

193 Ship Canal Parkway, LLC.

Brownfield Cleanup Program

**Remedial Investigation Work
Plan**

Buffalo Urban Development Corp Site

Buffalo, NY 14203

(BCP Site C915240)

October 2012



Signature 1 Name
Title

Signature 2 Name
Title

Signature 3 Name
Title

Brownfield Cleanup Program

Remedial Investigation Work Plan BUDC Site

Prepared for:

Buffalo Urban Development Corp

Prepared by:

ARCADIS, Inc.

50 Fountain Plaza

Suite 600

Buffalo

New York 14202

Tel 716 667 0900

Fax 716 667 0279

Our Ref.:

04080008.0000

Date:

October 2012

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

1.	Introduction	1
1.1.	Site History	1
1.2.	Previous Investigations	2
1.2.1.	RECRA Environmental, Site Characterization and Environmental Assessment, 1988	2
1.2.2.	Malcolm Pirnie, Inc., Hanna Furnace Site - Characterization of the Former Railroad Yard (Parcel 1), Revised October 1999	2
1.2.3.	Malcolm Pirnie, Inc., Supplemental Investigation Report. Hanna Furnace Site, Former Railroad Yard (Parcel 1), Revised January 2001	3
1.2.4.	Malcolm Pirnie, Inc., Investigation of High pH Groundwater, June, 2001.	4
1.3.	Site Development Plan	4
2.	Purpose	6
3.	Investigation Scope of Work	7
3.1.	Soil/Fill Characterization	8
3.1.1.	Surface Soil/Fill Sampling Program	8
3.1.2.	Subsurface Soil/Fill Sampling Program	8
3.1.2.1.	Drilling of Soil Borings	8
3.1.2.2.	Subsurface Soil/Fill Sample Collection	9
3.2.	Groundwater Monitoring Well Installation, Development, and Sampling	9
3.2.1.	Site Hydrogeologic Conditions	9
3.2.2.	Monitoring Well Installation	9
3.2.3.	Well Development	10
3.2.3.1.	Groundwater Sample Collection	10
3.3.	Site Survey	11
4.	Qualitative Human Health Risk Assessment	12
5.	Quality Assurance /Quality Control (QA/QC)	13
5.1.	Analytical Methods	13
5.2.	Laboratory	13

5.3.	Data Submittal	13
5.4.	Data Usability Summary Report	13
6.	Health and Safety	14
6.1.	Community Air Monitoring	14
7.	Project Organization	15
8.	Reporting	16
9.	Project Schedule	17
10.	References	18

Figures

1-1	Site Location Map
1-2	Environmental Concerns
3-1	Proposed Surface Soil Sample Locations
9-1	Schedule

Tables

1-1	Summary of Soil/Fill Analytical Results and SCO Exceedences
3-1	Analytical Program Summary

Appendices

A	Historic Environmental Reports
B	Citizen Participation Plan

1. Introduction

In March 2010, Buffalo Urban Development Corp (BUDC) applied to enter into the New York State Department of Environmental Conservation's (NYSDECs) Brownfield Cleanup Program (BCP) for an approximately 9.65 acre Site within the Buffalo Lakeside Commerce Park and located at 193 Ship Canal Parkway, Buffalo, New York, see Figure 1-1. The Site is currently vacant but was part of the Hanna Furnace iron manufacturing plant. This Remedial Investigation (RI) Work Plan is provided along with the BCP application. Based on environmental data provided in the application, the entire 9.65 acre parcel is included in the application to the BCP. BUDC plans to construct a 150,000 square feet facility on the Site for light manufacturing and/or distribution purposes. ARCADIS, Inc. has prepared this Remedial Investigation Work Plan (RIWP) for investigation of the Site in accordance with the NYSDEC BCP requirements.

