MALCOLM PIRNIE

REMEDIAL INVESTIGATION REPORT

Former Ames/Hills Plaza Site

VOLUME I

Prepared For:

THE KROG CORPORATION

AUGUST 2005

Submitted by:
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Introduction

SECTION 1

1.1 Purpose and Scope

On behalf of The Krog Corporation (Krog), Malcolm Pirnie, Inc. (Malcolm Pirnie) has prepared this Remedial Investigation (RI) Report in support of Krog's plans to redevelop the former Ames / Hills Plaza Site (Site), located at 15 South Main Street in Jamestown, Chautauqua County, New York. Krog plans to redevelop the Site for use as a professional office park complex, and has volunteered to participate in the New York State Brownfield Cleanup Program (BCP), which provides tax incentives to remediate brownfield sites for redevelopment and reuse. The RI was performed in accordance with the requirements of the BCP and with approval and oversight by the New York State Department of Environmental Conservation (NYSDEC).

The purpose of the remedial investigation is to more thoroughly evaluate environmental conditions at the site, including:

- The presence and magnitude of contaminants at the site, if present.
- The extent and composition, both physical and chemical, of fill material present.
- Hydrogeologic characteristics (e.g., depth to saturated zone, hydraulic gradients, proximity to drinking water aquifers, flood plains and wetlands).
- The potential for migration of contaminants from the site, and whether possible future migration may pose a threat to human health or the environment.
- The preliminary identification of potentially feasible remedial alternatives, if warranted.

This report summarizes the findings of field activities conducted at the site in September 2004, December 2004, and January 2005. Field activities were conducted in accordance with the NYSDEC-approved Remedial Investigation Work Plan, submitted by Malcolm Pirnie in January 2005. Also included in this report are the results of investigation work done at the site by Lender Consulting Services, Inc.

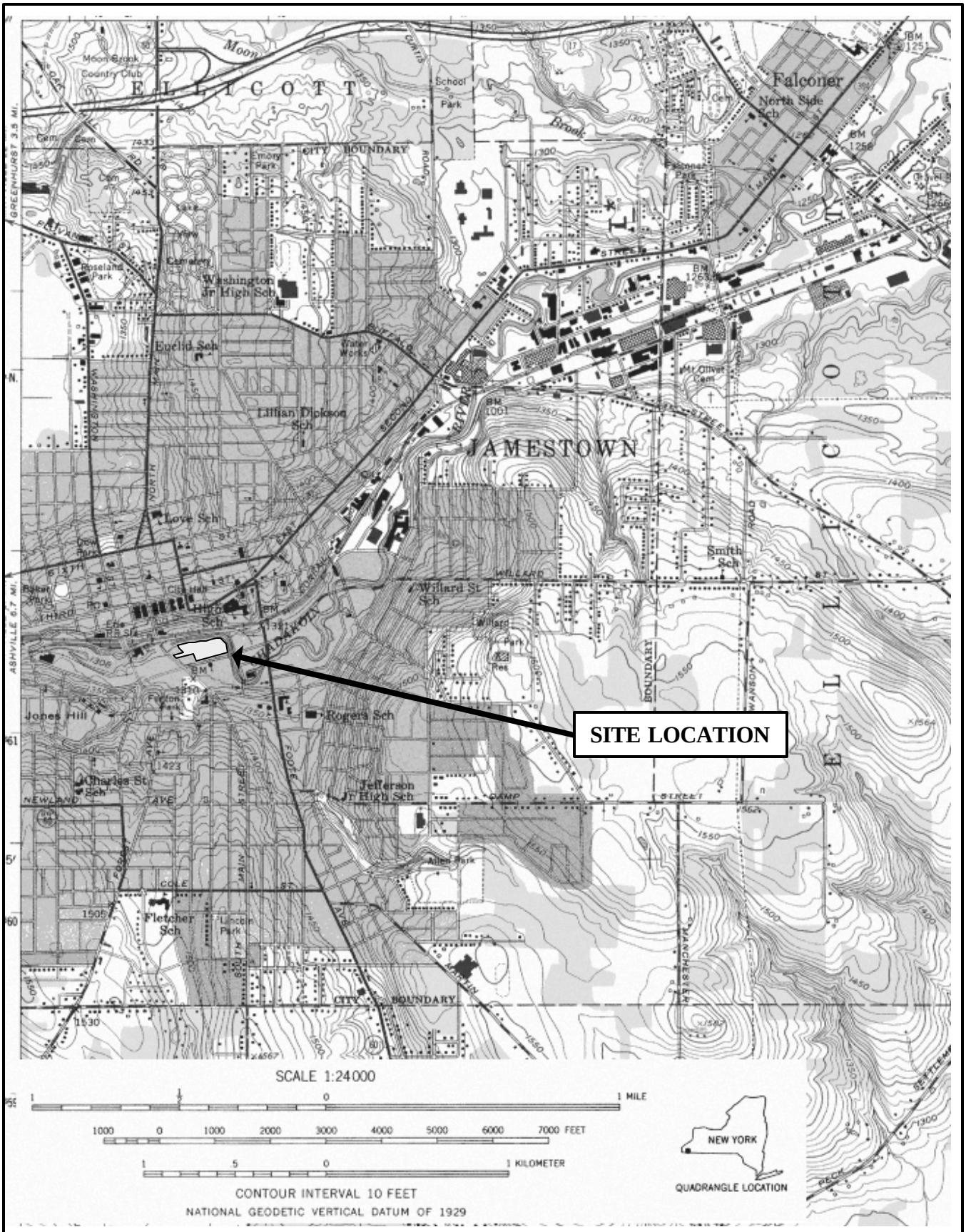
1.2 Site Description and Location

The Site is a former Ames then Hills Department store plaza situated on approximately seven acres of land centrally located in the City of Jamestown, Chautauqua County, New York. The site is bounded to the north and east by the Chadakoin River and on the south and western sides by developed properties that include restaurants, light retail businesses and their associated parking lots. Figure 1-1 shows the general location of the Site.

Currently, the site is occupied by the 77,000 square feet single-story brick and steel framed former Ames and Hills department store building. The building is situated at the eastern end of the site. The majority of the site is an asphalt-paved parking lot that extends from the west of the building to the western site boundary. The east side of the building consists of an asphalt-paved truck entrance and loading docks. Two small open grassy areas are located immediately north and south of the building. A public access river walk is located immediately to the north of the parking lot and follows the edge of the Chadkoin River, terminating at the western edge of the open grassy area to the north of the building. The riverbank along the east side of the site is wooded. A restaurant is located adjacent to the northwest corner of the site, and at the time of this investigation, a CVS Pharmacy was under construction adjacent to the southwest corner of the site. Neither of these two parcels are included as part of this investigation. Figure 1-2 is a site map showing the locations of these features.

1.3 Site Background and History

The Hills and later the Ames department store occupied the easternmost portion of the property. Historic development of this tract included: furniture manufacturing and storage facilities (i.e., Jamestown Chair Company, Watson Manufacturing Co., A.P. Olsen & Co. Modern Cabinet Co., and Diamond Furniture Co.) mills including the Brooklyn Mills, and Pearl City Mills, and a tire service center and gasoline station.



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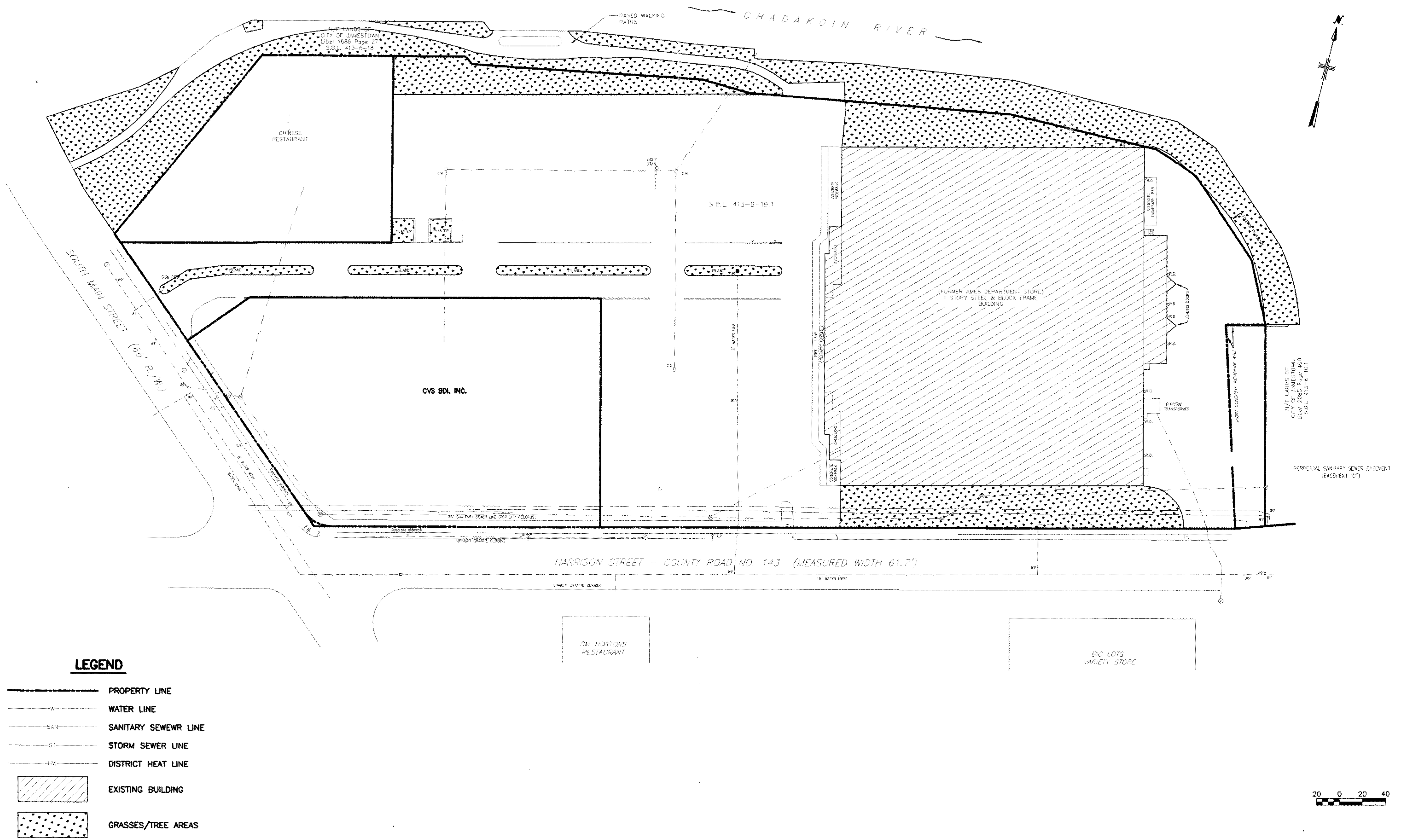
MARCH 2005 3198-004

FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK
REMEDIAL INVESTIGATION

FIGURE 1-1
SITE LOCATION



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15 SOUTH MAIN STREET
JAMESTOWN, NY

FORMER AMES/HILLS PLAZA

FIGURE 1-2
SITE MAP

DATE MARCH 2005

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Historic use of the westernmost potion of the site included businesses associated with metal working, i.e., Jamestown Iron Works, the Manor Iron Works, Cast Iron Welding and Brazing Co. with associated foundries and machine shops. A furniture factory, shock absorber company, gasoline filling station, and a tire and battery service center were also located on the property.

As an element of the City of Jamestown's urban renewal efforts during the 1970s, surficial fill material was reportedly placed on the property. The origin and composition of this fill material is unknown.

1.4 Report Organization

Section 2 provides details concerning the physical characteristics of the site area, including topography, demography, and the geologic setting. Section 3 summarizes the findings of previous investigations conducted at the site, and Section 4 provides a description of the field activities conducted during the remedial investigation including field methods and results. Section 5 provides the results of the hydrogeologic evaluation of the site, and Section 6 provides the findings of the data usability and summary reports. Section 7 discusses the nature and extent of contaminants in the surface soil, subsurface soil/fill, and groundwater at the site. The human health risk assessment and ecological risk assessment are provided in Sections 8 and 9, respectively. The conclusions of this investigation, as well as any recommendations, are provided in Section 10. Full references for works and literature cited in this report are provided in Section 11.

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Physical Setting

SECTION 2

2.1 Land Use and Demography

The site is formerly a retail department store plaza and is situated in a mixed commercial and industrial portion of the City of Jamestown, NY. Only one large, one-story building is present on the property, and it is currently vacant. The remainder of the site consists primarily of asphalt-paved parking lots and access roadways. Access to the Site is unrestricted and vehicular and foot traffic was observed during the investigations.

Properties north and east of the site are primarily for commercial and industrial use. Immediately south and west of the site are retail businesses. A public access river walk park is located along the site's northern property boundary, beginning at South Main Street and ending at the northeast corner of the parking lot.

2.2 Topography and Drainage

The former Ames/Hills Plaza site is located in the Southern New York section of the Appalachian Plateau physiographic province. Major topographic features of the province are the result of several glaciations that created scoured uplands, glacial troughs, and deposits of deep valley fill.

The surface topography within the City of Jamestown is characterized by two topographic highs in the northern and southern portions of the city limits, with the Chadakoin River valley creating the low between the two highs. Peak elevations range from 1490 to 1550 feet above mean sea level (AMSL), while low elevations range from 1310 feet at the mouth of the Chadakoin River to as low as 1260 feet downstream at the eastern city limit.

The site is situated in the flood plain valley of the Chadakoin River; as such, the site and immediate surroundings are fairly flat. The elevation on the site varies between approximately 1300 and 1305 feet. The topographic gradient of the site slopes to the north and east toward the Chadakoin River.

A manmade storm drain system is present in the parking area west of the building. Three catch basins are present in this area and are shown on the survey performed by Abate Associates Engineers & Surveyors, P.C. This drainage system discharges to the north into the Chadkoin River.

2.3 Climate

The climate of Jamestown is characterized as temperate, continental and is influenced by air masses and weather systems that originate over land areas of the North American continent. Cold, dry weather prevails when the airflow descends from the northwest. Conversely, warmer and more humid weather prevails when airflow comes from the south and southwesterly directions. The site climate can be generally defined as follows:

- Average Annual Precipitation = 45.3 inches
- Average Summer High Temperature = 80.2° F
- Average Winter Low Temperature = 14.7° F

2.4 Soils

The Soil Survey of Chautauqua County identifies the soils as Urban Land which is defined as areas having 80 percent or more of the surface covered by asphalt, concrete, or buildings. Soil borings drilled at the site encountered a soil profile generally consisting of miscellaneous sand, silt, and gravel fill underlain by native soils consisting of silty sands, sandy gravels, and silty clays. This material is consistent with deposits identified in this area by the Surficial Geologic Map of New York (Cadwell Et al., 1986). The map identifies the material as stratified outwash sands to gravels.

2.5 Regional Geology and Hydrogeology

2.5.1 Regional Overburden Geology

The Surficial Geologic map of New York identifies surficial geology at the site as stratified outwash sands and gravels (Cadwell Et al., 1986). Poorly-sorted till is mapped at the higher elevations north and south of the site.

2.5.2 Regional Bedrock Geology

According to the Geologic Map of New York, the site is underlain by shale and siltstones of the Ellicott and Dexterville Formations of the Conneault Group. Bedrock was not encountered in any soil boring drilled during the remedial investigation or the previous subsurface investigations. Bedrock within the Chautauqua Lake Trough and the Chadakoin River valley area reportedly ranges from 230 feet to as deep as 400 feet below ground surface (Muller, 1963). The maximum depth drilled during this Remedial Investigation was 17 feet.

2.5.3 Regional Hydrogeology

Based on the regional topography, the regional groundwater flow in the vicinity of the Site is expected to flow from the higher elevations north and south of the Site into the Chadakoin River valley, and then eventually eastward through the river valley.

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Summary of Previous Investigations and Remedial Actions

SECTION 3

3.1 General

The following is a summary of previous environmental investigations performed at the former Ames/Hills Plaza Site. Information for this summary was obtained from copies of reports, or portions of reports, made available by the Krog Corporation. This summary is intended to provide a general overview of the previous investigations and Site conditions. Note that all sample analyses performed prior to the July 2004 LCS Inc. investigation were not performed according to NYSDEC BCP requirements and therefore cannot be validated.

3.2 Previous Investigations

December 2000 – In December 2000, the NYSDOT excavated and removed four underground storage tanks (USTs) encountered west of and adjacent to the site on South Main Street. As a result of this action, the New York State Department of Environmental Conservation (NYSDEC) listed this occurrence as Spill No. 0075070. Representatives of Center Associates Realty Corporation provided oversight services for the advancement of three confirmatory borings to collect soil samples at locations presumed to be downgradient of the former tanks. The samples were submitted for volatile organic compound (VOC) and semi-volatile organic compound (SVOC) analysis by Methods 8021 and 8270, respectively. Analytical results for the soil samples did not detect VOC/SVOC concentrations above the NYSDEC Spill Technology and Remediation Series (STARS) or Technical and Administrative Guidance Memorandum (TAGM) 4046 guidance values. The NYSDEC subsequently issued a determination of inactive status for this incident during January 2001.

September and October 2003 – On behalf of the Krog Corporation, Lender Consulting Services, Inc. (LCS) completed a Phase 1 Environmental Site Assessment at the Former Ames/Hills Plaza Site. The October 21, 2003 Phase I Site Assessment Report generally did not identify evidence of recognized environmental concerns except for the presence of two drums, found in the on-site building, one of which was a 55-gallon drum containing waste oil and was placed in a drum overpack container. The second drum was a 35-gallon drum of spent to partially spent aerosol cans. A compressed gas cylinder and two small propane tanks were also observed on-site. Based on a review of historic Sanborn® fire insurance maps and documented on-site work practices, a limited subsurface investigation was recommended to better characterize existing environmental conditions.

December 2003 – LCS, Inc. of Buffalo, New York conducted (for Center Associates Realty Corporation on behalf of Krog) a limited Phase 2 Environmental Site Assessment. The purpose of the investigation was to characterize site soils and to determine the potential contaminant impacts if any, related to historic on-site work practices.

The November 2003 drilling program included advancement of 37 soil boreholes designated BH-1 through BH-37 to depths of 12 to 16 feet below ground surface (bgs). Soil samples were collected based on photo ionization detector (PID) screening results and submitted for target compound list (TCL) VOC and SVOC analyses by Methods 8260 and 8270. Results of the investigation identified low concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds and selected VOCs at eight borehole locations. Concentrations of VOCs detected did not exceed STARS or TAGM guidance values for soils. However, analytical results for soil samples submitted from four borehole locations (BH-5, BH-7, BH-11 and BH-22) identified selected SVOCs and carcinogenic polycyclic aromatic hydrocarbons (PAHs) that exceeded STARS and TAGM guidance criteria. Conclusions of the report suggest that the source of the VOC and SVOC contaminants may be related to the historic release of a petroleum-based product.

Coincident with the submittal of soil samples for VOC and SVOC analysis, six soil samples were submitted for Resource Conservation and Recovery Act (RCRA)-listed metals testing. The analytical results for the samples collected at borings BH-5, BH-7, BH-11, BH-22 and BH-33 identified concentrations of arsenic, mercury and silver that

exceeded Eastern USA Background Concentration ranges or NYSDEC TAGM 4046 guidance values for soils. Based on these concentrations, it is calculated that lead and mercury could exceed Toxicity Characteristic Leaching Procedure (TCLP) Regulatory Levels at one or more locations.

Based on their review of the Limited Subsurface Investigation Report, the NYSDEC assigned Spill Number 0375393 to the Plaza site and issued a determination that additional investigation was necessary to characterize the site media and potential groundwater impacts.

March 12, 2004 – During February 2004 representatives of LCS, Inc. initiated a subsurface drilling investigation on behalf of the Krog Corporation. The purpose of the investigation was to address a request by the NYSDEC to further investigate potential impacts to groundwater media at the Ames/Hills site. A total of four boreholes, designated BH-38 through BH-41, were advanced at locations selected and approved by the NYSDEC, and temporary well points (TPMW-1 through TPMW-4) were installed to facilitate groundwater sample collection.

The stratigraphy of the shallow overburden was characterized during borehole advancement and a PID was used to screen the soil samples as they were recovered. Although elevated PID measurements were recorded for all but one sample interval, only one borehole (BH-38) exhibited petroleum-based odors. Subsequent to borehole advancement, four temporary monitoring wells designated TPMW-1 through TPMW-4 were installed in the borings BH-38 through BH-41, respectively. Groundwater samples were collected and submitted for the chemical analysis of STARS-listed VOCs and SVOCs by USEPA Methods 8260 and 8270. Results of the groundwater analytical testing generally indicated no significant impacts to the site's shallow groundwater. However, elevated concentrations of four benzene analytes (VOCs) and two PAHs (SVOCs) were detected above NYSDEC Class GA Groundwater Standards in the groundwater sample collected at the TPMW-1 monitoring well installed within borehole BH-38.

July 2004 – LCS Inc. performed a supplemental environmental investigation on behalf of the Krog Corporation in July 2004 to support a due diligence effort for property acquisition. A total of 18 soil borings and eight test pits were advanced within the site boundaries to better characterize the physical and chemical nature of the overburden fill

material. The boreholes which were designated BH-42 through BH-59 were advanced within confines of the Former Ames / Hills building and at selected locations within the parking lot (see Figure 3-1).

Soil samples were collected at each borehole and test pit location based on PID screening results coupled with visual and olfactory observations. Samples were submitted for TCL VOC/SVOC analytes and target analyte list (TAL) Metals. One soil sample submitted from test pit location TP-2 was analyzed for the New York State Department of Health (NYSDOH) fingerprint analysis by Method 310.13. In addition to soils testing, groundwater samples were collected from four temporary monitoring wells (TPMW-1 through TPMW-4) and submitted for TAL metals analysis plus cyanide.

Analytical results of the soils testing identified elevated levels of PAHs and metals above NYS guidance criteria. Specifically, elevated PAHs were detected at the boreholes designated BH-45 (4-6'), BH-46 (4-6'), BH-51 (6-8'), BH-53 (4-6'), BH-57 (12-14') and BH-59 (8-10'). Soil samples submitted from boreholes designated BH-42, BH-44, BH-46, BH-57 and BH-59 detected elevated concentrations of arsenic, copper, magnesium and mercury that exceeded TAGM 4046 soils guidance criteria. In addition to the SVOCs and metals identified above, significant concentrations of VOC and SVOC tentatively identified compounds (TICS) were detected at the BH-46, BH-47 and BH-51 borehole locations.

The results of groundwater testing identified elevated concentrations of barium, arsenic, and lead above NYSDEC Class GA groundwater standards at the TPMW-1, TPMW-2 and TPMW-4 well locations. Groundwater exceedences for iron, magnesium, manganese, and sodium were identified in each monitoring well TPMW-1 through TPMW-4.

3.3 Previous Remedial Actions

Excavation and removal of four underground storage tanks (USTs) encountered by NYSDOT adjacent to the Site on South Main Street. Confirmatory samples indicated no VOCs or SVOCs above TAGM values or STARS values. The NYSDEC subsequently issued a determination of inactive status for this site during January 2001.

