,000
REMOVAL AND OFF-SITE DISPOSAL OF SOIL/FILL	64,000,000	0	64,000,000