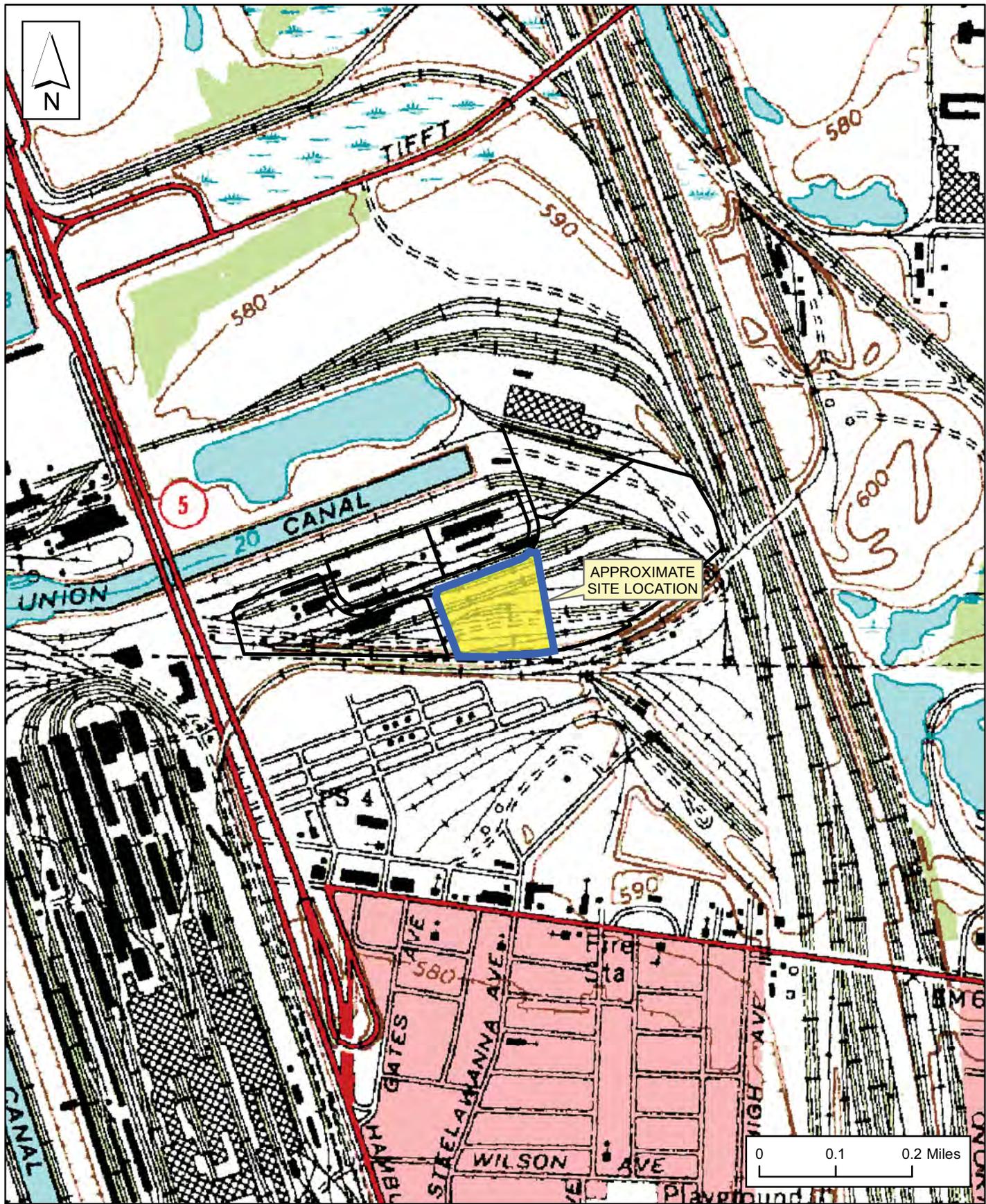
1.1. Site History

As shown on Figure 1-1, the property located at 193 Ship Canal Parkway, Buffalo consists of a single 9.65 acre parcel identified by Erie County's GIS website as Parcel 58342. The property is zoned for "Manufacturing and Processing". There are currently no improvements on the site.

Historic Site operations on the property included a railroad yard in support of the former Hanna Furnace iron manufacturer.

The Project Site is within the approximately 275 acre Buffalo Lakeside Commerce Park (BLCP) in the City of Buffalo, New York. For an approximate 80 year period, between 1902 and 1982, the Project Site was utilized to manufacture pig iron, which is the immediate product of smelting iron ore with coke and limestone in a blast furnace. Since that time, the Project Site has been abandoned and currently lays vacant. Structures formerly located on or immediately adjacent to the Project Site include production buildings, blast furnaces and various support structures.

The BLCP is partially developed and has significant potential to provide employment and tax base for south Buffalo.



1.2. Previous Investigations

Over the past 25 years, 16 separate environmental investigations were completed at the former Hanna Furnace Site. Of these 16 studies, only four included collection of samples from the proposed Project Site; these include:

- RECRA Environmental, Inc., Site Characterization and Environmental Assessment, Hanna Furnace, Buffalo, New York, August 1988
- Malcolm Pirnie, Inc., Hanna Furnace Site - Characterization of the Former Railroad Yard (Parcel 1), Revised October 1999
- Malcolm Pirnie, Inc., Supplemental Investigation Report. Hanna Furnace Site, Former Railroad Yard (Parcel 1), Revised January 2001
- Malcolm Pirnie, Inc., Investigation of High pH Groundwater, June, 2001

The scope and findings of each of these investigations are summarized below:

1.2.1. RECRA Environmental, Site Characterization and Environmental Assessment, 1988

In August 1988, Recra Environmental, Inc. (Recra) performed a Site Characterization and Environmental Assessment for the New York State Department of Transportation. The characterization and assessment included the entire 113-acre Hanna Furnace property. The work involved the collection of samples of surface and subsurface soil/fill, surface water, sediment and groundwater, performance of a risk assessment, and an evaluation of remedial alternatives.

The investigation of the Former Railroad Yard Area (Parcel 1) included the collection and analysis of surface soil (0.5' to 1.5' interval) samples, three of which were collected from the proposed Project Site (samples 20, 21, and 22). These surface soil samples were analyzed for arsenic, chromium, copper, lead, oil and grease, ammonia, and PCBs. Analytical results indicated elevated oil and grease, and each of the four metals tested and PCBs were present at concentrations above the restricted commercial SCOs at least one of the three sample locations, see Table 1-1.