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Remedial Investigation Methods and Results

SECTION 4

4.1 General

The field activities discussed within this RI report consisted of several tasks performed between September 2004 and January 2005. All tasks were conducted in accordance with the NYSDEC Brownfields Cleanup Program (BCP) requirements, and the NYSDEC-approved Remedial Investigation Work Plan (Malcolm Pirnie, December 2004).

The remedial investigation included the following field tasks:

- Indoor air and sub-slab soil vapor sampling.
- Geophysical survey along the southern property line.
- Advancement of five soil borings spatially distributed across the Site.
- Collection and analysis of five surface soil samples from the north and east sides of the Site as well as one centrally located in a landscape planter within the parking lot.
- Collection and analysis of seven subsurface soil/fill samples.
- Installation, development, and sampling of five shallow groundwater monitoring wells along the north, east, and southern site boundary's.
- Water level measurement in all newly-installed monitoring wells and the nearby river.

- Site surveys to locate the remedial investigation phase test borings, surface soil samples, and monitoring wells.

Detailed discussions of the purpose, methodologies, and results of each of the investigative activities performed are presented in the following subsections. Analytical results are presented and discussed in Section 7.0.

4.2 Site Survey and Base Map Preparation

Abate Associates Engineers & Architects of Jamestown, New York, prepared a survey of the Site. Ground control was established on site that includes USGS vertical control and NYS Plane Coordinates for horizontal control. The base map developed for the site, Figure 1-2, has a horizontal scale of 1-inch equal to 80 feet and covers an area of approximately 7 acres.

4.3 Geophysical Survey

4.3.1 Purpose

A geophysical survey was performed along the southernmost site boundary to investigate two potential underground storage tank (UST) areas. The non-intrusive survey was performed to search for evidence of USTs in areas of interest identified during the historical data review.

4.3.2 Methodology

The geophysical survey was performed by Construction Lending Services, Inc. (CLS) of Buffalo, New York using a Geonics EM-61 magnetometer. The survey was performed along a grid system of five feet spacing in the area between the building and the sidewalk along Harrison Street. The surveyed area was approximately 475 feet in the east–west direction and 45 feet in the north-south direction. The instrument performs readings of the ambient magnetic field intensity every 0.63 feet to detect ferrous or non-ferrous objects beneath the surface to a depth of approximately 15 feet. The data is retrieved from the unit and processed using a computer gridding program.

4.3.3 Results

The results of the survey indicate eight anomalies along the southern property boundary. A utility easement constitutes one of the anomalies that run the entire length of the survey area. Also, six of the anomalies were located within the utility easement, and may be attributed to the multiple utilities present beneath the surface. Only one anomaly was detected outside of the utility easement along the south side of the building, approximately 110 feet from the southwest building corner, and 21 feet from the sidewalk. Subsurface investigations were performed at this anomaly as part of the test trench and soil boring tasks. No source of contamination was uncovered at this location. The source of the remaining anomalies is likely the many buried utilities within the utility easement. These anomalies were not tested by excavation because of the physical hazards posed by the utilities. Results of the subsurface investigations are discussed later in this section. The geophysical survey report prepared by CLS is included as Appendix A.

4.4 Test Trench Excavation

4.4.1 Purpose

Test trenches were excavated at locations downgradient of known contaminant areas along the northernmost boundary of the site, and at locations of suspected USTs. The test trenches were excavated to visually characterize the uppermost surficial fill unit, investigate the presence or absence of USTs, and collect soil and waste samples for analysis.

4.4.2 Methodology

The subcontracted drilling firm (SJB Services) performed the test trench excavations at the direction of the on-site Malcolm Pirnie geologist. All excavations were performed using a rubber tire backhoe provided by SJB Services. At each test trench location, the topsoil, where present, was stripped from the surface and stockpiled separately from the excavated fill materials. Each trench was then excavated to the top of native soils or refusal. The physical characteristics of the soils were recorded on test trench logs using the Unified Soil Classification System (USCS) method. PID measurements were also taken of the excavated materials and recorded on the test trench logs. Depth to water

dimensions of the test trenches, and other pertinent observations were also recorded on the test trench logs. Representative soil samples were collected for chemical analysis from the excavated soils. Each test trench was then photographed prior to backfilling. The test trench was then backfilled with excavated wastes and covered with the segregated topsoil and/or cover materials. The ends of each trench were staked and later located by the surveyors.

4.4.3 Results

A total of three test trenches identified as TP-9, TP-10, and TP-11 were excavated at the site. Test trench TP-9 was located downgradient of previously identified areas of potential contamination. TP-10 was excavated at the location of an anomaly detected during the geophysical survey. TP-11 was located in the southeastern corner of the site, adjacent to a former underground storage tank (UST) area. Locations of the trenches are illustrated on Figure 4-1. Field logs with visual descriptions of the subsurface conditions encountered were prepared for each test trench, and are included in Appendix A. Analytical results of the test trench samples collected are discussed in Section 7.

In general, subsurface fill materials consisted of bricks, cinders, cobbles, and wood in a gravelly silt matrix. No USTs or evidence of staining was encountered at test trench locations TP-9 and TP-10. Occasional black staining was observed within TP-11 at approximately 6.5 - 7.0 feet bgs. Samples were collected from this depth interval for chemical analysis. A concrete slab was encountered at 4.5 feet bgs at test trench TP-9, resulting in termination of the test trench at that depth. Test trench TP-10 was excavated to the top of native soils. Test trench TP-11 was terminated at 9.0 feet bgs due to rapidly infiltrating groundwater creating instability in the sidewalls of the trench.

4.5 Soil Boring Program

4.5.1 Purpose

A soil boring program was conducted to characterize the physical and chemical composition of the overburden fill materials on Site through the collection and analysis of subsurface soil and/or fill samples.

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15 SOUTH MAIN STREET
JAMESTOWN, NY

FORMER AMES/HILLS PLAZA

FIGURE 4-1
SAMPLE LOCATION MAP

DATE MARCH 2005

SHEET ____ OF ____

CAD REF. NO. ____

XREFS: IMAGES: None
User: WELSHANS Spec: PIRNIE STANDARD File: F:\Projects\3198004\CADD\Jamestown\CADD\FIGURE 4-1.DWG Scale: 1:1 Date: 05/05/2005 Time: 09:09 Layout: Figure 4-1

4.5.2 Methodology

Test borings were advanced through unconsolidated overburden soils using 4-¼-inch inside diameter (ID) hollow stem augers. The drilling rig used to complete the test borings was provided and operated by a subcontractor to Malcolm Pirnie. At each test boring location, two-inch outer diameter (OD) split-spoon samples were collected and screened with a PID to obtain a qualitative estimate of total VOC concentrations within the subsurface soils. The on-site Malcolm Pirnie representative recorded the PID measurements, physical characteristics of the soil using the Unified Soil Classification System (USCS), depth to groundwater, and other notable conditions on the Field Boring Log for each test boring location. The split spoons were decontaminated prior to each use using a solution of Alconox and water followed by nitric acid and water rinse.

4.5.3 Results

A total of five shallow test boring locations were drilled and sampled at the Site. Locations of the test borings are shown on Figure 4-1. The test boring program consisted of two separate events. The advancement of test borings to facilitate the installation of monitoring wells MW-3, MW-4, and MW-5 were completed September 9, 2004. These wells were installed to provide preliminary groundwater characterization at the site for inclusion in the NYSDEC BCP Program. These three borings were then redrilled at locations within 10 feet of the existing monitoring wells on January 25, 2005 for the purpose of collecting subsurface soil samples for chemical analysis. Evidence of historic petroleum impact was encountered in the subsurface soil/fill material at borings MW-3 and MW-4. At the MW-3 location, beginning at the six foot depth, a petroleum odor and sheen was documented along with an oily appearance to the soil and PID readings above 1000 ppm. One or more of these conditions was noted to a depth of 14 feet bgs. At the MW-4 location, between approximately 7.5 and 10 feet, a sheen, strong odor, and PID readings as high as 950 ppm are documented. No visual or olfactory evidence of potential contamination was observed at the MW-5 boring location.

Two more soil borings MW-1, and MW-2, were also drilled at this time. Test boring MW-1 was advanced within an anomaly identified in the geophysical survey. No contaminant sources, obstructions, or visual evidence or olfactory evidence of contamination were observed in the split spoon samples. A summary of the total depths of each soil boring, as well as the fill thickness and intervals selected for analytical

samples are presented in Table 4-1. Borehole depths ranged from 15 feet to 17 feet bgs. A description of the geologic conditions encountered during the drilling program is provided in Section 5, and borehole logs with detailed overburden descriptions and other observations are provided in Appendix B. All soil borings not converted to monitoring wells were backfilled by pressure grouting from the total depth to the ground surface with a cement/bentonite grout mixture.

4.6 Monitoring Well Installation

4.6.1 Purpose

Five groundwater monitoring wells were installed during the RI to provide hydrogeologic and water quality data at the site. Groundwater elevation data were collected from these new wells.

4.6.2 Methodology

Well installation activities were completed using standard well installation techniques. All monitoring wells were constructed of 2-inch ID, flush joint, Schedule 40 PVC, with 0.010-inch slotted screen 10 feet in length. A silica sand filter pack was placed to approximately two feet above the top of the screened interval. A minimum two-foot thick bentonite chip seal was placed above the sand pack as a seal to prevent the downward infiltration of surface water. The remainder of the boring annulus was filled with cement/bentonite grout. Monitoring wells were completed at the surface with flush-mount "road boxes" and a two-foot by two-foot concrete drainage pad.

4.6.3 Results

All monitoring wells were installed to depths of 15 and 16 feet bgs. A summary of well construction details including the existing wells is presented in Table 4-2. Detailed well construction diagrams and borehole logs with geologic descriptions for the wells are presented in Appendix B.

4.7 Monitoring Well Development

4.7.1 Purpose

The newly installed wells were developed to flush the well and sand pack of fine sediments. The development process is intended to create wells that will yield water samples that are representative of the groundwater quality at that location, as well as provide accurate measurement points for groundwater elevations.

4.7.2 Methodology

The newly installed monitoring wells were developed following well completion. All wells were developed using either, pre-cleaned dedicated bailers, a centrifugal pump attached to dedicated polyethylene tubing, or a submersible pump attached to dedicated polyethylene tubing. Groundwater evacuated from each well during development was monitored for pH, specific conductivity, temperature, dissolved oxygen, and turbidity. Development continued until approximately 10 well volumes had been purged, or until pH, temperature and conductivity values had stabilized. Development water was containerized in 55-gallon drums pending characterization and later disposal.

4.7.3 Results

The newly installed wells were all developed and Well Development/Purging Logs are included in Appendix C.

4.8 Groundwater Elevation Measurement

4.8.1 Purpose

Groundwater and surface water levels were measured prior to the groundwater sampling event at the new groundwater monitoring wells. The synoptic water level event was collected to provide data for the determination of the groundwater flow direction at the Site.

4.8.2 Methodology

Depth-to-water measurements were determined to the nearest 0.01 foot from the top of the PVC well riser and stream measuring stations upstream and downstream of the site using an electronic water level indicator. Following the completion of the site survey, all water levels were converted to elevation measurements in units of feet above mean sea level.

4.8.3 Results

An equipotential map for the shallow overburden water table was prepared using these data. A discussion of groundwater flow directions and water level is presented in Section 5.3, Site Hydrogeology. A tabulated summary of the water level data is provided in Table 4-3.

4.9 Environmental Sampling Program

The environmental sampling program included the collection of surface soils, subsurface soils/fill, indoor air and groundwater samples in accordance with the NYSDEC approved RI Work Plan. Sampling events consisted of the September 2004 well installation and groundwater sampling, the December 2004 indoor air and sub slab soil vapor sampling, the January 2005 soil boring and test trench sampling, and the January 2005 groundwater sampling. The groundwater samples collected during the September 2004 groundwater sampling were sent to Adirondack Environmental Services, Inc. for analyses. All subsequent samples were submitted to Severn Trent Laboratories, Inc. Environmental Quality Associates, Inc. validated all of the data. Data validation and usability is discussed in section 6.0. The validation results are presented in Appendix D. Post-validation analytical results for both sampling events are presented and discussed in Section 7.

4.9.1 Surface Soil Sampling

4.9.1.1 Purpose

The purpose of the surface soil sampling was to characterize the surface soils adjacent to the northern and eastern property boundaries, and one location within a landscape planter in the western parking lot area of the site. The surface soil sample locations were

selected as per the direction of the NYSDEC representative during a preliminary site meeting in August 2004. This characterization was used to evaluate potential human health risks to site workers and trespassers that may come into contact with these surface soils.

4.9.1.2 Methodology

The uppermost two-inches of surface soil were collected using decontaminated stainless steel spoons. The samples collected were placed directly into the appropriate laboratory-supplied sample jars. The soils were then submitted to the subcontracted laboratory for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide analyses.

4.9.1.3 Results

Five surface soil samples were collected at the locations shown on Figure 4-1. Analytical results for the soil samples are discussed in detail in Section 7.0, Site Contaminant Characterization.

4.9.2 Subsurface Soil Sampling

4.9.2.1 Purpose

The purpose of the soil boring program was to characterize the physical and chemical conditions of the subsurface fill materials at the Site. This characterization was also used to evaluate potential human health risks to site workers and contractors that may come into contact with these soils. Subsurface soils were collected from the soil borings and test trenches.

4.9.2.2 Methodology

Soil cores were continuously collected from the soil borings using two-inch diameter split spoons two feet in length driven by a 140-pound hammer. The split spoons were decontaminated prior to each use using a solution of Alconox and water. Upon retrieval each split-spoon sample was screened with a photoionization detector (PID) and described on boring logs by a Malcolm Pirnie geologist. Samples were collected directly from the split spoon for analysis. Soils excavated from the test trenches were screened with a PID. Samples were collected from the spoils pile. The bucket of the backhoe was

decontaminated between test trench locations using a high pressure steam cleaner. All soil samples were submitted for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide analyses. The intervals selected for analysis were based on the results of the PID measurements, visual observations or their depth relative to the water table. Due to the presence of sheen, strong odors, and elevated PID readings, one sample MW-3, 6-8 feet interval was also submitted for petroleum "fingerprint" analysis (NYSDOH Method 310.13). Also, in accordance with the NYSDEC-approved work plan, this sample and a sample from the 7.5 to 8.0 depth interval from soil boring MW-4 were submitted for analysis of PCBs because of visual evidence of dark staining on the soil at those locations.

4.9.2.3 Results

A total of seven subsurface soil samples were collected from soil borings and test trenches, and submitted to a subcontracted analytical laboratory for analysis. Analytical results for the soil samples are discussed in detail in Section 7.0, Site Contaminant Characterization.

4.9.3 Groundwater Sampling Program

4.9.3.1 Purpose

The five groundwater monitoring wells were sampled to characterize the groundwater quality at the site.

4.9.3.2 Methodology

Groundwater samples were collected from monitoring wells MW-3, MW-4, and MW-5 immediately following their installation and development in September 2004. Monitoring wells MW-1 and MW-2 were sampled in February 2005, approximately one week following development. A water level indicator was used to measure the water table elevation at each monitoring well. Each well was then purged using dedicated polyethylene tubing and a centrifugal pump. The evacuated groundwater was periodically measured for the pH, conductivity, temperature, turbidity, dissolved oxygen, and redox potential. Upon stabilization of these parameters, groundwater samples were collected using new polyethylene disposable bailers. Samples were collected for TCL VOCs, TCL SVOCs, and TAL metals plus total cyanide analyses.

4.9.3.3 Results

A total of five groundwater samples plus a field duplicate for each sampling event, and a matrix spike (MS), and matrix spike duplicate (MSD) were collected. Well Purging and Sampling Logs are included in Appendix C. Analytical results for the groundwater samples are discussed in detail in Section 7.0, Site Contaminant Characterization.

4.9.4 Air Quality Characterization

4.9.4.1 Purpose

Malcolm Pirnie, Inc. performed an air quality characterization at the Site to evaluate the intrusion of vapor originating from the soil or groundwater underlying the building. The air quality sampling was performed in accordance with the NYSDEC-approved RI Work Plan and included a pre-sampling survey for potential confounding sources of organic vapors within the building, as well as sampling of outdoor air, sub-slab soil vapor, and indoor air.

4.9.4.2 Methodology

Prior to the initiation of indoor air sampling, a confounding sources survey was conducted in the building to identify and, if possible, eliminate any potential sources of VOCs present in the building, other than those potentially present due to vapor intrusion, that may confound the results of the air sampling event. A photo ionization detector (PID) was used to screen potential confounding sources and areas of the building.

To assess background concentrations of VOCs in the area of the site, two samples of ambient air outside the building were collected. One sample was collected upwind (south) of the building and one sample was collected downwind (north) of the building.

Five sub-slab soil vapor samples were collected from beneath the former Ames/Hills building floor slab. At each soil vapor sampling point, a 1.5-inch diameter hole was drilled through the floor slab of the building and extending a minimum of six-inches below the bottom of the floor slab using a rotary hammer drill. The thickness of the slab was between four and six inches. A six-inch stainless steel vapor sampling screen, attached to Teflon®-lined polypropylene tubing was placed in the borehole. Filter pack sand was poured around and extending approximately two-inches above, the vapor

sampling point. Bentonite powder was poured on top of the filter pack sand and hydrated with de-ionized water to create a low permeability seal in the borehole.

Prior to sampling, each vapor point was purged at a rate of approximately 500 milliliters per minute for a period of five minutes using a peristaltic pump. A six-liter, laboratory-certified summa canister was used for sampling. Air in the canister was evacuated at the laboratory (Sever Trent Laboratories – Knoxville, TN) creating negative pressure within the canister. The summa canister was fitted with pressure gauge and flow controller to regulate air flow into the canister. The flow controller was calibrated to collect a composite vapor sample over an eight-hour period. Additionally, soil vapor passed through an in-line particulate filter present in the sample chain, prior to the flow controller. Following purging, the Teflon-lined tubing was attached to the summa canister and the sample valve was opened. The pressure in the canister was checked to verify that a vacuum had been maintained in the canister during shipment. Changes in pressure over the eight hour sampling period were monitored to verify proper flow controller calibration and sampling rate.

To evaluate the presence of VOCs in indoor air of the on-site building, three indoor air samples were collected using a Summa canister sampling train, which consists of a six-liter, stainless steel, Summa canister, a flow controller, particulate filter, pressure gage, and fittings. All canisters were evacuated by the analytical laboratory prior to use at the Site. Flow regulators supplied by the analytical laboratory were used to collect a continuous sample over an eight-hour period, an assumed exposure time for a worker at the site, from the building's breathing zone assumed to be five feet above the floor.

The air samples were analyzed for VOCs by Severn Trent Laboratories using USEPA Compendium Method TO-15. One of the indoor air samples was not analyzed because of a flow controller malfunction which caused the sample to be unrepresentative.

4.9.4.3 Results

The confounding sources survey identified two areas of the building that could potentially provide confounding sources of VOCs. A maintenance room was present in the rear (eastern) portion of the building where numerous containers of VOC-containing materials were stored. These materials included paints, stains, sealants, adhesives, and lubricants. The room was screened with a PID and no VOCs were detected. Access to the maintenance room was limited to a single door. To minimize the potential for VOC

sources in the maintenance room to affect indoor air samples, this door was shut and remained shut during the duration of the sampling event. Additionally, no indoor air samples were collected in the area proximal to the maintenance room. A loading dock was present in the rear (eastern) portion of the building, adjacent to the maintenance room. Potential sources of VOCs found to be present in the loading dock area included a 55-gallon drum of apparent waste oil, and a 35-gallon drum of spent to partially spent aerosol cans. The loading dock area was accessed internally through two large doorways and externally by two additional overhead doors. The area could not be isolated from the remainder of the building; therefore, indoor air samples were not placed adjacent to the loading dock area.

In addition to the above-mentioned areas, an open borehole was present inside the building, apparently created by a direct-push drilling rig during a previous investigation. The borings penetrated the building's slab and continued to a total depth of approximately 11 feet below ground surface (bgs) with groundwater present in the borehole at an approximate depth of 8 feet bgs. The borehole provides a pathway for VOCs potentially present in soil and groundwater to affect indoor air. No additional confounding sources were observed at the site.

Analytical results for the air quality samples are discussed in detail in Section 7.0, Site Contaminant Characterization.

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Hydrogeologic Evaluation

SECTION 5

5.1 Introduction

The geology and hydrogeology of the Site described herein was characterized using data from previous site investigations, hydrogeologic reference literature, and the most recent information collected from soil borings and monitoring wells installed at the Site during the subsurface investigation performed between September 2004 and February 2005. The previous investigations consisted of 59 soil borings, eight test pits, and four temporary monitoring wells advanced or installed and sampled at the Site. The recent investigation consisted of five soil borings and monitoring wells, three test pits and five surface soil samples. Locations of soil borings test pits, surface soil samples, and monitoring wells are illustrated on Figure 4-1. Detailed logs of the recent investigation locations are provided in Appendix B. A summary of soil boring and well construction details is presented in Tables 4-1 and 4-2.

5.2 Site Geology

This discussion of site geology has been derived from the remedial investigation, as well as previous investigation reports by others. In general, subsurface conditions at the Site consist of fill materials underlain by fine-grained silt and organic deposits, and coarse grained deposits of sand and gravel.

- ***Fill Materials*** - Fill materials consisted of dark brown to black gravelly silt with cinders, slag, brick, and concrete fragments. Fill depths were generally consistent across the site, with an average depth of 6 ½ feet and maximum depths of 11 feet below ground surface. The maximum fill depths encountered occurred along the northern side of the existing building. A buried asphalt layer was encountered at borings BH7, BH8, BH9, BH10, and BH46, ranging in depths from 4 feet to 7 ½ feet bgs. Evidence of the former structures in the form of shallow refusals and buried concrete slabs and foundations were encountered at boring BH24, test pits

TP5 and TP9. The fill thickness distribution across the Site is illustrated on Figure 5-1.

- ***Fine-Grained Soils*** - Fine-grained deposits of silty to sandy clay and gravelly silt were encountered beneath the fill materials at the majority of the boring locations at the site. These fine grained deposits exist as shallow as 3 feet bgs at boring BH48 and as deep as 14 feet bgs at boring BH5. Thicknesses ranged from less than one foot to six feet.

- ***Coarse-Grained Soils*** - Coarse-grained deposits were encountered throughout the Site and consist of stratified sandy gravel, gravelly sand, and silty sand deposits. The gravel units contained subrounded coarse gravels and cobbles typical of fluvial deposits. These coarse-grained units exist at varying depths, including near the surface, or beneath the fill materials, or fine-grained deposits.

Bedrock – Bedrock was not encountered in any of the soil borings drilled during the remedial investigation or the previous subsurface investigations. Bedrock within the area is reportedly ranges from 230 feet to as deep as 400 feet below ground surface (Muller, 1963). The maximum depth drilled during this Remedial Investigation was 17 feet.