1.2.2. Malcolm Pirnie, Inc., Hanna Furnace Site - Characterization of the Former Railroad Yard (Parcel 1), Revised October 1999

As part of a characterization of Parcel 1 of the Hanna Furnace site, 36 soil borings were drilled for the collection of composite surface and subsurface soil/fill samples. Of

TABLE 1 - 1
SUMMARY OF SOIL/FILL ANALYTICAL RESULTS
AND
SCO EXCEEDENCES
193 SHIP CANAL PARKWAY SITE - BLCF, BUFFALO, NEW YORK

Analyte	PCBs	Arsenic	Barium	Cadmium	Copper	Chromium	Cyanide	Lead
SCO (Rest.Commercial)	1	16	400	9.3	270	1500	27	1000
1988 RECRA Surface Soil samples								
(ss) 20	1.3	14	-	-	170	110	-	3300
(ss) 21	0.37	32	-	-	640	4700	-	260
(ss) 22		23	-	-	23	310	-	21
1999 Malcolm Pirnie Composite Surface Soil samples								
G (SB11+12)			222		49.7		21.2	1120
1999 Malcolm Pirnie Composite Subsurface Soil Samples								
C (SB-5+6)			274		26.5		20.1	62.7
D (SB7+36)			286	8.1	21.9		33.2	56.2
E (SB8+9)			260		20.5		5.79	85.1
G (SB11+12)			389		13.8		32.7	24.4
H (SB13+14)		20.4	226		9.18		7.65	66.5
K (SB19+20)			408	1.05	42.2		3.23	166
2000 Malcolm Pirnie surface soil samples								
SS6	1.2	10.6	53.1	19.9	58.3		3.6	89.4
SS9		17.9	83.7	2	15.3			46.8
SS17		22.9	298	19.9	501			766
2000 Malcolm Pirnie subsurface soil samples								
SB-37 (8-10')			428				3.1	5.4
SB-39 (6.5-10.4')			269				43	

Surface Soil above Restricted commercial SCO

Subsurface Soil Above restricted commercial SCO

the 36 borings, 12 were located on the proposed project site. From the 12 borings, six composite surface soil/fill (0 to 2' interval) samples (C1, D1, E1, G1, H1, and K1) and six composite subsurface soil/fill samples (C2, D2, E2, G2, H2, and K2) were collected and analyzed for PAHs, phenols, cyanide, and the TAL metals. Each composite sample was collected from two adjacent borings of the entire fill thickness at both locations. Two of the composite subsurface samples (E2 and K2) were also submitted for TCLP analysis. Also, all of the borings encountered a blue colored fill material which was thought to possibly be the result of cyanide contamination. For this reason, the blue fill material from one of the borings (SB-20) was also analyzed for total and reactive cyanide.

Surface soil/fill samples contained cyanide and several PAHs at variable concentrations. Lead was present in one of the six surface samples at a concentration above the restricted commercial SCO of 1000 mg/kg.

Subsurface soil/fill samples contained several PAHs at variable concentrations. Arsenic, Barium, and cyanide were present in one or more of the six samples at concentrations above the restricted commercial SCOs. ***Since the samples were composited, selected analytical results may have a low bias because of dilution inherent in the sample compositing process. Additional sampling is necessary to further delineate the magnitude and extent of the elevated cyanide and metals.***

See Table 1-1 and the map of identified environmental concerns, Figure 1-2.

1.2.3. Malcolm Pirnie, Inc., Supplemental Investigation Report. Hanna Furnace Site, Former Railroad Yard (Parcel 1), Revised January 2001

Based on the results of the 1999 characterization of the former railroad yard, additional investigation was performed. Soil/fill debris files were inventoried and sampled (SS-1 through SS-20) and analyzed for VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide. Seven of the 20 samples (SS-6 through SS-10, SS-16, and SS-17) were collected from the proposed project site. Three of these samples (SS-6, SS-9, and SS-17) contained PCBs, arsenic, cadmium, and/or copper at concentrations above the restricted commercial SCOs. Several PAHs and metals were also present at variable concentrations.

Additional characterization of the subsurface blue fill was also performed. Four soil borings (SB-37 through SB-40) were sampled of the blue fill and analyzed for VOCs, SVOCs, PCBs, pesticides, TAL metals, and cyanide. Two of the four borings (SB-37 and SB-40) were located on the proposed project site. Barium and/or cyanide were

detected in the blue fill at concentrations above the restricted commercial SCOs at these locations.

See Table 1-1 and the map of identified environmental concerns, Figure 1-2.

1.2.4. Malcolm Pirnie, Inc., Investigation of High pH Groundwater, June, 2001.

Based on elevated groundwater pH readings from wells MW-104 and MW-105, located at the western side of Parcel 1, Malcolm Pirnie conducted a focused pH investigation in this area which extended into Parcel 2. Groundwater from five soil borings and ten test pits was measured in the field for pH. Groundwater pH in the five borings ranged from 10.0 to 11.53 and in the test pits from 8.67 to 11.95. The extent of the elevated pH (greater than 10) was mapped and extends onto the proposed Project Site. See map of identified environmental concerns, Figure 1-2. Experience at the CertainTeed Site located immediately to the east of the project site has identified ***that the presence of groundwater with high pH will require special construction methods and handling procedures that will result in increased costs.*** Copies of the historical reports discussed above are provided in Appendix A.

Summary Environmental Characterization

The long history of heavy industrial use has impacted soil and groundwater at the former Hanna Furnace Site which is in the process of being redeveloped as the Buffalo Lakeside Commerce Park. To date, three parcels of the BLCP have been admitted into the BCP, surrounding the Project Site on three sides.

Investigations completed at the Site have provided documentation of chemical contamination and groundwater with elevated pH. Site soil/fill is known to contain PCBs, Arsenic, Barium, Cadmium, Copper, Chromium, lead, and cyanide at concentrations above applicable soil cleanup objectives. The elevated cyanide appears to be concentrated at the western side of the Project Site. Additional characterization is warranted to delineate the extent of the elevated cyanide and to characterize the site groundwater.

1.3. Site Development Plan

BUDC intends to construct a facility of 150,000 square feet or more for light manufacturing and/or distribution purposes. The requester intends to continue to market the Site to site selectors, developers and companies who are looking for a



“park-like” setting to build facilities in the area. A current prospect envisions a production facility that could employ nearly 1,000 workers at full capacity.

The proposed use of the Project Site is in accordance with the City of Buffalo Urban Renewal Plan for the Union Ship Canal Redevelopment Area, which has previously determined the land use classification. The Urban Renewal Plan is designed to encourage interaction among companies and development of non-noxious industry by blending environmental features and transportation linkages with modern industrial park amenities.

For the intended use of light manufacturing and/or distribution purposes, the Urban Renewal Plan requires a minimum site area of five acres. This land use will require large setbacks and buffers to screen buildings from roads to create a parkway experience that was intended for the Union Ship Canal area.

2. Purpose

A Remedial Investigation is planned to further characterize the Site and support planned development in accordance with the requirements of the BCP. Based on the historical use of the Site and documented characterization results; ARCADIS has developed a work scope to further investigate surface and subsurface conditions. This Work Plan details specific tasks that will facilitate Site characterization and compliance with the NYSDEC BCP requirements. Specifically, when used in concert with results of previous investigations, the findings of the remedial investigation will be used to:

- Describe the amount, concentration, persistence, mobility, form (e.g., solid, liquid), and other significant characteristics of the contamination present.
- Define hydrogeological factors (e.g., depth to saturated zone, hydrologic gradients (if practical), proximity to a drinking water aquifer, and wetlands proximity).
- Define the thickness and aerial extent of the Site fill material and characterize the chemical composition of the fill.
- If applicable, define the extent to which the contaminants of concern have potential to migrate, and whether potential future migration may pose a threat to human health or the environment.
- Determine the extent to which contaminant levels pose an unacceptable risk to public health and the environment.
- Provide sufficient information to allow for the identification of potentially feasible remedial alternatives.

Develop Remedial Action Objectives (RAOs) for the Site based on the contaminant characterization results, exposure pathways, and risk evaluation data. Based on our knowledge of potential Site issues, the RAOs for the Site may require implementation of remedial actions designed to remove or cover impacted soil/fill material.

3. Investigation Scope of Work

Environmental data collected from the Site confirms the presence of contamination (PCBs, metals, and cyanide) in subsurface soil/fill at concentrations above the soil cleanup objectives (SCOs) for restricted commercial use. Also, the pH of groundwater beneath the site is elevated at some locations. However, additional characterization is necessary to sufficiently characterize the Site. Available environmental data from the Site was collected as part of larger investigations of either the 35-acre former railroad yard of the Hanna Furnace Site or of the entire 131 acre Hanna Furnace Site. Thus the data collected from within the currently proposed 9.6 acre BCP Site is relatively sparse, of limited analyses, and in some cases, from composited samples.

The available body of data is not enough to sufficiently determine the nature, concentration, and extent of environmental contamination of the Site soil/fill and groundwater. The proposed Remedial Investigation scope of work is designed to complement the existing data to provide a complete environmental characterization of the Site and to support the evaluation of potential health risks and the identification of remedial goals and alternatives.

Of particular focus, is further delineation of elevated concentrations of cyanide in Site soil/fill. Current data suggests that there may be a localized area of cyanide impacted soil/fill at the western side of the site. Also, of particular focus will be characterization of on-site groundwater. No groundwater monitoring wells were installed on the site in previous investigations yet elevated groundwater pH was measured from on-site test pits.

To achieve the objectives of the BCP, the Remedial Investigation will include the following tasks:

- Collection and analysis of 10 surface soil/fill samples
- Drilling of 18 soil borings
- Collection of 18 subsurface soil samples
- Installation and sampling of 6 temporary groundwater monitoring wells.

Subsequent to NYSDEC approval of the RI Work Plan and Citizens Participation Plan (Appendix B) and requisite public comment period, ARCADIS will initiate the remedial investigation and prepare a report of findings. The major tasks and elements

associated with this Work Plan are described in detail within this section. Table 3-1 provides a summary of samples to be collected during the RI.