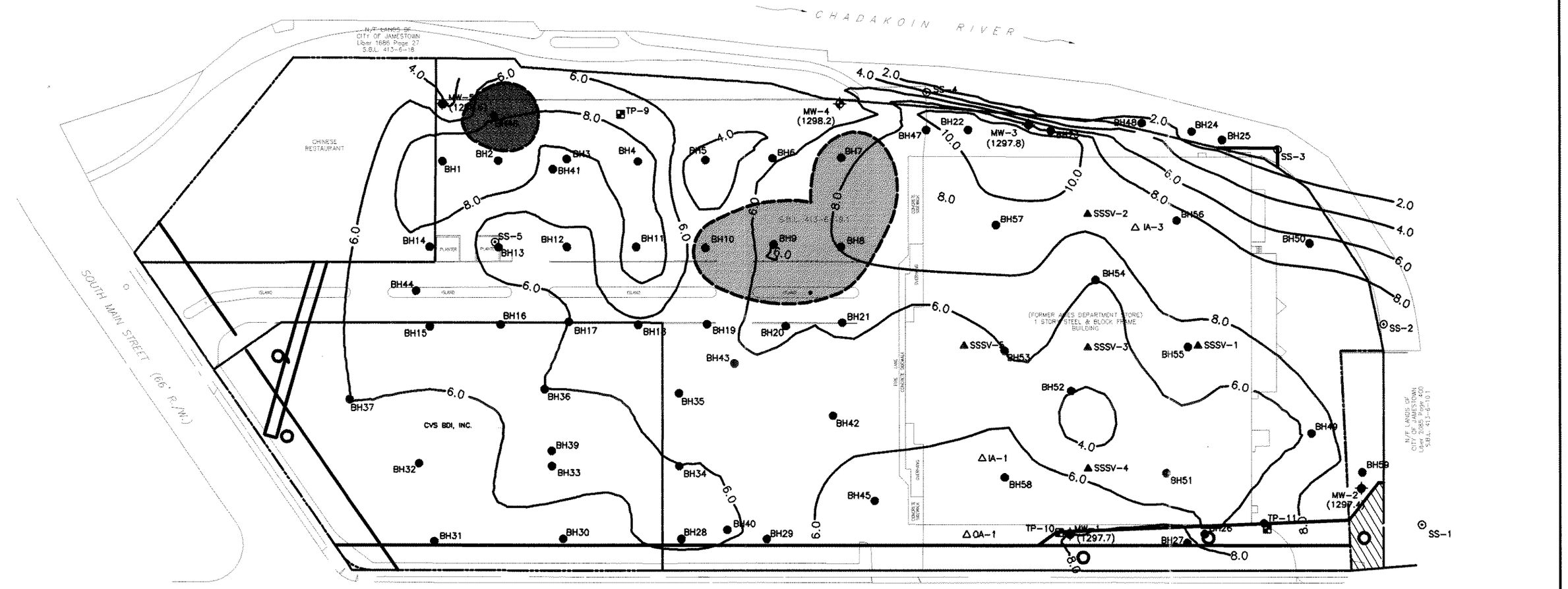
5.3 Site Hydrogeology

Depths to groundwater were measured on February 4, 2005, in the newly installed monitoring wells. These measurements were used to determine groundwater elevations and local groundwater flow direction. These depths and their calculated elevations were presented in Table 4-3. The groundwater elevations were then used to produce a groundwater isopotential map for the shallow groundwater bearing zone, Figure 5-2.

Groundwater Flow - The water table, as measured in the groundwater monitoring wells, was generally observed at depths of approximately five to seven feet below grade.

Figure 5-2 shows that shallow groundwater has a general northwest to southeast flow across the site. Shallow groundwater discharge occurs along the course of the Chadakoin River that borders the site to the north and east.

It should be noted that groundwater measurements were performed once during the Remedial Investigation, and represent the conditions at that time. Therefore, no conclusions can be made as to seasonal variations or groundwater flow direction during different river water elevations based on this single measurement event.



LEGEND

- MONITORING WELL LOCATION
- TEST PIT LOCATION
- BOREHOLES COMPLETED ON JULY 7–8 2004
- SURFACE SOIL SAMPLE LOCATION
- SUB–SLAB SOIL VAPOR SAMPLE LOCATION
- AIR SAMPLING LOCATION
- PROPERTY LINE
- FILL THICKNESS CONTOURS
- AREAS OF BURIED ASPHALT

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15 SOUTH MAIN STREET
JAMESTOWN, NY

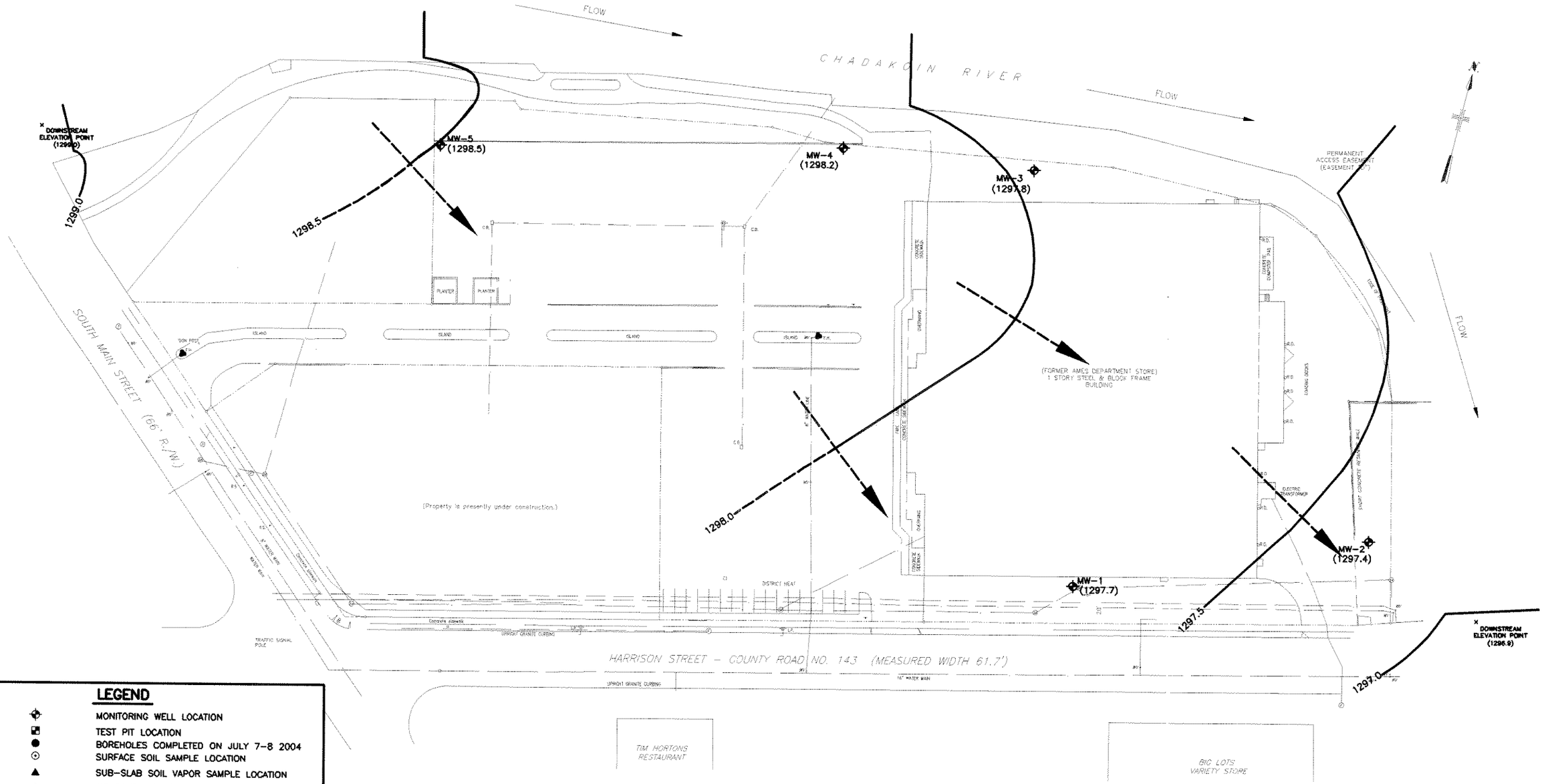
FORMER AMES/HILLS PLAZA

FIGURE 5–1
ESTIMATED THICKNESS OF FILL MATERIAL

DATE MARCH 2005

C SHEET 01 OF 01

CAD REF. NO.



LEGEND

- MONITORING WELL LOCATION
- TEST PIT LOCATION
- BOREHOLES COMPLETED ON JULY 7-8 2004
- SURFACE SOIL SAMPLE LOCATION
- SUB-SLAB SOIL VAPOR SAMPLE LOCATION
- AIR SAMPLING LOCATION
- PROPERTY LINE
- SHALLOW GROUNDWATER ISOPOTENTIAL CONTOUR (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- (1298.5) GROUNDWATER ELEVATION (FEET)

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REVISIONS			
NO.	BY	DATE	REMARKS

DES BEG
DWN SAT
CKD KRM

15 SOUTH MAIN STREET
JAMESTOWN, NY

FORMER AMES/HILLS PLAZA

FIGURE 5-2
SHALLOW GROUNDWATER EQUIPOTENTIAL MAP

DATE MARCH 2005

SHEET ____ OF ____

CAD REF. NO. ____

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Data Validation/Usability

SECTION 6

Samples were collected for the Remedial Investigation during four sampling events. Soil samples were collected from soil borings by LCS, Inc. in July 2004 and analyzed for TCL VOCs, TCL SVOCs, TAL Metals, Pesticides, Herbicides, PCBs, Cyanide, pH, and petroleum products. Groundwater samples were also collected from temporary monitoring wells and analyzed for TAL Metals and cyanide. Severn Trent Laboratories of Buffalo, New York analyzed the both the soil and groundwater samples collected by LCS, Inc. The second event, conducted in September 2004 by Malcolm Pirnie, Inc., included the collection of groundwater samples from three permanent monitoring wells. These samples were analyzed for TCL VOCs, SVOCs, TAL metals, and cyanide by Adirondack Environmental Services, Inc. of Albany, New York. The third sampling event occurred December 2004 and consisted of outdoor air, indoor air and subslab soil vapor samples. Severn Trent Laboratories of Burlington Vermont analyzed the air samples for VOCs. Additional surface soil and subsurface soil samples were collected by Malcolm Pirnie in January 2005, and groundwater samples were collected in February 2005. Severn Trent Laboratories of Buffalo, New York analyzed the both the soil and groundwater samples for TCL VOCs, TCL SVOCs, TAL Metals, Cyanide, and petroleum products.

Environmental Quality Associates, Inc. (EQA), a qualified data validator, performed third-party validation of the analytical results from both laboratories. The data validation was conducted according to the guidelines established by NYSDEC's Data Usability Summary Review (DUSR) process. The DUSR process was performed to provide a determination of whether the data meets the project specific criteria for data quality and data use. The air quality data collected during the third sampling event was not reviewed by the data validator.

Data Review Reports were prepared for each sample delivery group (SDG) and are attached to this report as Appendix D. The Data Review Reports provide copies of the laboratory analytical results and descriptions of the criteria used to review the laboratory results and supporting quality control documentation. While a few data points were rejected, overall, all data packages were deemed usable by the data validator. The usability of the data, as assessed by the data validator is presented in detail in the following sections. All data summary tables in Section 7 and related discussions and conclusions present and use analytical results that have been validated, with the exception of the air quality data and the petroleum products analysis performed on one of the soil samples.

6.1 July 2004 LCS, Inc. Borehole Soil Samples

The July 2004 LCS, Inc. samples consisted of two sample delivery Groups (SDGs), identified as A04-6482, and A04-6485. These two SDGs consisted of subsurface soil samples collected from soil borings. The soil samples were analyzed for full TCL VOCs, TCL SVOCs, TAL metals, cyanide, chlorinated pesticides, PCBs, and chlorinated herbicides. All samples collected and received by the laboratory during the July 2004 sampling event were received within the allowable temperature range for cooler packed samples (between two and six degrees centigrade) established by the NYSDEC-ASP. NYSDEC holding times for extraction and analysis were met for all samples. No additional issues were identified regarding sample receiving or holding times for the July 2004 soil samples.

Volatile Organics

Data validation resulted in assigning "J" qualifiers to some of the results indicating that the result is a quantitatively estimated value. The qualifiers were assigned to the data based on the results of one or more of the following:

- Continuing calibration parameters exhibiting several target compounds whose Relative Response Factor (RRF) values were greater than 15% of the Relative Standard Deviation (RSD).
- Surrogate recoveries of compounds exceeding the upper limits on initial sample runs, due to matrix interferences.

The reported methylcyclohexane result for BH47 (10-12) was changed from 520 E ug/kg to the 2900 ug/kg result from the mid-level dilution run, due to detected results greater than the calibration range in the initial run. It should be noted that LCS, Inc., reported the results of the dilution run for all compounds for BH47 and its duplicate. Lower concentrations and/or reporting limits were reported on the Form I's, and should be considered more accurate

Two of four method blanks exhibited detections of methylene chloride, bromomethane, acetone and several non-target compounds. This resulted in the following:

- Qualifying positive results for methylene chloride or acetone less than 10x the blank value as a quantitatively estimated non-detect value "UJ".
- All associated positive Hexane results were rejected if the value was less than 5x the blank value.

Semi-Volatile Organics

Calibration parameters in excess of relative response factor percent difference (RRF %D) limits on June 8, 2004 resulted in "J" qualifications for 2,4-dinitrophenol in the associated samples.

Several non-target compounds as well as bis(2-ethylhexyl)phthalate were present in the method blanks. If these compounds were found to be present in associated samples below a 10x blank value, they were qualified "U" as not detected.

TAL Metals and Cyanide

For both SDGs, reported positive results greater than the analyte method detection limit (MDL) but below the reporting limit (RL), that were qualified with a "B" qualifier by the laboratory, were changed to a "J" qualification by the data validator.

Concentration reference standards outside of acceptable limits resulted in a "J" qualifier for the selenium and mercury results. Selenium was qualified "UJ", suggesting a negative bias.

The digestion (prep) blank contained several analytes below the Reporting Limit (RL) values. All associated reported sample results less than ten times the associated prep blank response were qualified with a "UJ" or "J" qualifier.

Matrix spike recoveries for antimony, mercury, and selenium were below the acceptable limit of 75%. Reported concentrations of these analytes were qualified as "UJ" or "J". Additionally, matrix spike duplicate precision values for arsenic exceeded the respective acceptable limits. As a result, reported concentrations were qualified with a "J".

The serial dilution sample precision values for 12 analytes (Al, Ba, Ca, Cr, Co, Fe, Mg, Mn, Ni, K, V, and Zn) exceeded the acceptable limit of 10 percent and undiluted sample concentrations were greater than 50 times the IDL. Positive results for these compounds greater than 50 times the IDL were qualified "J".

Pesticides

Results for beta-BHC were qualified "J" as quantitatively estimated due to a greater than 40 % difference in precision values between two analytical columns.

Sample results for DDT, endrin aldehyde, and endrin keytone were qualified "J" or "UJ" since the continuing calibration values % deviation values were greater than 15%.

Herbicides

The result for 2,4-D was rejected in the equipment blank sample, due to no recovery of this compound in the blank spike sample. The results for 2,4,5-TP (Silvex); and 2,4,5-T were qualified "UJ" due to low recoveries of these compounds in the blank spike samples. No other data qualifications were made for herbicides in this SDG, however, no matrix spike or matrix spike duplicate samples were reported.

PCBs

Only positive Aroclor results above the Method Detection Limit (MDL) but less than the reporting limit were qualified "J" as quantitatively estimated.

pH

Analytical results for soil pH values were acceptable following a review of the laboratory calibration data.

6.2 July 2004 LCS, Inc. Test Pit Soil Samples and Temporary Monitoring Well Groundwater Samples

The soil samples included in this delivery group (A04-6722) were analyzed for full TCL VOCs, TCL SVOCs, TAL metals, cyanide, chlorinated pesticides, PCBs, chlorinated herbicides, and petroleum products. The petroleum products data was not included as part of the data validation review. The groundwater samples included in this SDG were analyzed for TAL metals and cyanide. The validation report indicates that all samples in the SDG were received in good condition and were analyzed within all applicable holding times.

A summary of the data validation findings that affected data results or data qualification is provided below. Additional notes, which did not affect results or data qualification, are located in the appended data validation report, (Appendix D).

Volatile Organics

Quantitatively estimated qualifications "J" were made to methylene chloride and methyl acetate results of samples associated with the calibration parameters in which the RRF values were greater than 15% of the RSD values.

The continuing calibration standard exhibited RRF % deviations greater than 20%, resulting in the "UJ" qualification of non-detect results in associated samples.

Methylene chloride, acetone, and several non-target compounds were detected in the method blanks associated with this SDG. This resulted in qualifying the results for these compounds as "UJ" for any detected result less than ten times the blank value, and rejecting detected results less than five times the blank values.

Semi-Volatile Organics

The evaluation of internal standards for perylene-d12 indicated a recovery greater than two times the continuing calibration standard. This resulted in the qualification of all detected SVOCs with a "J".

Calibration parameters in excess of RRF %D limits on June 8, 2004 resulted in "J" qualifications for caprolactam, hexachloroethane, 2,4-dinitrophenol, 3,3'-dichlorobenzidine, hexacylopentadine, di-n-octylphthalate, and benzo(b)floranthene in the associated samples.

Several non-target compounds as well as bis(2-ethylhexyl)phthalate were present in the method blanks. If these compounds were found to be present in associated samples below a 10x blank value, they were qualified "U" as not detected. Any positive results less than five times the blank values were rejected.

TAL Metals and Cyanide

Groundwater: Concentration reference standards outside of acceptable limits resulted in a "UJ" qualifier for the selenium results in the groundwater samples.

Soils: Reported positive results greater than the analyte method detection limit (MDL) but below the reporting limit (RL), that were qualified with a "B" qualifier by the laboratory, were changed to a "J" qualification by the data validator.

The digestion (prep) blank contained several analytes below the Reporting Limit (RL) values. All associated reported soil sample results less than ten times the associated prep blank response were qualified with a "UJ" or "J" qualifier.

Matrix spike recoveries for antimony, mercury, and selenium were below the acceptable limit of 75%. Reported concentrations in the soils of these analytes were qualified as "UJ" or "J". Additionally, matrix spike duplicate precision values for arsenic exceeded the respective acceptable limits. As a result, reported concentrations were qualified with a "J".

Pesticides

The summary or raw calibration data for the pesticide analysis for SDG A04-6722 was not present in the data package, and therefore could not be fully validated at the time of

this report. The laboratory was contacted by the validator, and the appropriate QC summaries and calibration data are being forwarded to the validator for review. Any data qualifications necessary due to calibrations will be issued as an addendum to this report.

Herbicides

The results for all three target herbicides were qualified by the validator as "UJ" in this SDG. All reported herbicide results were reported as non-detect by LCS, Inc. in their "Focused Soil and Groundwater Investigation Report", August 2004. The qualification by the validator indicates the potential for false non-detects in the samples due to low recoveries of these compounds in the blank spike samples.

PCBs

Only positive Aroclor results above the Method Detection Limit (MDL) but less than the reporting limit were qualified "J" as quantitatively estimated.

6.3 January 2005 Malcolm Pirnie Inc. Surface and Subsurface Soil Samples

The surface soil and subsurface soil samples included in this delivery group (0105-SS) were analyzed for TCL VOCs, TCL SVOCs, TAL metals, cyanide, and PCBs. The validation report indicates that all samples in the SDG were received in good condition and were analyzed within all applicable holding times.

A summary of the data validation findings that affected data results or data qualification is provided below. Additional notes, which did not affect results or data qualification, are located in the appended data validation report (Appendix D).

Volatile Organics

The continuing calibration standard exhibited RRF % deviations greater than 20%, resulting in the "J" or "UJ" qualification of methyl acetate results in associated samples. "UJ" qualifications were also applied to choloromethane for one sample due to RRF% deviations greater than 20%.

Benzene, chlorobenzene, 1,1-DCE, toluene, and TCE results were qualified "UJ" in one sample due to poor recoveries of these compounds in the spike duplicate of this sample.

Semi-Volatile Organics

Calibration parameters in excess of RRF %D limits on January 24, 2005 resulted in "J" qualifications for benzo(b)floranthene in the associated samples.

The reported results for benzo(b)fluoranthene, and benzo(k)fluoranthene in the sample from SS-2 were changed from the estimated results from the initial sample run to the results from the 10 times dilution run. The reported results for benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene in the sample from SS-3 were changed from the estimated results from the initial sample run to the results from the 10 times dilution run.

TAL Metals and Cyanide

Matrix spike recoveries for antimony, arsenic, chromium, copper, magnesium, mercury, lead, and zinc were outside the acceptable limits of 75% - 125%. Reported concentrations of these analytes were qualified as "UJ" or "J".

The serial dilution sample precision values for eight analytes (Al, Ba, Ca, Fe, Pb, Mg, Mn, and Zn) exceeded the acceptable limit of 10 percent and undiluted sample concentrations were greater than 50 times the IDL. Positive results for these compounds greater than 50 times the IDL were qualified "J".

PCBs

Since no positive results were reported for PCBs in any of the samples submitted for analysis, no changes to the data or data qualifiers were required.

6.4 February 2005 Malcolm Pirnie Inc. Groundwater Samples

The groundwater samples included in this delivery group (A05-1057) were analyzed for TCL VOCs, TCL SVOCs, TAL metals, and cyanide. The validation report indicates that all samples in the SDG were received in good condition and were analyzed within all applicable holding times.

A summary of the data validation findings that affected data results or data qualification is provided below. Additional notes, which did not affect results or data qualification, are located in the appended data validation report (Appendix D).

Volatile Organics

Since no positive results were reported for VOCs in any of the samples submitted for analysis, no changes to the data or data qualifiers were required.

Semi-Volatile Organics

Since no positive results were reported for SVOCs in any of the samples submitted for analysis, no changes to the data or data qualifiers were required.

TAL Metals and Cyanide

Matrix spike recoveries for aluminum, barium, copper, iron, lead, magnesium, and zinc were outside the acceptable limits of 75% - 125%. Reported concentrations of these analytes were qualified "J" with a positive bias suggested due to matrix effects.

The serial dilution sample precision values for sodium exceeded the acceptable limit of 10 percent deviation. All positive results for sodium were qualified "J".

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Site Contaminant Characterization

SECTION 7

7.1 Introduction

The nature and extent of contamination at the Former Ames/Hills Site was characterized through collection and analysis of surface soil, subsurface soil/fill, groundwater, indoor air, and soil vapor. Sample locations are shown on Figure 4-1. Sampling methodologies were performed in accordance with the NYSDEC and NYSDOH-approved Remedial Investigation Work Plan (Malcolm Pirnie, Inc., January 2005). Sampling protocols and methodologies are described in Section 4.0 of this report for each sampled media. Groundwater samples collected September 9, 2004 were submitted under chain-of-custody to Adirondack Environmental Services, Inc. of Albany, New York. Surface soil, subsurface soil/fill, and groundwater samples collected during sampling events in January and February 2005 were submitted for analyses under chain-of-custody to Severn Trent Laboratories of Amherst, New York. Indoor air and soil vapor samples collected in December 2004 were submitted for analyses under chain-of-custody to Severn Trent Laboratories of Colchester, Vermont. Analytical services provided by both laboratories were performed in accordance with the most current SW-846 and ASP2000 analytical methods and protocols. Appendix E contains raw analytical data (Form 1's) for each sample analyzed. Analytical summary tables (Tables 7-1, 7-2, 7-10, and 7-13) provided in this section include only those parameters for which a value greater than the laboratory detection limit was found at a minimum of one sample location.