3.1. Soil/Fill Characterization

3.1.1. Surface Soil/Fill Sampling Program

Prior sampling at the Site did not include surface soil/fill samples. To characterize the surface soil/fill at the Site, samples of the uppermost 2 inches of soil/fill will be sampled at 10 locations across the site. Surface soil/fill samples will be collected at the same locations as proposed soil borings and analyzed for Target Compound List (TCL) Semi Volatile Organic Compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, target analyte list (TAL) metals, cyanide, and pH. Figure 3-1 illustrates the proposed surface soil sample locations.

3.1.2. Subsurface Soil/Fill Sampling Program

Subsurface soil/fill samples collected during previous investigations contained elevated concentrations of PCBs, metals, and cyanide at concentrations above the NYS Soil Cleanup Objectives (SCOs) for restricted commercial use. The elevated PCBs and metals appear to be located randomly across the site whereas the elevated cyanide appears to be located along the western side of the Site.

Additional sampling of the subsurface soil/fill material will be performed across the site to further characterize the nature, concentration, and extent of contamination in the soil/fill. Information obtained from previous investigations indicates that the thickness of the soil/fill at the Site averages nine feet and is as much as 12 feet.

3.1.2.1. *Drilling of Soil Borings*

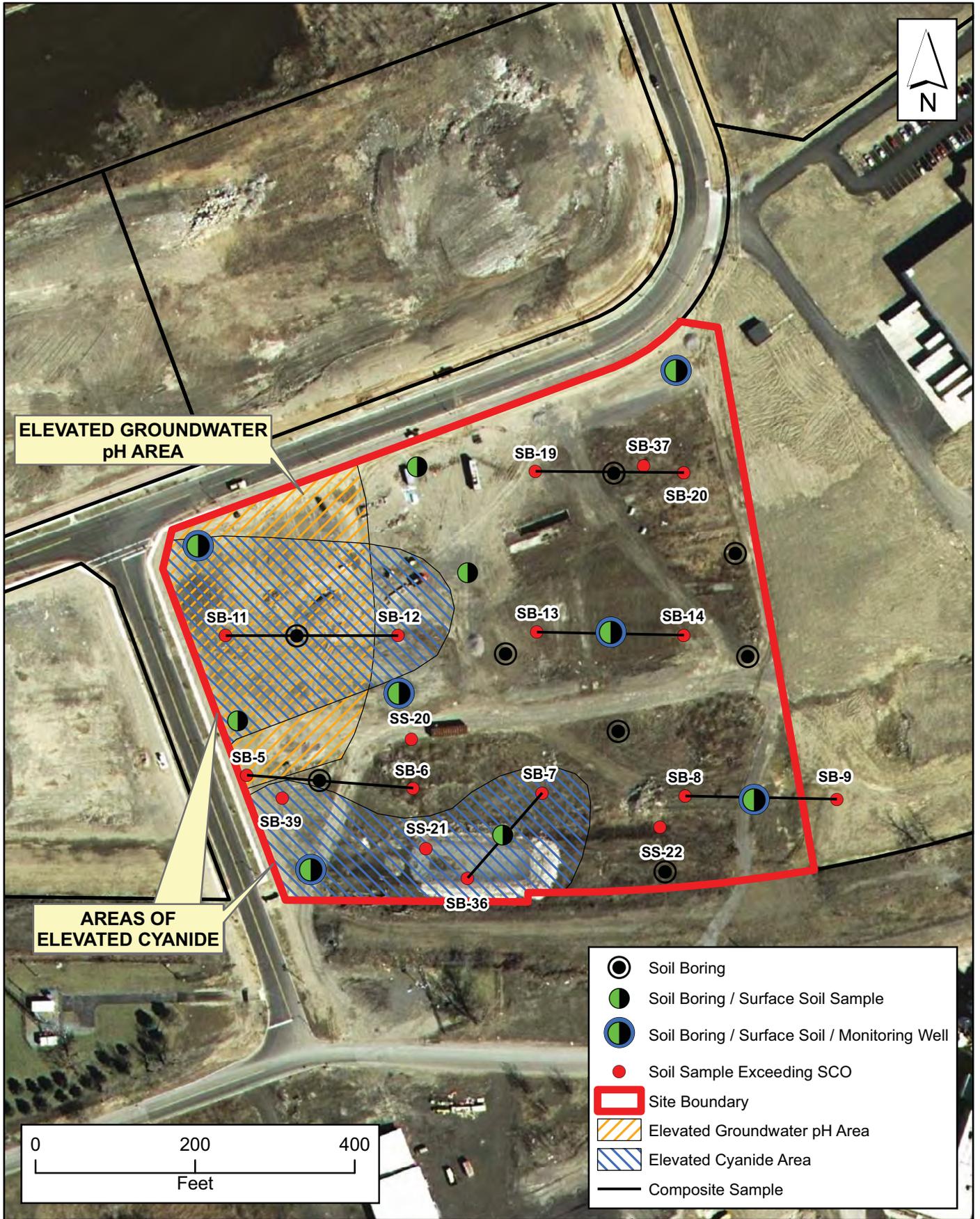
Subsurface soil/fill will be characterized by drilling 18 soil borings in a grid pattern across the Site. A drilling rig capable of advancing a borehole using rotary hollow stem auger and split spoon drilling methods will be used to advance 18 soil borings through the soil/fill and a minimum of one to two feet into the underlying native soil. Soil borings will be drilled to a depth sufficient to expose the underlying native soil layer. With an anticipated maximum fill thickness of 12 feet, the total depth of the borings is anticipated to be a maximum of 14 feet bgs. Upon retrieval of each two-foot split spoon sample of soil/fill, the soil/fill samples will be screened for total organic vapors using a photo-ionization detector (PID). The organic vapor measurements will be recorded and the soil/fill material described on boring logs by an ARCADIS geologist.

TABLE 3-1

**Analytical Program Summary
Remedial Investigation
193 Ship Canal Parkway Site
Buffalo, New York**

Sample Media	Number of Samples				Analyses
	Field Samples	Duplicates	MS/MSD Samples	Trip Blanks	
Surface Soil/Fill (10 at boring locations)	10	1	1/1	1	TCL SVOCs TCL PCBs, TCL Pesticides TAL Metals Cyanide and pH
Subsurface Soil/fill (18 from soil boring)	18	1	1/1	5	9 TCL VOCs 9 TCL Pesticides 18 TCL SVOCs 18 TCL PCBs, 18 TAL Metals 18 cyanide 18 pH
Groundwater (6 temporary monitoring wells)	6	1	1/1	1	TCL VOCs TCL SVOCs TCL Pesticides, TCL PCBs TAL total Metals Cyanide and pH

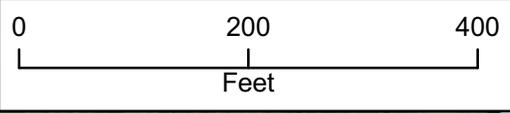
Notes: MS = matrix spike
MSD = matrix spike duplicate
SVOCs = semivolatile organic compounds
TAL = target analyte list
TCL = target compound list
VOCs = volatile organic compounds



ELEVATED GROUNDWATER pH AREA

AREAS OF ELEVATED CYANIDE

- Soil Boring
- Soil Boring / Surface Soil Sample
- Soil Boring / Surface Soil / Monitoring Well
- Soil Sample Exceeding SCO
- ▭ Site Boundary
- ▨ Elevated Groundwater pH Area
- ▨ Elevated Cyanide Area
- Composite Sample



Upon reaching total depth at each soil boring, if groundwater is present, pH of the groundwater will be measured by the ARCADIS geologist.

3.1.2.2. Subsurface Soil/Fill Sample Collection

Soil/fill samples will be collected the discrete depth interval that displays the greatest evidence of contamination, if present from the borings shown on Figure 3-1. Determination of potential contamination will be based on field screening criteria including sample physical composition, odor, and PID readings. Eighteen subsurface soil/fill samples are anticipated. All 18 subsurface soil/fill samples will be analyzed for TCL SVOCs, PCBs, TAL metals, cyanide, and pH. Based on existing data, VOCs, and pesticides are not anticipated to be contaminants of concern at this Site therefore only 9 of the 18 proposed samples will also be analyzed for VOCs and pesticides.

Six of the 18 boreholes will be converted to temporary groundwater monitoring wells for groundwater characterization. A summary of proposed samples and analyses is provided in Table 3-1.

All non-dedicated, downhole sampling equipment will be decontaminated between soil boring locations in accordance with accepted drilling practices using a high-pressure hot water "steam" cleaner or scrubbed usingalconox and a hot water wash followed by clean potable water rinse. After soil characterization and sampling, borings that are not converted to monitoring wells will be grouted from total depth to grade level with a grout mixture of 95% cement and 5% bentonite.

3.2. Groundwater Monitoring Well Installation, Development, and Sampling

3.2.1. Site Hydrogeologic Conditions

Based on information obtained during previous site investigations, groundwater is anticipated to be encountered at a depth between 2 and 8 feet below grade across the site. Groundwater within the soil/fill interval will be characterized by installing temporary groundwater monitoring wells within the soil borings.

3.2.2. Monitoring Well Installation

Monitoring wells will be constructed of 2-inch ID, flush joint, Schedule 40 PVC, with 0.010-inch slotted screen a maximum of 10 feet in length. A silica sand filter pack will be placed to approximately two feet above the top of the screened interval. A two-foot thick layer of bentonite chips will be placed above the sand pack as a seal to prevent

the downward infiltration of surface water. Approximately six inches of fine sand will be placed on top of the bentonite seal and the remainder of the boring annulus was filled with sand to grade. The temporary monitoring wells will be completed at the surface with a locking cap to the 2" ID PVC riser pipe.

3.2.3. Well Development

The newly installed monitoring wells will be developed no sooner than 24 hours after construction has been completed. The development procedure will require purging of the groundwater and periodically surging the water in the well to loosen and remove suspended fines from the well screen and sandpack. Measurements of the water volume removed and water quality parameters including temperature, pH, conductivity, and turbidity will be recorded at regular intervals throughout the development process. Development will continue until water quality measurements stabilize to within 10% of the previous measurement. Development water will be discharged to the ground surface at the respective well locations.