Sampling frequency and location were determined based on observed site conditions and review of historical environmental data for the site. Sampling locations for all media are provided on Figure 4-1. Surface soil samples were collected from five locations on January 26, 2005. Subsurface soil/fill samples were collected from three test trenches and five soil borings performed from January 25 through January 28, 2005. Groundwater

samples were collected on September 9, 2004 and February 4, 2005. Indoor air and subslab soil vapor samples were collected on December 21, 2004.

Lender Consulting Services, Inc. (LCS) conducted a subsurface investigation at the site in July 2004 that included 11 soil borings, seven test trenches, and the installation and sampling of four temporary groundwater monitoring wells. Analytical results for these samples are discussed in this section and are presented in Tables 7-3 through 7-9, and 7-11 through 7-12, as they appeared in the LCS Focused Soil and Groundwater Investigation Report, August 2004.

Analytical results were compared to the following standards and criteria:

- Surface and subsurface soil/fill data were compared to NYSDEC Technical Administrative Guidance Memorandum (TAGM) 4046, Recommended Soil Cleanup Objectives, December 2000. Metals were compared to TAGM 4046 and eastern U.S. background concentrations. Poly Aromatic Hydrocarbons (PAHs) were compared to background soil concentrations for urban soils as referenced from the U.S. Department of Health and Human Services Toxicological Profile for PAHs

- Groundwater data were compared to NYSDEC Class GA groundwater standards and guidance values, (6NYCRR Part 360).

- Indoor air and soil vapor analytical results were compared to Generic Target Indoor Air Concentrations and Generic Screening Levels for shallow soil vapor, respectively provided by the USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soil. Additionally, measured concentrations of trichloroethene and tetrachloroethene were compared to draft NYSDOH Soil Vapor and Indoor Air decision matrices.

7.2 Surface Soil

Five surface soil samples were collected along the northern and eastern perimeters of the site, as well as one sample from a landscape planter in the western portion of the site. All sampling locations are shown on Figure 4-1. Analytical results for surface soil samples are provided in Table 7-1.

VOCS

No VOCs were detected at concentrations in excess of TAGM 4046 Soil Cleanup Objectives in any on the five surface soil samples. Only two VOC analytes were detected in surface soil samples, all of which were present at concentrations less than laboratory reporting limits and were therefore considered estimated results.

SVOCs

SVOCs were present in surface soil at the site at concentrations in excess of NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives in four of the five surface soil samples collected. Six of the seven SVOCs present in the surface soil samples at concentrations greater than cleanup objectives, with the exception of phenol, are identified as carcinogenic polycyclic aromatic hydrocarbons (PAHs) and therefore have reduced cleanup objectives as compared to other SVOCs. Only two of the PAHs (bezo(a)pyrene and chrysene) were present above the typical range found in urban soils. All other PAHs were within or below the typical urban background concentrations for PAHs.

Metals

In general, most surface soil samples contained metals at concentrations within expected background concentrations for the eastern United States. Copper, selenium, and zinc were the only metals present at concentrations above expected background. Copper was present in surface soil samples SS-2 at 87.8 mg/kg and SS-4 at 58.6 mg/kg, which is greater than TAGM 4046 Recommended Soil Cleanup Objective of 25 mg/kg and eastern U.S. background concentrations, which are expected to range from 1 to 50 mg/kg.

Selenium was present in surface soil samples SS-2, SS-3, SS-4, and SS-5 at concentrations ranging from 4.2 to 6.4 mg/kg. The TAGM 4046 Soil Cleanup Objective for selenium is 2.0 mg/kg. Eastern US. background concentrations of selenium range from 0.1 to 3.9 mg/kg. Based on the consistency of measured selenium concentrations from several samples collected across the site and from varying depth intervals, it is likely that these concentrations represent background conditions for this site, which are only slightly greater than the eastern U.S. background range.

Zinc concentrations ranged from 84.2 mg/kg in sample SS-3, to 602 mg/kg in sample SS-2. The recommended Soil Cleanup Objective for zinc is 20 mg/kg or to the site specific background concentrations, which is expected to be between 9 and 50 mg/kg for the eastern US.

7.3 Subsurface Soil

Similar to the surface soil results, the distribution of the subsurface soils containing constituents greater than NYSDEC cleanup objectives or urban background concentrations were well distributed across the site, and that these measured concentrations may be characteristic of the fill material underlying the site rather than from a former or current on-site source. Analytical results for the subsurface soils collected by Malcolm Pirnie are summarized in Table 7-2. LCS data is presented in Tables 7-3 through 7-9.

VOCs

No VOCs were present in subsurface soil samples collected at the site at concentrations in excess of NYSDEC TAGM 4046 Soil Cleanup Objectives and concentrations of most VOCs were less than laboratory detection limits in both the July 2004 LCS sampling event and the January 2005 Malcolm Pirnie sampling event.

In addition to the TCL VOC analyte list, tentatively identified compounds (TICs), or non-target, unspecified compounds detected in samples during analyses were quantified. These concentrations were combined to represent a total TIC concentration for each sample. One sample, the 10 to 12-foot depth interval collected by LCS from boring location BH-47, located near the northwest corner of the building contained TICs with a total concentration of 170,000 micrograms per kilogram (µg/kg), which exceeds the NYSDEC TAGM 4046 Soil Cleanup Objective for total VOCs (10,000 µg/kg).

SVOCs

For the January 2005 sampling event, five SVOCs were present in the subsurface soil at the site at concentrations in excess of NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives. These SVOCs were detected at MW-1, and MW-2 in the southeastern portion of the site, as well as TP-9 in the northwest portion of the site.

These SVOCs are identified as carcinogenic polycyclic aromatic hydrocarbons (PAHs) and therefore have reduced cleanup objectives as compared to other SVOCs. Two of these PAHs (bezo(a)pyrene and chrysene) were present above the typical range found in urban soils.

Results from the July 2004 sampling event conducted by LCS identified SVOCs at concentrations in excess of NYSDEC TAGM 4046 Soil Cleanup Objectives in seven of the 19 soil samples collected.

PCBs

The two samples that were submitted for PCB analysis (MW-3[6-8'] and MW-4 [7.5-8']) did not contain any PCBs at detectable concentrations.

Metals

Metals concentrations in subsurface soil samples were generally consistent with those observed in surface soil at the site. These data indicate that the metals may be characteristic of fill material present underlying a majority of the site. Copper was present in soil samples from sampling locations MW-1 and MW-2 at concentrations equivalent to or slightly exceeding the expected eastern United States background concentration and similar to concentrations observed in surface soil at the site. Zinc was also present in excess of Eastern U.S. background concentrations in all samples at concentrations ranging from 60.7 mg/kg in soil boring MW-5 to 185 mg/kg in MW-1. The expected eastern United States background concentration ranges from nine to 50 mg/kg. The consistency of concentrations of these metals across the site and at various depths indicate that these concentrations may be indicative of site background conditions.

In addition to the above exceedences, magnesium was present in the sample collected from soil boring MW-4 at 7,810 mg/kg, which is greater than the background range of 50 to 5,000 mg/kg and concentrations of magnesium in the other subsurface soil samples collected at the site, which ranged from 1,130 to 3,790 mg/kg. Mercury was present in the soil sample collected from soil boring MW-2 at 0.421 mg/kg, which is greater than the TAGM 4046 Recommended Soil Cleanup Objective (0.10 mg/kg) and the expected Eastern U.S. background concentration range (0.001 to 0.2 mg/kg). The sample collected from soil boring MW-1 contained mercury at a concentration of 0.2 mg/kg, which is

above the TAGM 4046 Cleanup objective, but within the expected background concentration range; however, mercury was not present in equal or comparable concentrations in any other surface or subsurface soil sample collected at the site.

LCS collected and analyzed 29 soil samples for TAL Metals from 11 soil boring locations and seven test trench locations in July 2004. The results for these analyses are consistent with findings of the January 2005 Malcolm Pirnie sampling event. Zinc was present in excess of expected eastern United States background concentrations and recommended cleanup objectives in 27 of the 29 samples analyzed. Also consistent with the findings of the January 2005 sampling event, copper (present in three of the 29 samples) magnesium (present in one of the 29 samples) and mercury (present in five of the 29 samples) were measured at concentrations in excess of expected eastern United States background concentrations and recommended cleanup objectives.

In addition, arsenic, calcium, cadmium, lead, and nickel were present at concentrations in excess of expected Eastern U.S. site background concentrations and recommended cleanup objectives. Arsenic exceeded cleanup objectives in six samples from five separate boring or test trench locations. The 0.3 to 3.0-foot depth interval from test trench TP-1 contained the only exceedences for cadmium, lead, and nickel. Calcium exceeded expected Eastern U.S. site background concentrations and recommended cleanup objectives in only the four to six-foot depth interval in boring location BH-46.

The location of samples containing metals at concentrations in excess of NYSDEC cleanup objectives and eastern United States background concentrations were generally well distributed across the site.

Pesticides

LCS collected and analyzed soil samples from 10 boring locations for organochlorine pesticides by ASP00 Method 8081 and herbicides by ASP00 Method 8151. Results for these analyses are presented in Table 7-7. As shown in the table, low concentrations of organochlorine pesticides were detected in five of the 10 soil samples, most of which were present below laboratory reporting limits. No organochlorine pesticides were present at concentrations in excess of TAGM 4046 Soil Cleanup Objectives. The locations of soil borings that contained pesticides extended across the site and observed

concentrations are likely attributable to historic controlled pesticide treatment applications at the site. No herbicides were detected in any of the soil samples submitted for analysis.

PCBs

Soil samples from 13 sampling locations were submitted by LCS for analysis of PCBs by ASP00 Method 8082. PCBs were detected in four soil samples at concentrations considerably lower than TAGM 4046 soil cleanup objectives. PCBs were generally detected in borings and test pits located along the southern portion of the site. Analytical results for PCBs are provided in Table 7-8.

Petroleum Finger-Print Analysis

Malcolm Pirnie collected one sample of the subsurface soil/fill at boring location MW-3, north of the site building. The sample was collected at the 6 to 8 feet depth because of evidence of petroleum staining observed while drilling and sampling. This sample was analyzed for petroleum product identification using NYSDOH method 310.13. Fuel oil #2 was reported in this sample at a concentration of 35 mg/kg. Analytical results are summarized in Table 7-2.

7.4 Groundwater

The following characterization of the groundwater at the site was based on the samples collected by Malcolm Pirnie in September 2004 and February 2005, as well as the samples collected by LCS in July of 2004. The groundwater data is summarized in Tables 7-9 through 7-11.

VOCs

VOCs were not present at concentrations exceeding NYSDEC Class GA Groundwater Standards in any of the five groundwater samples collected at the site by Malcolm Pirnie. Only two VOCs were detected (acetone and cyclohexane) at concentrations near the laboratory reporting limits. Groundwater samples collected by LCS in July 2004 were not analyzed for VOCs.

SVOCs

No SVOCs were present at concentrations exceeding NYSDEC Class GA Groundwater Standards in any groundwater samples collected by Malcolm Pirnie during the February 2005 groundwater sampling event. A majority of the SVOCs were not detected, or were present at concentrations below laboratory reporting limits and therefore reported as estimated values. Of the SVOCs detected, the majority were detected from one well location (MW-3), located in the northeast portion of the site, between the building and the Chadakoin River. Groundwater samples collected by LCS in July 2004 were not analyzed for SVOCs.

Metals

Eight metals were present in groundwater samples collected at the site in January 2005 at concentrations in excess of NYSDEC Class GA Groundwater Standards. Iron, manganese, and sodium exceeded Class GA Standards in samples from all five monitoring wells. Additional metals that exceeded NYSDEC Class GA Groundwater standards include antimony in monitoring wells MW-3 and MW-4, barium in monitoring well MW-3, and lead in monitoring wells MW-1 and MW-2. Arsenic and thallium were present in the duplicate sample collected from monitoring well MW-3 at concentrations in excess of Class GA groundwater standards but were not detected in the preliminary sample. Results for these metals are therefore uncertain.

Consistent with the January sampling event, all four groundwater samples collected by LCS in July 2004 contained iron, manganese, and sodium at concentrations in excess of NYSDEC Class GA Standards. Furthermore, exceedances were observed for arsenic (TP-MW-2), barium (TP-MW-1), and lead (TP-MW-4), all of which were also present at concentrations in excess of NYSDEC Class GA Standards in some January 2005 samples. No additional metals were present above NYSDEC Class GA Standards.

7.5 Vapor Intrusion Screening Results

Indoor Air

While several VOCs were present in indoor air samples at low concentrations, collection and analysis of background air samples from outdoor locations indicate that all but one of

these compounds is also present in background ambient air. As shown in Table 7-12, the only VOC present in indoor air that is not also present at higher concentrations in background samples is trichlorofluoromethane at concentrations ranging from 20 micrograms per meter cubed ($\mu g/m^3$) and 26 $\mu g/m^3$. The Generic Target Indoor Air Concentration provided by the USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soil, for trichlorofluoromethane is 700 $\mu g/m^3$. Trichlorofluoromethane is a chlorofluorocarbon used primarily as a propellant in aerosol spray cans, a refrigerant, an insecticide, and an industrial solvent and is not an identified human carcinogen. Since all other VOCs detected in indoor air were also present in background samples at approximately equivalent or greater concentrations, the source of these compounds in the indoor air is likely from the background outdoor air.

Sub-slab Soil Vapor

Numerous VOCs were detected in sub-slab soil vapor underlying the on-site building. The concentrations of VOCs measured in the soil vapor were compared to USEPA Generic Screening Levels for shallow soil vapor, provided in the USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils. All VOC concentrations measured in sub-slab soil vapor at the site were less than the USEPA draft guidance values. Furthermore, with the exception of those VOCs present in background air, VOCs present in sub-slab soil vapor were not detected in indoor air within the building, excepting trichlorofluoromethane as discussed above. For these compounds, it is unlikely that a complete soil vapor intrusion pathway is present at the site.

Vapor Intrusion Pathway Assessment

The NYSDEC and NYSDOH do not currently provide specific guidance values for allowable concentrations of most VOCs in soil vapor or indoor air. However, draft guidance has been released by the NYSDOH for two VOCs, trichloroethene (TCE) and tetrachloroethene (PCE). The guidance considers concentrations of VOCs in both sub-slab soil vapor and indoor air to identify requirements to further assess exposure risks and/or mitigate exposure pathways. Concentrations of TCE and PCE present in soil

vapor and indoor air at the site indicate that no further action is required to assess human exposure through the soil vapor intrusion pathway for these compounds.

Based on concentrations of trichlorofluoroethene in indoor air, background air, and sub-slab soil vapor at the site, a complete vapor intrusion pathway for this compound cannot be dismissed. The source of trichloroflouromethane in soil vapor and indoor air is uncertain since this compound was not present at detectable concentrations in shallow groundwater, surface soil, or subsurface soil at the site. The detected concentrations of trichlorofluoromethane in indoor air and soil vapor are significantly less than USEPA target indoor air concentrations and target shallow soil gas concentrations, respectively.

MALCOLM PIRNIE

Human Health Evaluation

SECTION 8

This section presents a qualitative evaluation of the potential for exposure and adverse human health effects associated with constituents detected in the various environmental media sampled at the Site.

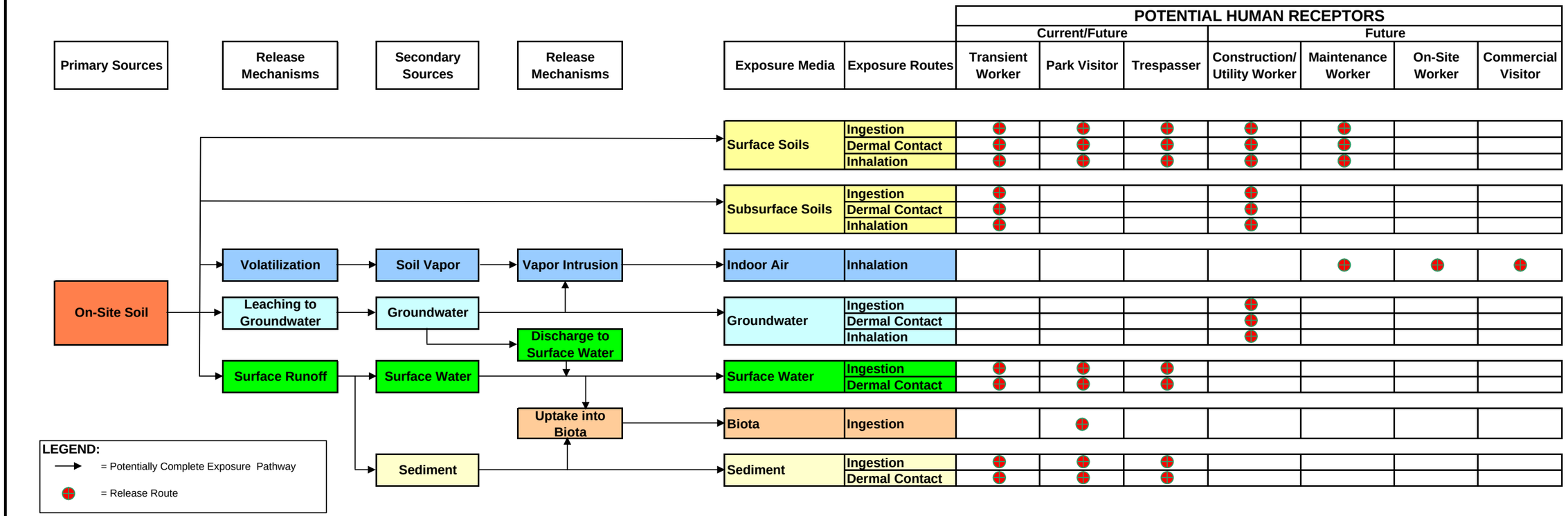
The exposure assessment is facilitated through the development of a conceptual site model, as presented on Figure 8-1. The conceptual Site model is a graphic illustration that outlines chemical source areas, possible chemical release mechanisms, environmental media that currently show or may show the presence of chemicals in the future, possible exposure pathways, potentially-exposed populations, and possible exposure routes. It considers current Site conditions and surrounding land use, as well as the most likely future Site conditions and surrounding land use based on the proposed redevelopment of the Site with a medical center building and extensive parking areas. The conceptual site model presents the hypotheses regarding the potential for exposure that are analyzed and discussed in this evaluation.

8.1 Overview

Although qualitative, the human health evaluation follows the four-step process that is typically used to assess potential human health risk; these include:

Data Evaluation: Relevant Site data are compiled and analyzed to determine the usability of the data and to select constituents of potential concern (COPC) that are representative of the conditions present at the Site.

Exposure Assessment: Actual and/or potential chemical release pathways are analyzed and potentially exposed human populations, possible exposure pathways, and potential exposure routes are identified.



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CONCEPTUAL SITE MODEL

Former Ames/Hills Plaza Site

Jamestown, New York

March, 2005
MALCOLM PIRNIE, INC

FIGURE 8-1

Toxicity Assessment: Qualitative toxicity information is presented for each COPC.

Risk Characterization: The potential for adverse human health effects, in terms of both non-carcinogenic hazard and carcinogenic risk, is evaluated, currently and in the future, in the absence of remedial action.

8.2 Data Evaluation

The data evaluation focuses on the compilation of usable chemical data to assess the potential for human exposure and the selection of COPC. As such, constituents in soil fill (i.e., surface and subsurface soils), groundwater, and air (i.e., indoor air and sub-slab soil vapor) are evaluated. While the entire data sets for these media were discussed previously, data summary tables were organized to facilitate the data evaluation. The data summaries, presented in Tables 8-1 to 8-7, are discussed below. These tables also present the screening criteria used to select COPC. The selection of screening criteria for each medium is discussed below. This process, as presented below, identifies those COPC that, if contacted, may pose potential risk to human health.

Selection of Media of Concern: Surface and subsurface soils, groundwater, indoor air, surface water, sediment, and biota are identified as environmental media of concern because they are or may become, in the future, readily available for human contact. Air is an environmental medium of concern due to the potential release of chemical vapors and chemically-contaminated respirable particulates from the Site. Biota is a medium of concern due to the potential for human consumption of wildlife that has been exposed to COPC.

Selection of COPC: The following sections describe the analytical data in the media sampled (i.e., surface soil, subsurface soil, groundwater, indoor air, and sub-slab soil vapor) and the identification of COPC in these media. COPC are selected by comparing the maximum detected concentration of each chemical in the indicated data sets to appropriate screening criteria (e.g., NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives); chemicals whose maximum detected concentration exceeds the screening criteria are selected as COPC. However, for the inorganic chemicals in soil, if a chemical exceeds a screening criterion, but is still within the range of the Eastern United States background concentrations, then it is not selected as a COPC. Chemicals without a corresponding screening criterion are also selected as COPC. Finally, chemicals with a

detection frequency of less than five percent of the samples with sample sizes of 20 or more are eliminated as COPC. Inorganic chemicals regarded as essential nutrients (i.e., calcium, iron, magnesium, potassium, and sodium) were eliminated as COPC if they exceeded the nutrient screening concentration. The nutrient screening concentrations were derived for a child, as shown in Appendix F. The COPC selected in the environmental media sampled are summarized in Table 8-8.

8.2.1 Surface Soil

Surface soil (0 to 2 feet below ground surface) data from the January 2005 sampling event are summarized in Table 8-1. Surface soil data from the July 2004 sampling event are summarized in Table 8-2. The frequency of detection, range of detected concentrations, and screening criteria are provided for the events separately. The screening criteria used are the NYSDEC's recommended soil cleanup objectives, Eastern United States background concentrations provided in TAGM 4046, and essential nutrient screening concentrations. Screening concentrations for essential nutrients are shown in Table F-1 of Appendix F. No site-specific background samples were collected. Background concentrations of PAHs in urban soils (ATSDR, 1995) were included in Tables 8-1 and 8-2 for comparison purposes only and are not used as screening criteria.

Surface soil was analyzed for VOCs, SVOCs, and metals. The following chemicals are selected as COPC for surface soil:

- VOCs: dichlorodifluoromethane and methyl acetate
- SVOCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, di-n-butyl phthalate, and phenol
- Metals: arsenic, cadmium, copper, lead, mercury, nickel, and zinc

The sum of the SVOC concentrations exceeded the TAGM 4046 screening criteria for total SVOCs (> 50,000 ug/kg). Of the PAHs selected as COPCs, only benzo(a)pyrene and chrysene were detected in concentrations greater than those typically found in urban soils.