3.2.3.1. Groundwater Sample Collection

Groundwater will be collected from each temporary well using low flow sampling techniques by dedicated plastic flex tubing and a peristaltic pump. If low-flow sampling is not feasible due to insufficient groundwater recharge rate, new and dedicated disposable bailers may be used to collect the groundwater samples. If sufficient groundwater volume is available, each well will be sampled for TCL VOCs, SVOCs, Pesticides, PCBs, TAL metals, cyanide, and pH.

Groundwater field parameters will be monitored during well purging prior to sampling including pH, specific conductivity, temperature, turbidity, and dissolved oxygen.

All groundwater samples will be collected in pre-cleaned and pre-preserved laboratory sample bottles in accordance with protocols for analyses shown on Table 3-1.

Appropriate QA/QC samples will be collected for the groundwater sampling event including one trip blank, one MS, one MSD, and one field duplicate sample.

Subsequent to sample collection all groundwater samples will be placed on ice and shipped under chain of custody to the selected analytical laboratory.

3.3. Site Survey

A topographic base map of the Site will be prepared at a scale of one-inch equals 50 feet, with a one-foot contour interval. The map will be used to locate the site boundary, pertinent Site features, monitoring wells, and sample locations.

The base map will be prepared by a New York State licensed surveyor as a subcontractor to ARCADIS. All mapping will conform to specifications for size, distribution and content as established by the USGS National Mapping division. Digital mapping will be supplied on an AutoCADD drawing. The surveyor will establish the horizontal location and vertical elevations using the New York State Plane Coordinate System and most recent vertical datum. Elevations of the ground surface and top of PVC riser will be measured and recorded for each monitoring well.

As required under the BCP agreement, an ALTA survey will be completed after the RI as part of the overall Site development.

4. Qualitative Human Health Risk Assessment

A qualitative human health risk assessment will be conducted to determine if the presence and concentrations of chemicals in the environmental media at the Site pose potential human health concerns. The assessment will encompass both on-Site and off-Site risks with the results of the exposure analysis used as one of the criteria to determine the most appropriate future actions at the Site. These may range from no further action, to additional data collection, to quantitative health risk assessment and the establishment of risk-based action levels. The assessment will begin with the construction of a conceptual Site model, a graphic illustration that outlines chemical source areas, possible chemical release mechanisms, environmental media that currently show or may show in the future the presence of chemicals, possible exposure pathways, possible points of exposure for human receptors, possible exposure routes, and possible human receptors. The conceptual model will be based on current Site conditions and surrounding land use as well as the planned future Site and surrounding land uses. For environmental media that may be of concern, qualitative evaluations will be made for the four components that typically comprise a health risk assessment: data evaluation; exposure assessment; toxicity assessment; and risk characterization/uncertainty analysis. In the data evaluation, chemical concentrations in the various media will be compared to appropriate NYSDEC risk-based standards and criteria (e.g., NYSDEC Soil Cleanup Objective and Cleanup Levels, Water Quality Standards, etc.). Chemicals detected in concentrations greater than these standards and criteria will be identified as chemicals of potential concern. In the exposure assessment, an evaluation will be made of the likelihood and magnitude of exposure to the chemicals of potential concern in environmental media of concern. This will involve outlining possible exposure routes and plausible exposure times, frequencies, and durations. In the toxicity assessment, the toxicity of the chemicals of concern will be outlined. This will include identifying known or suspected carcinogens and/or the target organ/system of concern for noncarcinogenic effects. In the risk characterization, information from the three components will be integrated, to estimate the likelihood and magnitude of possible health risks.

Fact sheets documenting the goals and progress of the project will be prepared at key milestones of the project and distributed to those on the project mailing list. The distribution list is included in the Citizens Participation Plan which is provided in Appendix B.

5. Quality Assurance /Quality Control (QA/QC)

5.1. Analytical Methods

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

5.2. Laboratory

The subcontracted laboratory will be certified by the New York State Department of Health to perform Contract Laboratory Program (CLP) analysis on all media to be sampled during this investigation. The laboratory will perform the sample analysis in accordance with the most recent NYSDEC Analytical Services Protocol (ASP).

5.3. Data Submittal

Analytical data will be submitted in complete ASP category B data packs. Procedures for chain of custody, laboratory instrumentation calibration, laboratory analyses, reporting of data, internal quality control, and corrective actions shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan. Where appropriate, trip blanks, field blanks, field duplicates, and matrix spike, matrix spike duplicate shall be performed at a rate of 5% and will be used to assess the quality of the data. The laboratory's in-house QA/QC limits will be utilized whenever they are more stringent than those suggested by the EPA methods.

5.4. Data Usability Summary Report

The data package will be sent to a qualified, independent, data validation specialist for evaluation of the accuracy and precision of the analytical results. A Data Usability Summary Report (DUSR) will be prepared to describe the compliance of the analyses with the analytical method protocols detailed in the NYSDEC Analytical Services Protocol (ASP). The DUSR will provide a determination of whether the data meets the project-specific criteria for data quality and data use. The validation effort will be completed in accordance with NYSDEC Division of Environmental Remediation DUSR guidelines.

6. Health and Safety

Field tasks will be performed using industry standard health and safety procedures. A site-specific Health and Safety Plan (HASP) will be prepared prior to mobilization and utilized by the field team during all field activities. This plan will detail known and potential hazards of the Site and field tasks as well as air monitoring and emergency procedures.

6.1. Community Air Monitoring

All of the planned RI work will be completed outdoors and on Site. Where intrusive drilling operations are planned, community air monitoring will be performed to protect the downwind community. An ARCADIS representative will continually monitor the breathing air in the vicinity of the immediate work area using PID instrumentation capable of measuring total volatile organic compounds in air at concentrations as low as 1 part per million (PPM). The air in the work zone also will be visually monitored for dust generation. If sustained VOC measurements above 5 PPM, or visible dust generation is observed, the intrusive work will be temporarily halted and a more rigorous monitoring of VOCs and dust using recordable meters will be implemented in accordance with the NYSDOH Generic Community Air Monitoring Plan (CAMP). A copy of the CAMP will be provided with the HASP.

7. Project Organization

ARCADIS has established a project team for the BCP Site whose collective qualifications and experience are strongly suited for successful completion of the project. The proposed responsibilities of the key staff are summarized below:

Kent McManus, PE, will be the Project Manager for the work. In this capacity Mr. McManus will be responsible for the successful completion of each task including coordination and supervision of engineers and scientists, and adherence to the work plan, schedule and budget.

Ben Girard, will be the Quality Leader, responsible for the development of the work plan, coordination of subcontractors, direction of the field program including maintaining quality assurance policies that pertain to all aspects of sampling, well drilling and development.

Brad Walker or Nicholas Klaus Beyrle, will be the field geologist responsible for implementing the field effort. Responsibilities will include sample collection, well development and directing ARCADIS' drilling subcontractors, and ensuring the successful completion of all field activities.

8. Reporting

Following receipt of the validated analytical results, ARCADIS will prepare a Remedial Investigation Report and a Remedial Action Work Plan (RAWP) with an attached Soil/Fill Management Plan (S/FMP). Preparation of the report will entail a summary of fieldwork performed to date; data collected, and will include appropriate summary data tables, soil boring and well construction logs, analytical results, photos, and maps. The report will also include ARCADIS' recommendations for further characterization of the Site, if necessary. If no additional characterization is required, as anticipated, the RI report will include a Qualitative Human Health Risk Assessment. If additional investigation is required, the Qualitative Human Health Risk Assessment will be completed following the receipt of validated results of the additional characterization.

The Remedial Action Work Plan will include an evaluation of remedial alternatives. Data obtained during previous investigations will be utilized along with the planned end use to identify, select, and evaluate remedial action alternatives for the Site. Potential Site constituents and migration pathways will be categorized as follows:

- Indoor Air and airborne dust.
- Soil/Fill.
- Groundwater.

Once the degree of contamination associated with these media and other Site characteristics are quantified, General Response Alternatives for Site remediation will be defined. The General Response Alternatives that are considered will include the "no action" measure as a baseline against which other remedial measures, if necessary, can be compared.

The RAWP will also include a Soil/Fill Management Plan, which will describe a plan for characterization and handling of excavated soil/fill based on NYSDEC Soil Cleanup Objectives as specified in 6 NYCRR Subpart 375-6.

9. Project Schedule

A schedule showing the planned remedial investigation activities and assessment of remedial alternatives is included in Figure 9-1.

FIGURE 9-1

**SCHEDULE OF PLANNED REMEDIAL INVESTIGATION
BUDC BCP SITE (193 Ship Canal Pkwy)
BUFFALO, NEW YORK**

Week Beginning Date (Monday)	2011															2013																										
	April				Sept				Oct				Nov			Dec				Jan				Feb				March				April										
	4	11	18	25	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22	29			
Remedial Investigation (RI) Tasks																																										
NYSDEC Approval of BCP Application	◆																																									
Prepare Remedial Investigation Work Plan (RIWP) / Submit to DEC for review					■				◆																																	
NYSDEC review of RIWP									■				◆																													
Revise RIWP / NYSDEC Approval													◆																													
Mobilization for Field Investigation													■																													
RI Field Work													■			■																										
Chemical Analysis of RI Samples													■			■				■																						
Third Party Data Validation													■			■				■																						
Qualitative Human Health Risk Assessment													■			■				■																						
Prepare RI Report / Remedial Action Work Plan (RAWP)													■			■				■				■																		
Submit RI / RAWP reports to NYSDEC for review and public comment													■			■				■				◆																		
Forty-five day comment period on RI report and Remedial Action Work Plan													■			■				■				■																		
NYSDEC Review and Approval of RI Report and RAWP													■			■				■				◆																		

- NYSDEC review
- ARCADIS
- Field work/Remedial contractors
- ◆ Deliverable submittal date

10. References

Malcolm Pirnie, Inc., October 1999, Hanna Furnace Site - Characterization of the Former Railroad Yard (Parcel 1),

Malcolm Pirnie, Inc., January 2001, Supplemental Investigation Report. Hanna Furnace Site, Former Railroad Yard (Parcel 1),

Malcolm Pirnie, Inc., June, 2001, Investigation of High pH Groundwater,

RECRA Environmental, Inc., August 1988, Site Characterization and Environmental Assessment, Hanna Furnace, Buffalo, New York.