8.2.2 Subsurface Soil

Subsurface soil (greater than 2 feet below ground surface) data from the January 2005 sampling event are summarized in Table 8-3. Subsurface soil data from the July 2004 sampling event are summarized in Table 8-4. The frequency of detection, range of detected concentrations, and screening criteria are provided for the events separately. The screening criteria used are the NYSDEC's recommended soil cleanup objectives, Eastern United States background concentrations provided in TAGM 4046, and essential nutrient screening concentrations. Screening concentrations for essential nutrients are shown in Table F-1 of Appendix F. No site-specific background samples were collected. Background concentrations of PAHs in urban soils (ATSDR, 1995) were included in Tables 8-3 and 8-4 for comparison purposes only and are not used as screening criteria.

Subsurface soil was analyzed for VOCs, SVOCs, pesticides, PCBs, petroleum products, metals, and cyanide. The following chemicals are selected as COPC for subsurface soil:

- VOCs: cyclohexane, dichlorodifluoromethane, isopropylbenzene, methylcyclohexane, and methyl ethyl ketone
- SVOCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and dibenzo(a,h)anthracene
- Pesticides: endrin aldehyde and endrin ketone
- Petroleum: fuel oil #2
- Metals: arsenic, copper, mercury, and zinc

The sum of the VOC tentatively identified compound (TIC) concentrations exceeded the TAGM 4046 screening criteria for total VOCs (> 10,000 ug/kg). Of the PAHs selected as COPC, only benzo(a)pyrene and chrysene were detected in concentrations greater than those typically found in urban soils.

8.2.3 Groundwater

Groundwater data from the September 2004 and February 2005 sampling events are summarized in Table 8-5. Groundwater data from the July 2004 sampling event are summarized in Table 8-6. The frequency of detection, range of detected concentrations,

and screening criteria are provided for the events separately. The screening criteria used are "Class GA," *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* from the Technical and Operational Guidance Series (TOGS) 1.1.1, June 1998, and April 2000 Addendum and the essential nutrient screening concentrations. Screening concentrations for essential nutrients are shown in Table F-2 of Appendix F. All groundwater data are for on-site monitoring wells.

Groundwater was analyzed for VOCs, SVOCs, metals, and cyanide. The following chemicals are selected as COPC based on the monitoring well data:

- VOCs: cyclohexane
- SVOCs: 2-methylnaphthalene, pentachlorophenol
- Metals: aluminum, antimony, arsenic, barium, cobalt, iron, lead, manganese, thallium, and vanadium.

Also detected were TICs in both the VOC and SVOC fractions.

8.2.4 Indoor Air

Indoor air data from the interior of the former Ames department store for the December 2004 sampling event are summarized in Table 8-7. The frequency of detection, range of detected concentrations, and screening criteria are provided. The screening criteria used are from the USEPA *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*, and background on-site outdoor air. The USEPA guidance screening levels used are generic risk-based, target indoor air concentrations in a residential setting.

Indoor air was analyzed for VOCs. There are no VOCs selected as COPC based on the indoor air data. It should be noted that at the time of sampling, it was the winter and the building was neither well maintained nor heated. In addition, there was an open borehole in the building left from a previous investigation, which had penetrated through the sub-slab to beyond the depth of the water table.

8.2.5 Sub-slab Soil Vapor

Sub-slab soil vapor data from beneath the foundation of the former Ames department store for the January 2005 sampling event are summarized in Table 8-7. The frequency of detection, range of detected concentrations, and screening criteria are provided. The screening criteria used are from the USEPA *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*. The screening criteria represent generic screening levels for target shallow soil gas that are protective of the target indoor air concentrations for a residential setting and an assumed soil gas-to-indoor air attenuation factor of 0.1

Sub-slab soil vapor was analyzed for VOCs. The following VOC chemicals are selected as COPC based on soil vapor data:

- VOCs: cyclohexane, 4-ethyltoluene, n-heptane, and 2,2,4-trimethylpentane

All of these COPCs were selected because they do not have a corresponding screening criterion for comparison. However, the detected concentrations are low and are similar to or less than the concentrations of the other VOCs detected in sub-slab soil vapor.

8.3 Exposure Assessment

The objective of the exposure assessment is to estimate the type of and potential for human exposure to the COPC that are present in, or migrating from, those environmental media of potential concern identified in Section 8.2. The exposure assessment consists of the consideration of populations that have the potential for exposure to conditions at the Site, currently and in the future, and an analysis of the pathways and routes by which receptors may be exposed to chemicals/media of concern at the Site. A listing of COPC by environmental medium is presented in Table 8-8.

8.3.1 Potentially Exposed Populations

The potential for human exposure to the COPC at the Site is considered under potential current and future scenarios. The following six categories of human receptors (termed "potentially exposed populations") are identified:

- Transient Worker: (adults) who may maintain the public access river walk park along the site's northern property boundary, landscaped areas immediately downgradient of the site along the banks of the Chadakoin River.

- Park Visitor: (adults, adolescents, children) who may visit the public access river walk park along the site's northern property boundary. The park visitors will probably park at the Site's parking lots.

- Trespasser: (adults, adolescents) who may loiter within the boundaries of the Site. Their activities are not related to the walk park adjacent to the Site.

- Construction/Utility Worker: (adults) whose work may require excavation at the Site while improving and/or maintaining the Site for future commercial use.

- Maintenance Worker: (adults) who may perform landscaping activities within the site boundaries and other maintenance activities within the occupied site building(s) in the future.

- On-Site Worker: (adults) who may work within the Site building, when the Site has been redeveloped for commercial use. Since the current plan is to redevelop the Site for a medical center, the workers will be medical and support staff.

- Commercial Visitor: (adults, adolescents, children) who may visit the Site building, when the Site has been redeveloped for commercial use. Since the current plan is to redevelop the Site for a medical center, the visitors will be medical patients and retail customers.

8.3.2 Exposure Pathways

The Site is approximately seven acres in size and is located centrally within the city. It is locally situated among commercial and industrial establishments. The Site is currently unused with a vacant former department store building and extensive asphalt paved parking lots and access roadways. Access to the site is not restricted or limited. However, access to the Site's vacant building is restricted. The Site and it's immediately vicinity are fairly flat. North of and adjacent to the Site is a public access walk park, that runs the entire length of the Site's parking lot, which is approximately 300 yards long. The park is included in the evaluation of the Site. The park is approximately 200 to 300 feet wide and adjacent to it to the north is the Chadakoin River. As the east-flowing river bends south, it becomes the northeastern and eastern boundaries of the Site. To the northwest corner of the Site is a small restaurant. Immediately south of the Site is

Harrison Road and west is South Main Street, both of which are wide divided roads with multiple lanes. Surface water at the Site west of the building flows into a storm drain system that discharges into the Chadakoin River. Also present in the area are three catch basins, which also discharge north into the river. Surface water east of the building is expected to flow northeast into the Chadakoin. There is no evidence of potable water wells downgradient of the site. Groundwater at the site flows toward the Chadakoin River.

Chemical release mechanisms, in the absence of remedial action, used in determining the exposure pathways, are summarized in Table 8-9. The potential receptors and routes of exposure are summarized with descriptions justifying their inclusion as potentially complete pathways.

Exposure pathways are considered for current and future scenarios, and are discussed below. All scenarios evaluated include exposure pathways that are considered as potentially complete. Such scenarios include foreseeable events such as construction and maintenance activities. Scenarios are analyzed and discussed with regard to their likelihood below.

8.3.2.1 Current/Future Scenario

The following exposure scenarios are based on current conditions, and are expected to exist in the future, in the absence of site remediation.

***Transient Worker*:** Based on current indications that the river walk park and the river's edge are well maintained and landscaped and that future maintenance activities may continue, the following exposure pathways are identified as potentially complete:

- Dermal contact with and incidental ingestion and inhalation of COPC in surface soils.
- Dermal contact with and incidental ingestion and inhalation of COPC in subsurface soils.
- Dermal contact with and incidental ingestion of surface water and sediment along the river's edge.

Park Visitor: Based on evidence that the river walk park has easy accessibility and is visited frequently, the lake upstream of the river is stocked with fish, and that the park may continue to exist in the future, the following exposure pathways are identified as potentially complete:

- Dermal contact with and incidental ingestion and inhalation of COPC in surface soils.
- Dermal contact with and incidental ingestion of surface water and sediment.
- Ingestion of biota (e.g., fish) exposed to Site COPC.

Trespasser: Since access to the Site's outdoor areas are not restricted or limited, trespassers may loiter within the boundaries of the Site.

- Dermal contact with and incidental ingestion and inhalation of COPC in surface soils.
- Dermal contact with and incidental ingestion of surface water and sediment along the river's edge.

8.3.2.2 Future Scenario

The following additional exposure scenarios, which may occur in the future, are evaluated based on the planned use of the Site's current on-site building as a converted medical center. As part of the redevelopment plan, it is anticipated that the majority of exterior of the Site will remain covered with asphalt parking lots. There may also be small areas of the Site with exposed soil for aesthetic plantings.

Construction/Utility Worker*:* During future redevelopment or maintenance of the Site, the following exposure pathways are identified as potentially complete:

- Dermal contact with and incidental ingestion and inhalation of COPC in surface soils.
- Dermal contact with and incidental ingestion and inhalation of COPC in subsurface soils.

- Dermal contact with and incidental ingestion and inhalation of COPC in shallow groundwater.

Maintenance Worker: Since the future grounds and structures may require maintenance, the following exposure pathways are identified as potentially complete:

- Dermal contact with and incidental ingestion and inhalation of COPC in surface soils.
- Inhalation of COPC in indoor air.

On-Site Worker: Since the majority of the exterior of the Site will continue to be covered with asphalt parking lots, exposure to COPC would be limited to indoor air should vapor intrusion from below the building occur. The following exposure pathways are identified for commercial visitors.

- Inhalation of COPC in indoor air.

Commercial Visitor: Since the majority of the exterior of the Site will continue to be covered with asphalt parking lots, similar to the on-Site worker, exposure to COPC would be limited to indoor air should vapor intrusion from below the building occur. The following exposure pathways are identified for future commercial visitors.

- Inhalation of COPC in indoor air.

8.4 Toxicity Assessment

For each COPC, critical non-carcinogenic and carcinogenic health effects, for oral and inhalation exposures, are presented in Tables 8-10 and 8-11, respectively. The critical health effects given are those that are used by the USEPA to derive reference doses and reference concentrations (to assess the potential for chronic non-carcinogenic health effects), and slope factors (to assess carcinogenic risk), that are typically used in the quantification of human health risks.

8.5 Risk Characterization

Based on Site conditions, observations, and the fact that the Site will be redeveloped, relative exposure and potential for adverse health effects are discussed for each receptor

population below. Table 8-12 provides a summary of the human health risk characterization.

8.5.1 Current/Future Scenario

The potential for exposure to COPC via the pathways described in the Exposure Assessment is discussed for each receptor population in the current/future scenario under the assumption that there is no remediation at the Site. The potential for exposure is classified as "Not Expected", "Possible", or "Likely" based on Site conditions.

Transient Worker:

Dermal contact with and incidental ingestion and inhalation of COPC in surface soil:

It is assumed that the grass field of the river walk park occasionally gets mowed and other park structures and plantings occasionally required maintenance. The individual(s) or groups of individuals that maintain this walk park and the edge of the river along the park/Site are considered transient workers in this evaluation. From the nature of the maintenance work, exposure to COPC in the surface soil via dermal contact or incidental ingestion, or inhalation of particulates released from the soil is possible.

Dermal contact with and incidental ingestion and inhalation of COPC in subsurface soil:

If the transient worker performs major landscape maintenance activities (e.g., removing or planting shrubs/trees or installing posts) in the river walk park, exposure to COPC in subsurface soil via dermal contact or incidental ingestion, or inhalation of particulates released from the soil is possible.

Dermal contact with and incidental ingestion of COPC in surface water or sediment:

The Chadakoin River, which runs near and on the northern and eastern borders of the Site, may or may not have been impacted by COPC at the Site. However, to be conservative, exposure to COPC in surface water or sediment via dermal contact or incidental ingestion is presumed possible. The landscaping along certain sections of the river bank is well maintained. It has also been documented that fallen tree branches and debris on the river are removed on occasion by neighborhood clean-up crews.

Park Visitor:

Dermal contact with and incidental ingestion and inhalation of COPC in surface soil:

Immediately north of the Site is a public access river walk park. Immediately north of the park is the Chadakoin River. Besides walking on its walk path, the park appears to be suitable for picnicking and fishing. Since the ground surface is either covered with the paved walk path or maintained grass fields, exposure to COPC in surface soil via dermal contact, incidental ingestion, or inhalation of particulates released from soil by the park visitor is not expected.

Dermal contact with and incidental ingestion of COPC in surface water or sediment:

The Chadakoin River, which runs near and on the northern and eastern borders of the Site, may or may not have been impacted by COPC at the Site. However, to be conservative, exposure to COPC in surface water or sediment via dermal contact or incidental ingestion is presumed possible. The park visitor may become exposed through wading along the river's edge, other recreational activities (e.g., rowing), or fishing.

Ingestion of biota impacted by Site COPC:

It is known that Lake Chautauqua, which is located less than one mile upstream of the Chadakoin River by the Site, is stocked with various game fishes by the NYSDEC. Therefore, it is expected that fish are caught on the river adjacent to the Site and that some of those fish may be consumed. Therefore, ingestion of COPC in biota (i.e., fish) caught for consumption in the vicinity of the Site is possible.

Trespasser:

Since access to the Site's outdoor areas are not restricted or limited, to be conservative, Site trespassers are considered a potential receptor population. It is assumed that the Site trespasser loiters within the boundaries of the Site and not in the river walk park.

Dermal contact with and incidental ingestion and inhalation of COPC in surface soil:

The vast majority of the Site is covered with either asphalt or grass. Since the trespasser in not expected to performing activities which penetrate these coverings, exposure to

COPC in surface soil via dermal contact or incidental ingestion, or inhalation of respirable particulates released from soil is not expected.

Dermal contact with and incidental ingestion of COPC in surface water or sediment:

There is no standing surface water or sediment within the boundaries of the Site. The northeastern boundary of the Site is adjacent to the Chadakoin River, however, a retaining wall limits access the river. The eastern boundary of the Site is also adjacent to the river, however, dense shrubbery and trees also limit access to the river. Therefore, exposure to COPC in surface water or sediment within the site boundaries via dermal contact or incidental ingestion is not expected.

8.5.2 Future Scenario

The potential for exposure to COPC via the pathways described in the Exposure Assessment are discussed for each receptor population in the future scenario below under the assumption that remedial actions are not implemented at the Site. The following receptor populations are considered with redevelopment and maintenance of the Site for commercial/industrial use. The redevelopment plan for the Site includes renovation of the current building into a medical center. The plan also indicates that the southern portion of the building will be demolished and rebuilt.

Construction/Utility Worker:

Dermal contact with and incidental ingestion and inhalation of COPC in surface soil:

Redevelopment and/or maintenance-related excavation or grading work at the Site could lead to contact with subsurface soil. Therefore, dermal contact with and incidental ingestion of COPC in surface soil, and inhalation of wind blown or mechanically driven COPC adsorbed to fugitive dust released from soil are likely. Such exposure would be limited to the construction/maintenance period.

Dermal contact with and incidental ingestion and inhalation of COPC in subsurface soil:

Redevelopment and/or maintenance-related excavation or grading work at the Site could lead to contact with subsurface soil. Therefore, dermal contact with and incidental ingestion of COPC in subsurface soil, and inhalation of wind blown or mechanically

driven COPC adsorbed to fugitive dust released from soil are likely. Such exposure would be limited to the construction/maintenance period. Such exposure would be limited to the construction/maintenance period.

Dermal contact with and incidental ingestion and inhalation of COPC in groundwater:

Groundwater at the Site is at 5 to 7 feet below ground surface; therefore, exposure to groundwater may be possible. It is conceivable that excavation work at the Site may reach the depth of the groundwater interface. Should this occur, dermal contact with and incidental ingestion and inhalation of COPC in groundwater is possible. Such exposure would be limited to the construction/maintenance period.

Maintenance Worker:

Dermal contact with and incidental ingestion and inhalation of COPC in surface soil:

Occasionally, the maintenance worker may be expected to perform landscaping or maintenance activities outdoors. Since the areas north and south of the building are only covered with grass and it may be possible that some maintenance activities could penetrate through the grass layer, exposure to COPC in surface soil through dermal contact with and incidental ingestion of COPC in surface soil, and inhalation of wind blown or mechanically driven COPC adsorbed to fugitive dust released from surface soil is possible.

Inhalation of COPC in indoor air through vapor intrusion:

COPC have been identified in soil vapor and groundwater under the building. COPC were not identified in indoor air within the building. However, at the time of indoor air sampling, it was winter and the building was not heated. In addition, the building was probably not sealed or maintained for occupancy. If the building is properly maintained for occupancy, including operation of the heating, ventilating, and air conditioning (HVAC) system, vapor intrusion of COPC into indoor air in the building is unlikely; however, exposure of COPC from vapor intrusion is possible.

On-Site Worker and Commercial Visitor:

Inhalation of COPC in indoor air through vapor intrusion:

As discussed for the maintenance worker above, if the building is properly maintained for occupancy, including operation of HVAC system, vapor intrusion of COPC into indoor air in the building is unlikely; however, exposure of COPC from vapor intrusion is possible.

8.6 Uncertainty Analysis

Uncertainty is inherent in the process of conducting human health evaluations. In qualitative evaluations, sampling and analysis data, information and assumptions regarding the likelihood, frequency, and magnitude of exposure, and information on the toxicity of the chemicals are used to infer the potential for exposure and health risk. By design, the evaluations rely on simple and conservative assumptions with the sole intent of identifying and eliminating from concern those scenarios that are unlikely to result in exposure and health risk and highlighting those scenarios that, depending on actual circumstances, may result in exposure and health risk. Uncertainty is associated with each component of this process, including environmental sampling and analysis, chemical fate and transport analysis, exposure assessment, and the toxicological information used to characterize potential human and ecological health risks. Uncertainty in any of these components could alter the conclusions regarding the likelihood of exposure and health risk for a given receptor population.

8.6.1 Sampling and Analysis

Uncertainty associated with environmental sampling is generally related to the limitations of the sampling in terms of the number and distribution of samples, while uncertainty associated with the sample analysis is generally associated with systematic or random errors (e.g., false positive or false negative results). Thus, the potential for exposure may be overstated or understated depending on how well each environmental medium is characterized.

In particular, the indoor air sampling results within the building are probably not representative of the building's indoor air when the building is maintained and operated for occupancy.

8.6.2 Exposure Assessment

Aspects of the human exposure assessment generally result in overstatement of the potential for long-term exposure. In addition, the release mechanisms for COPC may have been overstated. Of the environmental media of potential concern at the Site, only five media (surface soil, subsurface soil, groundwater, soil vapor, and air) were sampled. Other media (surface water, sediment, or biota) were not sampled and conservative assumptions were made for their inclusion as possible exposure pathways.

8.6.3 Toxicological/Screening Criteria

Screening criteria are not available for all chemicals that were detected in samples collected at the Site. As such, the potential for adverse health effects as a result of exposure to those chemicals, should exposure occur, is uncertain, based on the lack of available screening criteria, and associated toxicological criteria. In most cases, the critical effects listed for the COPC are for laboratory animals, not humans. Differences in toxicity may exist between laboratory animals and humans.

8.7 Summary and Discussion

The current/future and future scenarios assumed redevelopment and reuse of the Site with no remediation.

8.7.1 Current/Future Scenario

The potential for exposure to COPC in soils at the Site is somewhat limited given that the Site is and will be mostly covered by buildings and extensive asphalt paved parking lots and access roadways. However, portions of the Site and the river walk park adjacent to the Site have and will continue to have exposed surface soil, covered with grass or other landscaping. The Site is accessible by trespassers, the river walk park is maintained by transient workers, and the river walk park, the river's edge, and the river itself are used by recreational visitors.

From the nature of maintenance work, exposure to COPC in surface and subsurface soil by the transient worker is possible. Similarly, since the river's edge along the river walk park is maintained, exposure to surface water and sediment along the Chadakoin River by the transient worker is conservatively assumed to be possible. Since the river walk park contains a paved walk path and maintained grass fields, exposure of the park visitor to COPC in surface soil is not expected. Exposures of the park visitor to surface water and sediment along or in the Chadakoin River during wading, other recreational activities (e.g., boating), and fishing, and to biota (i.e., fish) collected from the river and consumed, are conservatively assumed to be possible. Since the majority of the Site is developed or grass-covered and the trespasser is unlikely to conduct activities that penetrate these covers, exposure of the trespasser to surface soil is not expected. Similarly, exposure to surface water and sediment in the Chadokoin River is not expected.

If during redevelopment of the site, exposed surface soil is removed and replaced with clean soil, the potential for exposure to surface soil by the transient worker could be eliminated. Finally, since surface water flow in the Chadakoin River near the Site has been estimated at four miles per hour and, therefore, the volume of diluent water is large, COPC reaching the river through surface runoff or groundwater discharge will likely become so diluted as to be undetectable and present insignificant exposure potential.

8.7.2 Future Scenario

The potential for exposure to COPC in the future was evaluated based on assumed redevelopment of the Site as a medical center and continued use of the river walk park. Under this scenario, additional potential receptors include the construction/utility worker, maintenance worker, on-Site worker, and commercial visitor.

Exposure of the construction\utility worker to COPC in surface and subsurface soil and shallow groundwater during construction, grading, or utility maintenance activities is likely or possible. Such exposures would be limited primarily to the construction/maintenance period. Since the maintenance worker may be expected to occasionally perform landscaping and maintenance activities outdoors, exposure to COPC in surface soil is possible. If the building is maintained and operated for occupancy, vapor intrusion of COPC in soil gas and groundwater into indoor air in the building is unlikely; however, inhalation of COPC by the maintenance worker, on-Site worker, and commercial visitor is possible.

If during redevelopment of the site, exposed surface soil is removed and replaced or covered with clean soil, the potential for exposure to surface soil and groundwater by the construction/utility worker and maintenance worker could be eliminated. In addition, the potential for exposure of the construction/utility worker to subsurface soil and groundwater could be controlled through the development and implementation of a site-specific health and safety plan. Finally, with renovation and reuse of the building, the vapor intrusion pathway, if present, could be eliminated through engineering design and controls (e.g., installation and operation of a subsurface vapor ventilation system).

MALCOLM PIRNIE

Fish and Wildlife Impact Analysis

SECTION 9

The Fish and Wildlife Impact Analysis for the site was conducted in accordance with the Remedial Investigation Work Plan (Malcolm Pirnie, Inc., 2004) and NYSDEC guidance for performing *Fish and Wildlife Impact Analyses (FWIA) for Inactive Hazardous Waste Sites* (NYSDEC, 1994). Steps I (Site Description) and IIA (Pathway Analysis) were used as a frame of reference. The purpose of the analysis is to identify potential wildlife and vegetative receptors that may be exposed to impacted media on the site and to determine if such exposure poses potential health risks.

This analysis, which is qualitative, consists of the following sections:

- Ecological characterization.
- Exposure and effects assessment.
- Identification of constituents of potential ecological concern (COPECs).
- Ecological risk characterization.
- Assessment of uncertainties and limitations.
- Summary.

9.1 Ecological Characterization

The ecological characterization is based on limited site information. Since the site was covered with snow most of the winter when the investigation was performed, the ecological characterization was based on photographs taken at and in the vicinity of the site, and available aerial photography and mapping. Site characteristics on and within an approximately 0.5-mile radius of the site are described to evaluate the potential for risks

to ecological receptors that may be exposed to impacted media on or emanating from the site. As shown on Figure 1-1, the site is located within the city limits of Jamestown. In general, commercial/industrial and limited residential uses dominate land-use patterns surrounding the site. Other sources of information used in the ecological characterization include: aerial photographs, the U.S. Geological Survey (USGS) topographic quadrangle map, U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) maps, and the New York State (NYS) Freshwater Wetlands map for the site vicinity.

The NYS Natural Heritage Program was contacted to determine the presence of rare, threatened, and/or endangered species, and significant or critical habitats in the vicinity of the site. According to the response letter dated March 16, 2005, (see Appendix F) a database search indicated no records of known occurrences of rare or state-listed animals, plants, significant natural communities, or other significant habitats, on or in the immediate vicinity of the site. The response letter is included in Appendix F.

9.1.1 Surface Water Bodies and Wetlands

There is little variation in topography on the site. The Chadakoin River borders the site to the north and east (see site aerial photo in Appendix F). It is fed by Chautauqua Lake approximately 3 miles upstream of the site. The Chadakoin River flows into Cassadaga Creek near the town of Levant approximately four miles downstream of the site. Stormwater runoff from the site is conveyed via a manmade storm drain system which discharges to the north into the Chadakoin River. Hydrogeologic investigations conducted as part of this RI indicate that shallow groundwater flow at the site is generally from northwest to southeast, toward the Chadakoin River. Localized groundwater discharge occurs to the Chadakoin River north and east along the border of the site.

The NYS classification for the Chadakoin River is Class C. Class C waters are suitable for fish propagation and survival and for primary and secondary contact recreation. The Chadakoin River supports a warm water fishery, with various sunfish species, bass species, and occasional muskellunge (*Esox masquinongy*), Northern pike (*Esox lucius*), and walleye (*Sander vitreus*).

One wetland, associated with the Chadakoin River, located just within the 0.5-mile radius upstream of the site, was noted using NWI's on-line mapping tool http://wetlandsfws.er.usgs.gov/wtlnds/launch.html). This wetland is identified as a freshwater pond.

9.1.2 Terrestrial Habitats

The main cover types on and in the vicinity of the site are limited to a few, generally associated with the developed nature of the area, and are described with site-specific detail below. Where possible, cover types were classified according to the NYS Natural Heritage Program's *Ecological Communities of New York State* (NYSDEC, 1990) and the *Draft Ecological Communities of New York State Second Edition* (NYSDEC, 2002).

Cover Types:

Urban Structure Exterior – Due to the developed nature of the area, there is limited natural habitat. However, the exterior surfaces of metal, wood, or concrete buildings (i.e., commercial/industrial buildings, bridges) may be sparsely vegetated with lichens, mosses, or terrestrial algae. Vascular plants may also grow in cracks in and around urban structures and may offer food sources and/or nesting and roosting habitat. The nooks and crannies of urban structures can provide nesting habitat for birds, insects, and roosting sites for bats.

Mowed lawn – A small area of mowed lawn is associated with the Chadakoin Riverwalk, a public access pathway adjacent to the Chadakoin River. Limited areas of mowed lawn are present in and around buildings and parking lots in the vicinity of the site.

Riverine/Riparian – The Chadakoin River, located on the northern and eastern boundaries of the site, is most characteristic of a midreach stream. It is relatively swift flowing with a total fall of about 50 feet over the few miles that the river flows through the city limits. Limited riparian areas are associated with the Chadakoin River in the vicinity of the site, as much of the river banks through the city consist of concrete embankments. A few small areas of vegetated river bank are located in the vicinity of the site.

Vegetation:

Vegetation on and in the vicinity of the site is limited. Several oak trees (*Quercus sp.*) are planted along the north side of the building on-site for ornamental purposes. Vegetation planted for ornamental purposes include some trees, shrubs, and other herbaceous vegetation associated with the mowed lawn area along the Chadakoin Riverwalk. Ornamental trees and shrubs are also associated with the limited areas of mowed lawn in and around buildings and parking lots in the vicinity of the site. In addition, the limited riparian area associated with the Chadakoin River includes trees, shrubs, and herbaceous vegetation.

9.1.3 Wildlife and Value of Vegetative Habitat

The terrestrial cover types previously described offer limited lower value habitat for those wildlife populations more tolerant of human activity, such as songbirds like the American robin (*Turdus migratorius*) and European starling (*Sturnus vulgaris*) and small mammals like the gray squirrel (*Sciurus carolinensis*), and house mouse (*Mus musculus*), and semi-aquatic species like raccoons (*Procyon lotor*).

The mowed lawn areas on and in the vicinity of the site, associated with residential and industrial development, create an environment of limited value to wildlife because of constant human disturbance. Species more tolerant of human activity, such as American robins, and gray squirrel, may be present.

Since the site and much of the area within a 2-mile radius of the site is developed, limited resources are offered to wildlife. However, as mentioned previously, the nooks and crannies of urban structures can provide nesting habitat for birds, insects, and roosting sites for bats. At best, the limited riparian areas and parks within the 2-mile radius of the site offer stop over habitat for bird species.

9.1.4 Value of Natural Resources to Humans

The Chadakoin Riverwalk, located on the site's northern boundary, offers limited recreational use to the public. The 2-mile radius surrounding the site is mostly developed land within the city limits. However, there are several small parks in the area including Allen Park southeast of the site, Willard Park east of the site, and Emory Park north of the site. These parks apparently support non-consumptive recreational uses. The

Chadakoin River may occasionally be used by individuals for kayaking, canoeing, and/or fishing. However, numerous obstacles like log jams, dams, and low clearance under bridges and buildings, and the developed nature of the area, do not make the reach of the Chadakoin River in the vicinity of the site a popular place for these recreational activities. Chautauqau Lake, located about three miles west-northwest and upstream of the site is a stocked lake and supports numerous sport fish species. The Chadakoin River in the vicinity of the site is not likely popular for fishing, especially with Chautauqau Lake nearby. However, occasional fishing in the Chadakoin River in the vicinity of the site may occur.

9.2 Exposure and Effects Assessment

This section describes potential ecological receptors that may be exposed to media of potential concern at and in the vicinity of the site. Potential exposure pathways are identified and described.

9.2.1 Potential Ecological Receptors and Exposure Pathways

The pathway analysis identifies environmental media of potential concern, COPEC in those environmental media, and migration pathways from the site and characterizes the potential for risk that may be associated with exposure of ecological receptors to COPECs in media of concern on or originating from the site. Exposure pathways are considered complete if potential receptors exist and it is likely that those receptors will come into contact with impacted media. Exposure pathways are considered potentially complete if it is possible, but not likely, that receptors will contact impacted media. If no exposure pathway to receptors can be identified, an exposure pathway is considered incomplete.

Past use of the site may have resulted in impacts to soil and the potential for constituents to migrate from soil to groundwater and subsequently discharge to the surface water of the Chadakoin River. In this analysis, the environmental media of concern are soil and, since groundwater discharges to surface water.

For terrestrial vegetation and wildlife, potentially complete exposure pathways are limited to those species tolerant of human activity in a developed area that may contact impacted surface soil on the site. Currently, exposed surface soil is limited to the

Chadakoin Riverwalk and small areas adjacent to the existing building. Future development plans include use of the existing building as medical office space and would not increase or decrease use of the site by ecological receptors.

Exposure routes for vegetation are via uptake from impacted soil. For wildlife species, exposure routes include direct contact with soil via ingestion and dermal absorption, as well as the ingestion of constituents that have been incorporated into the vegetation and organisms that make up their diet. Herbivorous species that may be present, like the gray squirrel and house mouse, may be exposed to constituents that have been incorporated from the soil into plant tissue. Carnivorous species may be exposed to constituents that have been taken up in other terrestrial wildlife species. There might be a slightly greater potential for exposure to receptor populations in the mowed lawn areas, due to the intermittent release of dust particles coinciding with mowing events.

For aquatic life, potentially complete pathways include contact with potentially impacted surface water and sediment by those aquatic and semi-aquatic species that live in and around the Chadakoin River adjacent to the site. Infiltration through impacted soil can result in the release of the more mobile constituents to groundwater. If groundwater discharges into the Chadakoin River, aquatic invertebrates, fish, and other wildlife may be directly exposed to these constituents or may ingest aquatic vegetation and other organisms that have incorporated them. Direct contact with water and sediments can also occur during feeding and nesting activities of waterfowl and other semi-aquatic organisms (i.e., raccoons).

However, the classes of constituents associated with the site include PAHs, which are not typically mobile due to their complex structure and hydrophobic properties, and metals, which are not typically mobile due to the insoluble complexes formed and sorption to soil particles. Constituents in groundwater may attenuate naturally before reaching the Chadakoin River. Although the river is not large, it is fast moving, likely diluting concentrations of constituents that may enter via groundwater discharge. However, due to the close proximity of the river to the site, exposure pathways for aquatic and semi-aquatic ecological receptors are considered potentially complete.

There is no exposure of potential receptors in the asphalt paved parking area and areas covered by buildings. Future development plans include use of the existing building as medical office space and construction of a CVS pharmacy store in the southwest corner

of the parking lot (the out parcel). Under future conditions, potential receptors are not expected to contact soil under these surfaces, and exposure pathways are incomplete.

9.2.2 Constituent Migration and Fate

Transformation or losses due to environmental degradation are not considered in this analysis. It is assumed that following uptake, concentrations in vegetation and wildlife receptors will equal concentrations measured in soil. This approach is conservative in that plants and wildlife typically do not take up 100 percent of the constituents from soil. Typically, biological uptake from soil or diet is less than a 1:1 ratio. The approach is also conservative because no dilution or attenuation of the constituents in groundwater potentially entering surface water bodies is considered.

9.3 Identification of Constituents of Potential Ecological Concern

The two environmental media that have been sampled and may be presently complete or potentially complete exposure pathways for ecological receptors at and/or in the immediate vicinity of the site are soil and groundwater.

9.3.1 Shallow Soil

Soil data from the January 2005 RI and soil data from the LCS July 2004 sampling event were used in this analysis. For the purposes of this analysis, only those samples taken from depths that are inclusive of the 0-4' below ground surface interval were included. This is based on the assumption that the majority of wildlife and vegetative parts will come into contact with only the topmost 4 feet of soil. Composite soil samples, as long as the interval began shallower than 4 feet, were included in this analysis (i.e., 3-5'). Although most of the soil sampling locations from the LCS July 2004 sampling event were beneath pavement or the building, the data were conservatively used in this analysis. Tables 9-1 and 9-2 summarize the soil data from the RI and the LCS July 2004 sampling event; for each detected constituent, the frequency of detection and range of detected concentrations are presented.

Five samples from the RI are included in this analysis. They were collected from the uppermost 0-2 inches of soil adjacent to the northern and eastern property boundaries and

one location within the landscape planter in the western region of the site and analyzed for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide.

Four samples from the LCS July 2004 sampling event are also included in this analysis. They were collected from one soil boring and three test pits at varying depth intervals and were sampled for VOCs, SVOCs, petroleum, pesticides, PCBs, TAL metals, and total cyanide.

To identify COPECs, available shallow soil data are compared to appropriate ecological screening criteria. The NYSDEC currently has no ecological screening criteria for soil. Therefore, screening benchmarks developed by the Oak Ridge National Laboratory (ORNL) for toxicity to wildlife (Sample et al., 1996) are used for comparison with concentrations in soil. Benchmark values for the white-footed mouse were selected for this analysis, because the white-footed mouse represents a characteristic herbivorous small mammal that may be present at the site. Benchmark values are presented in Tables 9-1 and 9-2 as dietary concentrations that correspond to the appropriate no observed adverse effect levels (NOAELs). For screening purposes, it was conservatively assumed that the constituent concentrations in soil would equal those in the white-footed mouse diet as well. COPECs are selected where the maximum detected concentrations exceed available soil benchmarks, for several PAHs and inorganic constituents, where maximum detected concentrations also exceed background concentrations, and where no benchmark is available for a particular constituent. COPEC in shallow soil are shown on Table 9-3.

As shown on Table 9-3, of the seven VOCs detected three are selected as COPEC because benchmark values are not available; however, the detected concentrations of the three VOCs with benchmark values are orders of magnitude below the benchmarks. Benchmarks are available for only three of the 24 SVOCs detected; however, background concentrations are available for several of the PAHs. Due to the ubiquitous nature of PAHs in urban soils and the general lack of benchmark values, detected concentrations of PAHs are compared to the range of background concentrations, where available. With the exception of chrysene, detected concentrations of SVOCs do not exceed benchmarks or background, where applicable. Chrysene remains a COPEC since detected concentrations in three of the seven samples exceeds background. Thirteen other SVOCs

remain as COPEC because benchmarks or background are not available. One pesticide (endrin ketone) and PCBs detected were orders of magnitude below the benchmarks.

Inorganic constituents, since they are naturally occurring, were compared to background concentrations as well as the benchmark values. Of the 21 inorganic constituents detected, only arsenic and zinc were detected at concentrations above benchmarks and background and are retained as COPECs. Magnesium is retained as a COPEC, while no benchmark is available, the maximum detected concentration does exceed background.

Of the soil samples collected, most from the LCS 2004 investigation were collected from areas under the paved parking lot or from beneath the existing building. It can be assumed that COPECs detected in those soil samples pose no current risk to potential ecological receptors because they are functionally sealed off and there is no future risk as long as these areas remain inaccessible. The remainder of the samples were collected from areas where soils are potentially exposed to ecological receptors, such as the Chadakoin Riverwalk and the unpaved areas around the existing building. While limited in value, exposure pathways in these areas may be complete, and there is a potential risk to ecological receptors.

9.3.2 Groundwater

Groundwater samples from five monitoring wells collected during the RI and groundwater samples from four temporary monitoring wells collected during the LCS July 2004 sampling event were used in this evaluation. Samples from the RI were analyzed for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide. Samples for the LCS July 2004 sampling event were analyzed for TAL metals and total cyanide. Tables 9-4 and 9-5 summarize the groundwater data from the RI and the LCS July 2004 sampling event; for each detected constituent, the frequency of detection and range of detected concentrations are presented.

Although constituents in groundwater may naturally attenuate before reaching the Chadakoin River and/or are likely to be significantly diluted in the fast moving water of the Chadakoin River, available groundwater data are conservatively compared to appropriate ecological screening criteria for surface water. The NYSDEC Surface Water Quality Standards for aquatic chronic effects in Class C waterways and the ORNL toxicological benchmarks for protection of aquatic biota (Suter and Tsao, 1996) are

presented in Tables 9-4 and 9-5 for comparison. COPECs are selected where the maximum detected concentrations exceed the lower of the available surface water quality criteria or where no criterion is available for a particular constituent. COPEC in groundwater are shown in Table 9-3.

As shown on Table 9-3, of the two VOCs detected, only cyclohexane remains as a COPEC because no surface water quality criteria or toxicological benchmarks are available. Of the six SVOCs detected, three SVOCs (2-methylnaphthalene, bis(2-ethylhexyl) phthalate, and fluorine) were detected at concentrations exceeding the NYSDEC Surface Water Quality Standards.

The maximum detected concentrations of the following inorganic constituents exceed either or both of the NYSDEC Surface Water Quality Standards or toxicological benchmarks on Tables 9-4 and 9-5: aluminum, antimony, barium, beryllium, calcium, cobalt, copper, iron, lead, manganese, and thallium. While attenuation in the soil and dilution in the river would likely significantly reduce the resulting concentrations from groundwater discharge to the Chadakoin River, maximum detected concentrations of antimony, beryllium, calcium, copper, and thallium would need to be attenuated and diluted by a factor of between 1 and 10 to equal the NYSDEC surface water quality standard or toxicological benchmarks, aluminum, lead, iron, and manganese would need to be attenuated and diluted by a factor of between 50 and 100 to equal the NYSDEC surface water quality standard or toxicological benchmark, and detected concentrations of barium would need to be attenuated and diluted by a factor of 300 to equal the toxicological benchmark.

9.4 Ecological Risk Characterization

The risk characterization section of this screening-level evaluation integrates information from ecological characterization and the exposure and effects assessment to determine whether the potential exists for ecological receptors to experience adverse health effects from exposure to the site-related chemicals identified as COPEC. The risk characterization discussion follows by medium

9.4.1 Potential Risks due to COPECs in Shallow Soil

COPECS in soil include: chrysene, arsenic, magnesium, zinc and, due to the lack of toxicological benchmarks, several VOCs and SVOCs. This analysis indicates a potential for adverse effects to the white-footed mouse. Concentrations of arsenic and zinc were consistently (in all 20 samples) more than 10 times the toxicological benchmark value. These results indicate there may be a potential for adverse effects associated with contact of the on-site soil; however, as limited low value habitat is present, much of the soil is and will continue to remain inaccessible to wildlife, the magnitude of risk is not great. Adverse effects to potential receptors higher on the food chain may be underestimated for constituents that tend to biomagnify, like mercury and PCBs, by using the benchmarks for the white-footed mouse. The maximum detected concentration of chrysene is approximately 15 times higher than the high end of the range in urban background. The potential for chrysene to pose potential adverse effects can not be assessed due to the lack of a toxicological benchmark value.

9.4.2 Potential Risks due to COPECs in Groundwater

COPECs in groundwater include: 2-methylnapthalene, bis(2-ethylhexyl)phthalate, fluorene, aluminum, antimony, barium, beryllium, calcium, cobalt, copper, iron, lead, manganese, thallium, and, due to the lack of toxicological benchmarks, cyclohexane. While attenuation in the soil and dilution in the river would likely significantly reduce the resulting concentrations from groundwater discharge to the Chadakoin River, detected concentrations of barium would need to be attenuated and diluted by a factor of 300 to equal the toxicological benchmark, iron would need to be attenuated and diluted by more than 90 times to equal the NYSDEC surface water quality standard, and lead and manganese would need to be attenuated and diluted more than 50 times to equal the toxicological benchmarks. These results indicate there may be a potential for adverse effects associated with aquatic life in the Chadakoin River from discharge of groundwater to surface water.

9.5 Uncertainty Analysis

Uncertainty is inherent in the process of conducting qualitative risk analysis. Environmental sampling and analysis are prone to uncertainty, as are the available toxicity data used to characterize risk. Uncertainty associated with the environmental

sampling is generally related to the limitations of the sampling program in terms of the number and distribution of samples. Uncertainty in the laboratory analysis of the samples is generally related to systematic or random errors.

The methodologies used in this analysis rely on conservative assumptions, and therefore, the potential for exposure and risk is overestimated. These assumptions include:

- Terrestrial receptors forage exclusively within the site boundaries and are exposed to the COPEC present in shallow soil on a daily basis. This is unlikely given the limited habitat that the site offers.
- The COPEC concentrations in shallow soil at the site represent the concentration of COPEC in the receptor populations' food source (vegetation). This is unlikely because plants do not readily take up all COPEC in a 1:1 ratio.
- The receptor populations' entire food source is impacted at the maximum detected concentrations of each COPEC. This is unlikely since the site is unlikely to solely support wildlife species.

Other sources of uncertainty in the analysis, that could lead to overestimation of potential for exposure and risk, include:

- Screening-level benchmark values were derived from data for laboratory animals; differences in toxicity may exist between laboratory animals and wildlife.
- Other receptor species that may inhabit the site may be more or less sensitive to COPEC than the receptor chosen for this analysis.

This analysis may over or underestimate the magnitude for potential adverse effects to aquatic life, depending on the extent of attenuation in soil prior to discharge and dilution subsequent to discharge to the Chadakoin River.

9.6 Summary

The majority of the site is paved and provides limited, low value wildlife habitat. However, even the existing building may be used for nesting songbirds. The Chadakoin Riverwalk and the unpaved areas around the existing buildings are the portions of the site with the most wildlife value, although the area is limited. The adjacent Chadakoin River provides habitat for aquatic life and semi-aquatic wildlife.

Limited potentially complete exposure pathways exist for vegetation and wildlife receptors that have the potential to contact impacted soil or ingest food items in their diet which have incorporated constituents from impacted soil. Although COPECs in groundwater are likely to attenuate and/or dilute before and/or upon reaching the Chadakoin River, exposure pathways for potential contact with groundwater that may discharge to surface water are considered potentially complete. The most likely complete exposure pathways are those associated with aquatic life in the Chadakoin River. Soil and groundwater data are compared to toxicological benchmarks, and for inorganic constituents in soil, to background, in order to select COPECs. Constituents for which benchmarks are not available were also selected as COPEC.

Proposed redevelopment of the site includes use of much of the existing building as medical office space, retaining the large paved parking lot. Therefore, future use would continue to limit wildlife use at the site. The most likely potential for adverse effects are associated with aquatic life in the Chadakoin River. However, attenuation in soil and dilution in the river are likely sufficient to minimize that potential.

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Conclusions and Recommendations

SECTION 10

10.1 Conclusions

The Remedial Investigation of the Former Ames/Hills Plaza Site provided an environmental characterization of on-site subsurface soil/fill, surface soils, groundwater, and indoor air sufficient to evaluate their potential risk to human health and the environment. A summary of conclusions is provided below by media evaluated:

10.1.1 Subsurface Soil/Fill

Evaluation of analytical results of subsurface soil/fill samples indicates that there are two known locations on-site that showed evidence of petroleum in the subsurface soil/fill. These areas are located in the vicinity of monitoring wells MW-3 and MW-4, along the northern site boundary. In addition, PAHs and metals are present throughout the site subsurface soil/fill at concentrations above TAGM levels. Two of the PAHs, (benzo (a) pyrene and chrysene), were also present above the range typically found in background urban soils. When totaled however, PAHs in subsurface soil/fill samples do not exceed the TAGM value for total SVOCs.

Arsenic, copper, mercury, and zinc were also present at concentrations above both the TAGM values and the range detected in eastern US background soils.

VOCs, pesticides, and PCBs were not detected in any of the subsurface soil/fill samples at concentrations above TAGM values.

10.1.2 Surface Soils

Analytical results of surface soil samples were similar to those of the subsurface soil/fill. Elevated concentrations of similar PAHs and metals were present in the surface soil samples. Volatile organic compounds, where present, were detected at very low concentrations, all below TAGM values.

10.1.3 Groundwater

Low concentrations of two VOCs and several PAHs were present primarily in only one of the five groundwater samples collected. These detections were present in well MW-3 which was found to contain remnants of fuel oil #2 in the subsurface soil/fill. Only one SVOC (pentachlorophenol) was present in this groundwater sample at a concentration (2.0 ug/l) above the groundwater standard of 1.0 ug/l. Both VOC and SVOC tentatively identified compounds were also present in the groundwater samples from wells MW-3 and MW-4. No other significant concentrations of organics were detected in the groundwater sampled. Seven metals (antimony, arsenic, barium, iron, lead, manganese, and thallium) were detected above groundwater standards in one or more groundwater samples.

10.1.4 Indoor Air

Analytical results of sub-slab and indoor air samples indicated no current health risk to occupants of the building as a result of site contaminants in breathing air.

10.2 Recommendations

Results of this and previous environmental studies at the Site confirm that the former Ames/Hill Plaza site is suitable for re-development as an office/commercial facility provided that certain remedial actions and precautions are taken to limit exposure to petroleum, PAHs and metals that are present in the surface soil and/or on-site soil/fill material.

Minimum precautions should include:

- Placement and/or maintaining of documented clean soil, asphalt, or concrete over the surface following or during site development to minimize the potential for exposure following site redevelopment. An exception to this cover plan may be the wooded area along the eastern site boundary near the river which is generally not accessed by humans but offers some wildlife value.

- Establishment of health and safety protocols for specific re-development activities to minimize exposure potential.

- Development of a soil/fill management plan for dealing with excavated fill material during development activities and when digging as required to maintain or enhance utilities following completion of site redevelopment. The soil/fill management plan should include health and safety requirements and excavated soil handling/disposal requirements.

- Installation of a sub-slab ventilation system for the building to essentially eliminate the future potential for exposure to organic vapors within the building if it is determined that they are migrating into the building air space.

As discussed in the qualitative human health evaluation and the fish and wildlife impact analysis, these actions will be sufficient to protect human health and the environment.

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SECTION 11

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TABLE 4-1
SOIL BORING SUMMARY
FORMER AMES/HILLS PLAZA
JAMESTOWN, NEW YORK

Boring No.	Date Drilled	Total Depth *(feet bgs)*	Depth to Water *(feet bgs)*	Maximum PID Reading/Depth Interval *(ppm/feet bgs)*	Sampled Interval *(feet bgs)*	Analyses	Comments
MW-1	01/25/05	17.0	8.5	3.1 ppm / 3.0 feet bgs	6.0 to 8.0	VOCs, SVOCs, TAL Metals, CN	None.
MW-2	01/25/05	15.0	6.0	0.0 ppm throughout	2.0 to 4.0	VOCs, SVOCs, TAL Metals, CN	Fill material to 9.5 feet bgs.
MW-3	01/26/05	16.0	5.0	1058 ppm / 11 feet bgs	6.0 to 8.0	VOCs, SVOCs, TAL Metals, CN	Petroleum odor and sheen noted from 6 to 14 feet bgs
MW-4	01/25/05	16.0	6.0	35.7 / 8.0 feet bgs	7.5 to 8.0	VOCs, SVOCs, TAL Metals, CN	Fill material to 5.5. feet bgs./ apparent petroleum product from 8 to 10 feet
MW-5	01/26/05	16.0	8.0	0.0 ppm throughout	4.0 to 6.0	VOCs, SVOCs, TAL Metals, CN	Fill to 7.0 feet bgs.

Notes:

bgs - below ground surface
ppm - parts per million
VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
TAL = Target Analyte List
CN = Cyanide

Created by: SC Date: 02/21/2005
Checked by: Date:

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TABLE 4-2
SUMMARY OF MONITORING WELL CONSTRUCTION DETAILS
REMEDIAL INVESTIGATION REPORT
FORMER AMES/HILLS PLAZA
JAMESTOWN, NEW YORK

Well No.	Screen Diam. *(in)*	Slot Size *(in)*	Well Material	Borehole Diameter *(in)*	Borehole Depth *(ft bgs)*	Screened Interval *(ft bgs)*	Date Installed
MW-01	2	0.010	PVC	8.5	16.0	6.0 - 16.0	1/25/2005
MW-02	2	0.010	PVC	8.5	14.0	4.0 - 14.0	1/25/2005
MW-03	2	0.010	PVC	8.5	15.5	5.5 - 15.5	9/8/2004
MW-04	2	0.010	PVC	8.5	15.5	5.5 - 15.5	9/8/2004
MW-05	2	0.010	PVC	8.5	15.5	5.5 - 15.5	9/8/2004

Notes:
bgs - below ground surface.

Created by: BW Date: 10/26/2004
Checked by: JJR Date: 10/29/2004

TABLE 4-3
GROUNDWATER ELEVATIONS - FEBRUARY 4, 2005
REMEDIAL INVESTIGATION REPORT
FORMER AMES/HILLS PLAZA
JAMESTOWN, NEW YORK

Well No.	PVC Riser Elev. (ft AMSL)	Water Level (ft BTOR)	Groundwater Elev. (ft AMSL)
MW-1	1304.5	6.82	1297.7
MW-2	1302.8	5.40	1297.4
MW-3	1303.9	6.10	1297.8
MW-4	1303.1	4.92	1298.2
MW-5	1303.3	4.80	1298.5
Upstream River Elevation(1)	1314.2	15.10	1299.1
Downstream River Elevation(2)	1305.4	8.46	1296.9

Notes:
(1) Upstream elevation measured from center of stone wall beneath railing on east side of South Main St. bridge over Chadakoin River.
(2) Down stream elevation measured from center of Harrison Street north side bridge curb.
AMSL - Above Mean Sea Level
BTOR - Below Top of Riser

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TABLE 7-1
SUMMARY OF ANALYTICAL RESULTS - SURFACE SOILS
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Sample Location Sampling Depth (ft. bgs) Collection Date	NYSDEC TAGM 4046[1]	Urban Background Concentrations[2][3]	SS-1 0.0 - 0.1' 01/26/2005	SS-2 0.0 - 0.1' 01/26/2005	SS-3 0.0 - 0.1' 01/26/2005	SS-4 0.0 - 0.1' 01/26/2005	SS-5 0.0 - 0.1' 01/26/2005
Volatile Organic Compounds - VOCs (ug/kg)							
Dichlorodifluoromethane	NA	NA	3 J	3 J		2 J	
Methyl Acetate	NA	NA					4 J
Total VOCs	10,000	NA	3	3		2	4
Semi-Volatile Organic Compounds - SVOCs (ug/kg)							
2-Methylnaphthalene	36,400	NA			120 J		
Acenaphthene	50,000***	NA		370 J	810		
Acetophenone	NA	NA	220 J	680	110 J		
Anthracene	50,000***	NA		750	1,500	300 J	
Benzo(A)Anthracene	224or MDL	169 -59,000	380 J	4,200	6,200	1,400	
Benzo(A)Pyrene	61	165 - 220	***260 J***	***4,400***	***5,800***	***1,300***	***390 J***
Benzo(B)Fluoranthene	1,100	15,000 - 62,000	550 J	5,000 J	8,300 J	1,600 J	
Benzo(G,H,I)Perylene	50,000***	900 - 47,000		530	750		
Benzo(K)Fluoranthene	1,100	300 - 26,000	440	4,700	4,200	1,600	
Benzyl Butyl Phthalate	50,000***	NA		7,400		370 J	
Bis(2-Ethylhexyl) Phthalate	50,000***	NA	200 J	1,900	200 J	2,800	
Caprolactam	NA	NA	270 J	2,300			
Carbazole	NA	NA		840	1,400	270 J	
Chrysene	400	251 - 640	550	***5,800***	***9,400***	***1,800***	400 J
Dibenz(A,H)Anthracene	14or MDL	NA		1,100	1,300	340 J	
Dibenzofuran	6,200	NA		160 J	420 J		
Di-N-Butyl Phthalate	810	NA		4,400			
Fluoranthene	50,000***	200 - 166,000	1,100	11,000	19,000	4,400	1,000
Fluorene	50,000***	NA		340 J	720		
Indeno(1,2,3-C,D)Pyrene	NA	8,000 - 61,000		2,600	2,800	720	
Naphthalene	13,000	NA			210 J		
Phenanthrene	50,000***	NA	430	5,000	12,000	2,100	590 J
Phenol	30or MDL	NA		160 J			
Pyrene	50,000***	145 - 147,000	620	7,700	15,000	2,700	740 J
Total SVOCs	500,000***	NA	5,020	71,330	90,240	21,700	3,120
Total BaP Equivalent[5]	NA	NA	363	6,785	8,966	2,046	394
TAL Metals (mg/kg)							
Aluminum	SB	33,000	4,710 J	9,100 J	7,160 J	7,330 J	7,190 J
Arsenic	7.5 or SB	3-12 **	6.4	***12.4***	8.7	7.1	10.2
Barium	300 or SB	15-600	44.4 J	97.6 J	88.5 J	75.6 J	76.3 J
Beryllium	0.16 or SB	0-1.75	0.25	0.44	0.29	0.41	0.32
Cadmium	1 or SB	0.1-1	0.24	***1.5***		0.39	
Calcium	SB	130 - 35,000 ***	10,700 J	4,390 E	14,400 J	19,500 J	9,760 J
Chromium, Total	10 or SB	1.5 - 40 **	11.4	21.9	8.4	***115***	10.9
Cobalt	30 or SB	2.5 - 60 **	4.3	9	6.3	5.3	7.3
Copper	25 or SB	1 - 50	35.7 J	***87.8 J***	32.1 J	***58.6 J***	38.7 J
Iron	2,000 or SB	2,000 - 550,000	13,600 J	23,900 J	17,100 J	18,600 J	18,200 J
Lead	400 [4]	****	78.3 J	93.9 J	24.5 J	484 J	33.3 J
Magnesium	SB	100 - 5,000	3,560 J	3,090 J	4,210 J	3,530 J	4,460 J
Manganese	SB	50 - 5,000	413 J	892 J	710 J	482 J	547 J
Nickel	13 or SB	0.5 -25	14.7	***27.6***	13.5	15.6	17.9
Potassium	SB	8,500 - 43,000 **	542	885	782	697	992
Vanadium	150 or SB	1-300	8.9	17.4	10.6	13	10.4
Zinc	20 or SB	9-50	***110 J***	***602 J***	***84.2 J***	***176 J***	***89.7 J***
Mercury	0.1 or SB	0.001 - 0.2	0.038	0.137	0.036	0.06	0.027

Created by: BW Date: 02/16/2005
Checked by: LG Date: 02/21/2005

TABLE 7-1 (cont'd)
SUMMARY OF ANALYTICAL RESULTS - SURFACE SOILS
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Notes:

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.
Shaded and framed concentrations exceed TAGM values.
Bold/Italic values exceed upper limits of urban background concentrations.
(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.
(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) USEPA Region 3 Soil Screening Level.
(5) 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.*
**** - The Soil Cleanup Objective refers to the sum of these compounds.*
J - Indicates an estimated value.
NA - Not Applicable or Not Available.

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TABLE 7-2
SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOILS
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Sample Location Sampling Depth (ft. bgs) Collection Date	NYSDEC TAGM 4046[1]	Urban Background Concentrations[2][3]	MW-1 6-8' 01/25/2005	MW-2 2-6' 01/25/2005	MW-3 6-8' 01/26/2005	SOIL DUP-1 (MW-3) 01/26/2005	MW-4 7.5-8' 01/25/2005	MW-5 (4-6) 01/26/2005	TP-9 4-4.5' 01/27/2005	TP-11 6.5-7.0' 01/28/2005
Volatile Organic Compounds - VOCs (ug/kg)										
Acetone	200	NA			33				28 J	73
Carbon Disulfide	2,700	NA							2 J	1 J
Cyclohexane	NA	NA				21				
Dichlorodifluoromethane	NA	NA								2 J
Isopropylbenzene (Cumene)	NA	NA			2 J	25				
Methyl Ethyl Ketone (2-Butanone)	NA	NA			8 J					14 J
Methylcyclohexane	NA	NA				170				
Methylene Chloride	100	NA					21 J			7
Total VOCs	10,000	NA			43	216	21		30	97
Semi-Volatile Organic Compounds - SVOCs (ug/kg)										
Acenaphthene	50,000***	NA							1,100 J	
Anthracene	50,000***	NA							2,200	
Benzo(A)Anthracene	224or MDL	169 -59,000	460	500					3,000	
Benzo(A)Pyrene	61	165 - 220	***480***	***500***					***2,400***	
Benzo(B)Fluoranthene	1,100	15,000 - 62,000	440 J	420 J					2,100 J	
Benzo(G,H,I)Perylene	50,000***	900 - 47,000	310 J	370 J					1,700 J	
Benzo(K)Fluoranthene	1,100	300 - 26,000	340 J	390					1,800 J	
Bis(2-Ethylhexyl) Phthalate	50,000***	NA		220 J						
Carbazole	NA	NA							760 J	
Chrysene	400	251 - 640	560	580					***3,100***	
Dibenzofuran	6,200	NA							720 J	
Di-N-Octylphthalate	50,000***	NA			67 J			36 J		
Fluoranthene	50,000***	200 - 166,000	1,200	1,200			290 J		7,600	
Fluorene	50,000***	NA							1,300 J	
Indeno(1,2,3-C,D)Pyrene	NA	8,000 - 61,000	290 J	320 J						
Phenanthrene	50,000***	NA	880	720			300 J		8,200	
Pyrene	50,000***	145 - 147,000	1,000	930			230 J		5,900	
Total SVOCs	500,000***	NA	5,960	6,150	67		820	36	41,880	
Total BaP Equivalent[5]	NA	NA	608	634	0		0	0	2,959	
Petroleum Products - Method 310.13 (mg/kg)										
Fuel Oil #2	NA	NA	--	--	35	26	--	--	--	--

Notes:

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 TAGM values.

Bold/Italic values exceed upper limits of urban background concentrations.

(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.

(2) TAL Inorganic Analytes from Eastern USA Background as shown in New York State Dept. of Environmental Conservation TAGM 4046, Dec. 2000.
US Dept. of Health and Human Services, August 1995.

(4) USEPA Region 3 Soil Screening Level.

(5) 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.*

**** - The Soil Cleanup Objective refers to the sum of these compounds.*

J - Indicates an estimated value.

NA - Not Applicable or Not Available.

Created by: BW Date: 02/16/2005
Checked by: LG Date: 02/21/2005

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TABLE 7-2
SUMMARY OF ANALYTICAL RESULTS - SUBSURFACE SOILS
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Sample Location Sampling Depth (ft. bgs) Collection Date	NYSDEC TAGM 4046[1]	Urban Background Concentrations[2][3]	MW-1 6-8' 01/25/2005	MW-2 2-6' 01/25/2005	MW-3 6-8' 01/26/2005	SOIL DUP-1 (MW-3) 01/26/2005	MW-4 7.5-8' 01/25/2005	MW-5 (4-6) 01/26/2005	TP-9 4-4.5' 01/27/2005	TP-11 6.5-7.0' 01/28/2005
TAL Metals (mg/kg)										
Aluminum	SB	33,000	7,490 J	11,000 J	5,500 J	5,850 J	7,120 J	8,010 J	4,710 J	8,730 J
Arsenic	7.5 or SB	3-12 **	9.4	***12.2***	4.1	4.3	7.7	7.9	6.9	***16.2 J***
Barium	300 or SB	15-600	209	214	70.4 J	72.3 J	57.9	103 J	202	81.5
Beryllium	0.16 or SB	0-1.75	0.38	1.1	0.57	0.55	0.37	0.29	0.31	0.36
Cadmium	1 or SB	0.1-1	0.39	0.33					0.36	0.24
Calcium	SB	130 - 35,000 ***	5,920 J	***70,400 J***	3,100 J	3,120 J	30,900 J	5,490 J	25,200 J	11,100 J
Chromium, Total	10 or SB	1.5 - 40 **	10.6 J	14.2 J	6	5.8	8.5 J	9.2	6.5	11.9
Cobalt	30 or SB	2.5 - 60 **	5.3	6.4	4.3	5.3	5.8	6.7	4	8.4
Copper	25 or SB	1 - 50	***50.7 J***	***68.1 J***	48.9 J	***56.1 J***	25.5 J	36.3 J	25.4 J	37.8 J
Iron	2,000 or SB	2,000 - 550,000	13,800 J	19,700 J	8,910 J	9,240 J	14,700 J	17,300 J	13,200	22,300 J
Lead	400 [4]	****	239 J	144 J	22.3 J	25.9 J	23.4 J	37.8 J	94.8 J	107 J
Magnesium	SB	100 - 5,000	2,340 J	3,790 J	1,130 J	1,230 J	***7,810 J***	2,780 J	2,880 J	4,750 J
Manganese	SB	50 - 5,000	479 J	911 J	312 J	338 J	655 J	858 J	353	488 J
Nickel	13 or SB	0.5 -25	13	16.6	18.8	21.2	13.1	14.7	9.3	19.1
Potassium	SB	8,500 - 43,000 **	763	1,210	460	439	957	900	675	874
Sodium	SB	6,000 - 8,000		281					161	
Vanadium	150 or SB	1-300	12.3	18.5	10.7	11.6	10.2	11.9	8.4	13.3
Zinc	20 or SB	9-50	***185 J***	***126 J***	***78.5 J***	***88.4 J***	***62 J***	***60.7 J***	***131 J***	***104***
Mercury	0.1 or SB	0.001 - 0.2	***0.2 J***	***0.421 J***	0.11	0.118		***0.208***	0.185	0.158
PCBs										
PCBs	10.0 Subsurface	NA	--	--				--	--	--

Notes:

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 TAGM values.
Bold/Italic values exceed upper limits of urban background concentrations.
(1) New York State Dept. of Environmental Conservation TAGM 4046, Recommended Soil Cleanup Objectives, Dec. 2000.
(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) USEPA Region 3 Soil Screening Level.
(5) 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.*
**** - The Soil Cleanup Objective refers to the sum of these compounds.*
J - Indicates an estimated value.
NA - Not Applicable or Not Available.

Created by: BW Date: 02/16/2005
Checked by: LG Date: 02/21/2005

TABLE 7-3
LCS, Inc. JULY 2004 VOC SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

VOC SOIL DATA - ASP00 METHOD 8260

Compound	BH44 (6-8) 7/7/2004 ug/kg	BH46 (4-6) 7/7/2004 ug/kg	BH47 (10-12) 7/7/2004 ug/kg	DUPLICATE[1] BH47 (10-12) 7/7/2004 ug/kg	BH49 (10-12) 7/7/2004 ug/kg	BH50 (10-12) 7/7/2004 ug/kg	BH56 (2-4) 7/8/2004 ug/kg	BH57 (12-14) 7/8/2004 ug/kg	BH58 (6-8) 7/8/2004 ug/kg	TAGM Recommended Soil Cleanup Objectives ug/kg
2-Butanone	11 U	4 J	1500 U	2000 U	12 U	4 J	11 U	12 U	12 J	300
Acetone	11 U	12	1500 U	2000 U	4 J	8 J	10 J	11 U	42	200
Benzene	11 U	11 U	1500 U	2000 U	12 U	12 U	11 U	12 U	13 U	60 or MDL
Carbon Disulfide	11 U	2 J	1500 U	2000 U	12 U	12 U	11 U	1 J	13 U	2,700
Cyclohexane	11 U	11 U	1500 U	580 J	12 U	12 U	11 U	12 U	13 U	NL
Dichlorodifluoromethane	11 U	11 U	1500 U	2000 U	12 U	12 U	11 U	12 U	2 J	NL
Ethylbenzene	11 U	6 J	1500 U	2000 U	12 U	12 U	11 U	12 U	13 U	5,500
Isopropylbenzene	11 U	11 U	1500 U	880 J	12 U	12 U	11 U	12 U	13 U	2,300
Methylcyclohexane	11 U	11 U	1500 U	2900	12 U	12 U	11 U	12 U	13 U	NL
Methylene chloride	**11 UJ**	**13 UJ**	**1500 UJ**	**2000 UJ**	**12 UJ**	**16 UJ**	**11 UJ**	11 J	**13 UJ**	100
Toluene	11 U	3 J	1500 U	2000 U	12 U	12 U	11 U	12 U	13 U	1,500
Total Xylenes	11 U	32	1500 U	2000 U	12 U	12 U	11 U	12 U	13 U	1,200
Vinyl chloride	11 U	11 U	1500 U	2000 U	12 U	12 U	11 U	12 U	13 U	200
TICs	77 BJN	290 JN	170,000 JN	215,000 JN	14 BJN	13 BJN	15 BJN	252 JN	19 BJN	10,000*

Compound	BH59 (8-10) 7/8/2004 ug/kg	TP1 (3-5) 7/14/2004 ug/kg	TP2 (0.3-3) 7/14/2004 ug/kg	TP3 (4-6) 7/14/2004 ug/kg	TP5 (6-8) 7/14/2004 ug/kg	TP6 (5-7) 7/14/2004 ug/kg	TP7 (7-9) 7/14/2004 ug/kg	TP8 (2-4) 7/14/2004 ug/kg	DUPLICATE 3 TP8 (2-4) 7/14/2004 ug/kg	TAGM Recommended Soil Cleanup Objectives ug/kg
2-Butanone	6 J	29	39	38	11 U	5 J	12 J	7 J	10 U	300
Acetone	13	100 B	140 B	120 B	11 U	21 U	36 U	36	10 U	200
Benzene	11 U	13 U	12 U	12 U	11 U	13 U	14 U	10 U	10 U	60 or MDL
Carbon Disulfide	11 U	13 U	2 J	12 UJ	1 J	13 UJ	14 UJ	2 J	1 J	2,700
Cyclohexane	11 U	13 U	12 U	12 U	11 U	13 U	14 U	10 U	10 U	NL
Dichlorodifluoromethane	11 U	3 J	2 J	12 U	11 U	4 J	14 U	10 U	10 U	NL
Ethylbenzene	11 U	13 U	12 U	12 U	11 U	13 U	14 U	10 U	10 U	5,500
Isopropylbenzene	11 U	13 U	12 U	12 U	11 U	13 U	14 U	10 U	10 U	2,300
Methylcyclohexane	11 U	13 U	12 U	12 U	2 J	13 U	14 U	10 U	10 U	NL
Methylene chloride	**11 UJ**	**13 U**	13 U	15 U	13 U	**13 U**	**14 U**	12 U	10 U	100
Toluene	11 U	13 U	12 U	12 U	11 U	13 U	14 U	10 U	10 U	1,500
Total Xylenes	11 U	13 U	12 U	12 U	5 J	13 U	14 U	10 U	10 U	1,200
Vinyl chloride	11 U	13 U	1 J	12 U	11 U	13 U	14 U	10 U	10 U	200
TICs	16 BJN	286 BJN	274 J	11 BJN	196 J	12 BJN	152 BJN	155 JN	192 JN	10,000*

ug/kg = micrograms per kilogram
TAGM Recommended Soil Cleanup Objectives = Division Technical and Administrative Guidance Memorandum No. 4046
(TAGM 4046): Determination of Soil Cleanup Objectives and Cleanup Levels and addendum (August, 2001)
STARS Memo #1 Guidance Values = Spill Technology and Remediation Series Petroleum-contaminated Soil Guidance Policy (August 1992)
NL = Not Listed
MDL = Method Detection Limit
J = Indicates an estimated value
E = Identifies compounds whose concentrations exceed the calibration range of the instrument for that particular analysis
U = Indicates compound was analyzed for, but not detected at or above the reporting limit
N = Indicates presumptive evidence of a compound. This flag is used only for Tentatively Identified Compounds, where the identification is based on the Mass Spectral library search. It is applied to all TIC results.
B = This analyte was also detected within the laboratory's method blank and may be the result of laboratory contamination.
* = As per TAGM 4046 individual and sum of VOCs not listed, Tentatively Identified Compounds (TICs) must be <or = 10,000mg/kg

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, to reflect adjustments to the data by the data validator.

TABLE 7-4
LCS, Inc. JULY 2004 SVOC SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

SVOC SOIL DATA - ASP00 METHOD 8270

Compound	BH43 (6-8) 7/7/2004 ug/kg	BH44 (6-8) 7/7/2004 ug/kg	BH45 (4-6) 7/7/2004 ug/kg	BH46 (4-6) 7/7/2004 ug/kg	BH47 (10-12) 7/7/2004 ug/kg	DUPLICATE[1] BH47 (10-12) 7/7/2004 ug/kg	BH48 (6-8) 7/7/2004 ug/kg	BH49 (10-12) 7/7/2004 ug/kg	BH50 (10-12) 7/7/2004 ug/kg	BH51 (6-8) 7/8/2004 ug/kg	BH53 (4-6) 7/8/2004 ug/kg	TAGM Recommended Soil Cleanup Objectives ug/kg
2-Methylnaphthalene	360 U	11 J	1800 U	800 J	96 J	94 J	390 U	400 U	410 U	450 J	3700 U	36,400
Acenaphthene	360 U	380 U	1800 U	3800 J	25 J	23 J	390 U	400 U	410 U	2600 J	3700 U	50,000***
Acenaphthylene	360 U	380 U	1800 U	7400 U	450 U	460 U	390 U	400 U	410 U	3500 U	3700 U	50,000***
Anthracene	360 U	380 U	1800 U	6100 J	20 J	18 J	390 U	400 U	410 U	5100	110 J	50,000***
Benzo(a)anthracene	360 U	380 U	110 J	9800	17 J	18 J	390 U	400 U	410 U	8400	500 J	224 or MDL
Benzo(a)pyrene	360 U	380 U	83 J	7500	450 U	460 U	390 U	400 U	410 U	5800	390 J	61 or MDL
Benzo(b)fluoranthene	360 U	380 U	86 J	6600 J	450 U	460 U	390 U	400 U	410 U	4000	410 J	220 or MDL
Benzo(ghi)perylene	360 U	380 U	1800 U	2600 J	450 U	460 U	390 U	400 U	410 U	3100 J	210 J	50,000***
Benzo(k)fluoranthene	360 U	380 U	53 J	7200 J	450 U	460 U	390 U	400 U	410 U	4600	280 J	220 or MDL
Biphenyl	360 U	380 U	1800 U	240 J	450 U	460 U	390 U	400 U	410 U	160 J	3700 U	NL
Bis(2-ethylhexyl) phthalate	**360 U**	**380 U**	1800 U	7400 U	**450 U**	**460 U**	**390 U**	**400 U**	**410 U**	**3500 U**	**3700 U**	50,000***
Butyl benzyl phthalate	16 J	380 U	1800 U	7400 U	450 U	460 U	390 U	400 U	410 U	3500 U	430 J	50,000***
Carbazole	360 U	380 U	1800 U	3200 J	450 U	460 U	390 U	400 U	410 U	1300 J	3700 U	NL
Chrysene	360 U	380 U	100 J	8700	15 J	15 J	390 U	400 U	410 U	7100	450 J	400
Di-n-butyl phthalate	360 U	380 U	1800 U	7400 U	450 U	14 J	390 U	400 U	410 U	3500 U	3700 U	8,100
Di-n-octyl phthalate	70 J	39 J	1800 U	7400 U	450 U	13 J	390 U	14 J	10 J	3500 U	3700 U	50,000***
Dibenzo(a,h)anthracene	360 U	380 U	1800 U	1500 J	450 U	460 U	390 U	400 U	410 U	1300 J	3700 U	14.3 or MDL
Dibenzofuran	360 U	380 U	1800 U	2500 J	18 J	17 J	390 U	400 U	410 U	1200 J	3700 U	6,200
Fluoranthene	360 U	15 J	220 J	22000	69 J	73 J	390 U	400 U	410 U	17000	880 J	50,000***
Fluorene	360 U	380 U	1800 U	3800 J	34 J	34 J	390 U	400 U	410 U	2700 J	3700 U	50,000***
Indeno(1,2,3-cd)pyrene	360 U	380 U	1800 U	2800 J	450 U	460 U	390 U	400 U	410 U	2800 J	190 J	3,200
Naphthalene	360 U	380 U	1800 U	2200 J	450 U	460 U	390 U	400 U	410 U	280 J	3700 U	13,000
Phenanthrene	360 U	12 J	70 J	21000	140 J	140 J	11 J	400 U	410 U	22000	570 J	50,000***
Pyrene	360 U	13 J	200 J	15000	63 J	63 J	390 U	400 U	410 U	16000	770 J	50,000***
TICs	200 J	0	0	13900 J	27020 JN	19810 JN	675 J	582 J	140 J	14180 J	3150 J	500,000***

ug/kg = micrograms per kilogram

TAGM Recommended Soil Cleanup Objectives = Division Technical and Administrative Guidance Memorandum No. 4046

(TAGM 4046): Determination of Soil Cleanup Objectives and Cleanup Levels and addendum (August, 2001)

NL = Not Listed

MDL = Method Detection Limit

*** = Total Semi-VOCs < 500ppm, and Individual Semi-VOCs < 50ppm

J = Indicates an estimated value.

U = Indicates compound was analyzed for, but not detected at or above the reporting limit.

B = This analyte was also detected within the laboratory's method blank and may be the result of laboratory contamination.

N = Indicates presumptive evidence of a compound. This flag is used only for Tentatively Identified Compounds, where the identification is based on the Mass Spectral library search.
It is applied to all TIC results.

= Analyte Detected above Recommended Soil Cleanup Objectives.

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, based on the results of the data validation of the SDGs for samples collected 7/7/04 and 7/8/04.

TABLE 7-4
LCS, Inc. JULY 2004 SVOC SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

SVOC SOIL DATA - ASP00 METHOD 8270

Compound	BH57 (12-14) 7/8/2004 ug/kg	BH59 (8-10) 7/8/2004 ug/kg	TP1 (3-5) 7/14/2004 ug/kg	TP2 (0.3-3) 7/14/2004 ug/kg	TP3 (4-6) 7/14/2004 ug/kg	TP5 (6-8) 7/14/2004 ug/kg	TP6 (5-7) 7/14/2004 ug/kg	TP7 (7-9) 7/14/2004 ug/kg	TP8 (2-4) 7/14/2004 ug/kg	DUPLICATE3 TP8 (2-4) 7/14/2004 ug/kg	TAGM Recommended Soil Cleanup Objectives ug/kg
2-Methylnaphthalene	110 J	180 J	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	36,400
Acenaphthene	460	3800 U	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	50,000***
Acenaphthylene	380 U	120 J	340 U	13 J	360 U	15 J	350 U	370 U	390 U	390 U	50,000***
Anthracene	540	440 J	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	50,000***
Benzo(a)anthracene	680	1000 J	52 J	100 J	32 J	110 J	9 J	370 U	390 U	390 U	224 or MDL
Benzo(a)pyrene	390	760 J	42 J	82 J	22 J	91 J	350 U	370 U	390 U	390 U	61 or MDL
Benzo(b)fluoranthene	300 J	1000 J	29 J	79 J	22 J	60 J	15 J	370 U	390 U	390 U	220 or MDL
Benzo(ghi)perylene	140 J	270 J	35 J	62 J	14 J	67 J	350 U	370 U	390 U	390 U	50,000***
Benzo(k)fluoranthene	360 J	1400 J	46 J	53 J	15 J	94 J	350 U	370 U	390 U	390 U	220 or MDL
Biphenyl	70 J	3800 U	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	NL
Bis(2-ethylhexyl) phthalate	**380 U**	3800 U	**340 U**	**340 U**	**360 U**	**350 U**	**350 U**	**370 U**	**390 U**	**390 U**	50,000***
Butyl benzyl phthalate	1900	3800 U	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	50,000***
Carbazole	220 J	3800 U	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	NL
Chrysene	820	860 J	47 J	94 J	31 J	98 J	10 J	370 U	390 U	390 U	400
Di-n-butyl phthalate	44 J	100 J	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	8,100
Di-n-octyl phthalate	28 J	3800 U	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	50,000***
Dibenzo(a,h)anthracene	75 J	130 J	9 J	18 J	360 U	19 J	350 U	370 U	390 U	390 U	14.3 or MDL
Dibenzofuran	370 J	120 J	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	6,200
Fluoranthene	1600	1700 J	78 J	160 J	61 J	180 J	19 J	13 J	21 J	390 U	50,000***
Fluorene	500	290 J	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	50,000***
Indeno(1,2,3-cd)pyrene	150 J	270 J	29 J	52 J	12 J	57 J	350 U	370 U	390 U	390 U	3,200
Naphthalene	90 J	170 J	340 U	340 U	360 U	350 U	350 U	370 U	390 U	390 U	13,000
Phenanthrene	2000	1900 J	15 J	27 J	10 J	27 J	350 U	370 U	390 U	390 U	50,000***
Pyrene	1300	1600 J	87 J	180 J	60 J	200 J	16 J	12 J	16 J	390 U	50,000***
TICs	2862 J	0	0	0	0	0	4360 JN	0	0	0	500,000***

ug/kg = micrograms per kilogram

TAGM Recommended Soil Cleanup Objectives = Division Technical and Administrative Guidance Memorandum No. 4046 (TAGM 4046): Determination of Soil Cleanup Objectives and Cleanup Levels and addendum (August, 2001)

NL = Not Listed

MDL = Method Detection Limit

*** = Total Semi-VOCs < 500ppm, and Individual Semi-VOCs < 50ppm

J = Indicates an estimated value.

U = Indicates compound was analyzed for, but not detected at or above the reporting limit.

B = This analyte was also detected within the laboratory's method blank and may be the result of laboratory contamination.

N = Indicates presumptive evidence of a compound. This flag is used only for Tentatively Identified Compounds, where the identification is based on the Mass Spectral library search. It is applied to all TIC results.

= Analyte Detected above Recommended Soil Cleanup Objectives.

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, to reflect adjustments to the data by the data validator.

TABLE 7-5
LCS, Inc. JULY 2004 METALS SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

METALS SOIL DATA - ASP00 METHODS 6010/7470/7471

Compound	BH42 (0-2) 7/7/2004 mg/kg	BH42 (6-8) 7/7/2004 mg/kg	BH44 (0-2) 7/7/2004 mg/kg	BH44 (6-8) 7/7/2004 mg/kg	BH45 (0-2) 7/7/2004 mg/kg	BH45 (4-6) 7/7/2004 mg/kg	BH46 (0-2) 7/7/2004 mg/kg	BH46 (4-6) 7/7/2004 mg/kg	Eastern USA Background Concentrations mg/kg	NYSDEC Guidance Value mg/kg
Aluminum - Total	6400 J	8300 J	8350 J	9400 J	10900 J	12500 J	6940 J	7790 J	33,000	SB
Antimony - Total	0.42 J	0.63 J	0.66 BJ	0.42 UJ	0.52 BJ	0.43 UJ	0.48 J	0.51 BJ	NA	SB
Arsenic - Total	8.8 J	20.2 J	11.3 J	9.4 J	9 J	10.1 J	8.8 J	7.1 J	3-12**	7.5 or SB
Barium - Total	90.7 J	79.8 J	100 J	147 J	83.3 J	197 J	119 J	109 J	15-600	300 or SB
Beryllium - Total	0.29 J	0.35 J	0.39 J	0.36 B	0.5 J	0.46 J	0.4 B	0.46 J	0-1.75	0.16 or SB
Cadmium - Total	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.06 B	0.04 U	0.1-1	1 or SB
Calcium - Total	28300 J	1060 J	19400 J	2050 J	11300 J	2460 J	15100 J	42900 J	130-35,000**	SB
Chromium - Total	7.6 J	9.1 J	11.3 J	9.8 J	12.1 J	10.7 J	14.6 J	13.4 EJ	1.5-40**	10 or SB
Cobalt - Total	5.9 J	7.1 J	7.4 J	6.6 J	9 J	7.6 J	6.1 J	5.4 BEJ	2.5-60**	30 or SB
Copper - Total	10.6	20.2	36.6	22.1	23.4	10.8	45.8	117	1-50	25 or SB
Iron - Total	16300 J	19900 J	22800 J	17800 J	21200 J	16300 J	16800 J	18700 J	2,000-550,000	2,000 or SB
Lead - Total	9.3	17	67.7	84.1	28.7	18.7	136	107	***	SB**
Magnesium - Total	2440 J	2440 J	7310 J	2530 J	4410 J	1920 J	4260 J	4320 J	100-5,000	SB
Manganese - Total	746 J	551 J	790 J	373 J	530 J	900 J	495 J	683 J	50-5,000	SB
Mercury - Total	0.008 U	0.007 U	0.098	0.153	0.045	0.032	0.274	0.167 J	0.001-0.2	0.1
Nickel - Total	12.9 J	16.8 J	17.5 J	14.2 J	19.6 J	12 J	14.3 J	12.6 J	0.5-25	13 or SB
Potassium - Total	808 J	726 J	1010 J	807 J	1290 J	1040 J	958 J	1040 J	8,500-43,000**	SB
Selenium - Total	0.53 U	0.51 U	0.53 U	0.54 U	0.52 U	0.55 U	0.55 U	0.54 U	0.1-3.9	2 or SB
Silver - Total	0.13 UJ	0.12 UJ	0.13 UJ	0.16 J	0.13 UJ	0.14 J	0.18 J	0.19 J	NA	SB
Sodium - Total	562	190 J	205 J	163 J	642	366 J	79.5 J	148 J	6,000-8,000	SB
Vanadium - Total	9.1 J	11.4 J	13.5 J	13.3 J	15.6 J	18.9 J	11.7 J	13 J	1-300	150 or SB
Zinc - Total	37.3 J	**51.4** J	**79.6** J	**62.1** J	**64.1** J	**58.4** J	**109** J	**106** J	9-50	20 or SB

mg/kg = milligrams per kilogram

NYSDEC Guidance Values = Division Technical and Administrative Guidance Memorandum No. 4046 (TAGM) 4046): Determination of Soil Cleanup Objectives and Cleanup Levels (August, 2001)

SB = Site Background Levels

NA = Not Available

* = Indicates analysis is not within the quality control limits.

** = New York State Background

*** = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61ppm. Average background levels in metropolitan or suburban areas, or near highways, typically range from 200-500ppm.

B = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.

E = Indicates a value estimated or not reported due to the presence of interferences.

N = Indicates spike sample recovery is not within the quality control limits.

U = Indicates element was analyzed for, but not detected at or above the reporting limit.

= Analyte detected above Eastern USA and Recommended Soil Cleanup Objectives

Bold = Indicates analyte appears present at an elevated site background concentration.

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, to reflect adjustments to the data by the data validator.

TABLE 7-5
LCS, Inc. JULY 2004 METALS SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

METALS SOIL DATA - ASP00 METHODS 6010/7470/7471

Compound	BH47 (0-2) 7/7/2004 mg/kg	BH47 (10-12) 7/7/2004 mg/kg	DUPLICATE[1] BH47 (10-12) mg/kg	BH48 (0-2) 7/7/2004 mg/kg	BH48 (6-8) 7/7/2004 mg/kg	BH49 (0-2) 7/7/2004 mg/kg	BH51 (0-2) 7/8/2004 mg/kg	BH54 (6-8) 7/8/2004 mg/kg	Eastern USA Background Concentrations mg/kg	NYSDEC Guidance Value mg/kg
Aluminum - Total	9250 J	7230 J	6980 J	9420 J	9720 J	10900 J	12000 J	9450 J	33,000	SB
Antimony - Total	0.4 UJ	0.53 UJ	0.52 BJ	0.43 BJ	0.47 BJ	0.43 BJ	0.4 UJ	0.43 UJ	NA	SB
Arsenic - Total	10 J	8 J	10.2 J	9 J	9.1 J	8.2 J	10 J	9.5 J	3-12**	7.5 or SB
Barium - Total	75.8 J	80.5 J	71.8 J	82.1 J	100 J	171 J	73.6 J	104 J	15-600	300 or SB
Beryllium - Total	0.45 B	0.33 J	0.34 J	0.43 J	0.42 BJ	0.48 J	0.49 J	0.42 J	0-1.75	0.16 or SB
Cadmium - Total	0.04 U	0.05 U	0.07 J	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.1-1	1 or SB
Calcium - Total	5830 J	2090 J	2160 J	5700 J	2700 J	1560 J	1740 J	28800 J	130-35,000**	SB
Chromium - Total	13.4 J	8 J	8.1 J	11.3 J	10.6 J	12.4 J	12.2 J	10.6 J	1.5-40**	10 or SB
Cobalt - Total	7.6 J	4.7 J	5.1 J	7.4 J	7.2 J	7.9 J	9.7 J	7.7 J	2.5-60**	30 or SB
Copper - Total	28.7	27.7	48.8	31.4	24.4	16.6	23.8 J	29.1 J	1-50	25 or SB
Iron - Total	19500 J	11900 J	13300 J	19400 J	18600 J	21100 J	22800 J	21000 J	2,000-550,000	2,000 or SB
Lead - Total	19.9	23.1	54.5	28.3	57.4	16.7	17.7	24.4	***	SB**
Magnesium - Total	3910 J	1800 J	1960 J	2940 J	2730 J	2770 J	3250 J	8190 J	100-5,000	SB
Manganese - Total	459 J	206 J	211 J	474 J	518 J	633 J	608 J	687 J	50-5,000	SB
Mercury - Total	0.007 U	0.018 J	0.038	0.007 U	0.1	0.019	0.007 U	0.008 U	0.001-0.2	0.1
Nickel - Total	17 J	11.5 J	12.3 J	16.9 J	15.6 J	18.2 J	20.6 J	17.7 J	0.5-25	13 or SB
Potassium - Total	1060 J	749 J	795 J	1030 J	1120 J	916 J	1140 J	1410 J	8,500-43,000**	SB
Selenium - Total	0.51 U	0.68 U	0.66 U	0.53 U	0.57 U	0.54 U	0.52 U	0.55 U	0.1-3.9	2 or SB
Silver - Total	0.12 UJ	0.23 J	0.2 J	0.13 UJ	0.3 J	0.13 UJ	0.13 UJ	0.13 UJ	NA	SB
Sodium - Total	52.4 BJ	111 J	117 J	36.3 J	67.6 J	77.4 J	53.5 J	86.4 J	6,000-8,000	SB
Vanadium - Total	13.2 J	10.4 J	10.4 J	13.4 J	13.9 J	17.7 J	16.8 J	12.8 J	1-300	150 or SB
Zinc - Total	**52.6** J	**65.3** J	106 J	**70.6** J	**64.9** J	**50.7** J	**57.2** J	**84.3** J	9-50	20 or SB

mg/kg = milligrams per kilogram
NYSDEC Guidance Values = Division Technical and Administrative Guidance Memorandum No. 4046 (TAGM) 4046): Determination of Soil Cleanup Objectives and Cleanup Levels (August, 2001)
SB = Site Background Levels
NA = Not Available
* = Indicates analysis is not within the quality control limits.
** = New York State Background
*** = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61ppm. Average background levels in metropolitan or suburban areas, or near highways, typically range from 200-500ppm.
B = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.
E = Indicates a value estimated or not reported due to the presence of interferences.
N = Indicates spike sample recovery is not within the quality control limits.
U = Indicates element was analyzed for, but not detected at or above the reporting limit.
= Analyte detected above Eastern USA and Recommended Soil Cleanup Objectives
Bold = Indicates analyte appears present at an elevated site background concentration.

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, to reflect adjustments to the data by the data validator.

TABLE 7-5
LCS, Inc. JULY 2004 METALS SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

METALS SOIL DATA - ASP00 METHODS 6010/7470/7471

Compound	BH57 (12-14) 7/8/2004 mg/kg	BH59 (0-2) 7/8/2004 mg/kg	BH59 (8-10) 7/8/2004 mg/kg	TP1 (0.3-3) 7/14/2004 mg/kg	TP1 (3-5) 7/14/2004 mg/kg	TP2 (0.3-3) 7/14/2004 mg/kg	TP2 (5-7) 7/14/2004 mg/kg	TP3 (4-6) 7/14/2004 mg/kg	Eastern USA Background Concentrations mg/kg	NYSDEC Guidance Value mg/kg
Aluminum - Total	7010 J	6560 J	8240 J	6860	3680	8740	13500	9040	33,000	SB
Antimony - Total	0.44 UJ	0.43 UJ	0.45 UJ	5.6 J	4.5 J	4 J	0.54 UJ	0.7 J	NA	SB
Arsenic - Total	14.8 J	7.6 J	7.8 J	17.5 J	24.1 J	13.9 J	5.4 J	13.9 J	3-12**	7.5 or SB
Barium - Total	137 J	499 J	111 J	2010	69.5	486	324	207	15-600	300 or SB
Beryllium - Total	0.27 J	0.62	0.63	0.66	0.49 J	0.63	0.4 J	0.41 J	0-1.75	0.16 or SB
Cadmium - Total	0.04 U	0.04 U	0.04 U	1.4	0.04 U	0.91	0.12 J	0.04 J	0.1-1	1 or SB
Calcium - Total	1750 J	18700 J	7500 J	6190	2290	8690	3920	2820	130-35,000**	SB
Chromium - Total	7.8 J	9.2 J	12.2 J	20.7	25.1	18.9	12.7	9.8	1.5-40**	10 or SB
Cobalt - Total	8.3 J	5.5 BJ	6.1 J	8.9	12	10.3	5.2 J	8.4	2.5-60**	30 or SB
Copper - Total	49 J	177 J	54.2 J	378	81.4	299	18.9	17.6	1-50	25 or SB
Iron - Total	16000 J	17100 J	14800 J	54100	153000	52900	15300	23600	2,000-550,000	2,000 or SB
Lead - Total	13.7	83.3	71.4	819	102	458	17.4	47.6	***	SB**
Magnesium - Total	2390 J	3110 J	2340 J	1830	600	4030	2310	2530	100-5,000	SB
Manganese - Total	1660 J	430 J	341 J	589	844	638	645	4130	50-5,000	SB
Mercury - Total	0.008 U	0.007 U	0.061	1.1 J	0.239 J	0.223 J	0.16 J	0.445 J	0.001-0.2	0.1
Nickel - Total	14.4 J	11.7 J	14.3 J	40.2	27	173	12.8	13.9	0.5-25	13 or SB
Potassium - Total	718 J	1250 J	977 J	913	547	732	1310	855	8,500-43,000**	SB
Selenium - Total	0.56 U	0.55 U	0.57 U	0.6 UJ	0.49 U	0.57 UJ	0.69 UJ	0.75 J	0.1-3.9	2 or SB
Silver - Total	0.14 UJ	0.19 J	0.14 UJ	0.54 J	0.37 J	0.29 J	0.17 UJ	0.13 UJ	NA	SB
Sodium - Total	253 J	395 J	112 J	511 J	225 J	462 J	362 J	226 J	6,000-8,000	SB
Vanadium - Total	10.2 J	15.2 J	15 J	19	54.4	22.5	16.3	16.2	1-300	150 or SB
Zinc - Total	**63.9** J	**85.5** J	**70.8** J	860	81.4	889	65.8	61.3	9-50	20 or SB

mg/kg = milligrams per kilogram
NYSDEC Guidance Values = Division Technical and Administrative Guidance Memorandum No. 4046

(TAGM) 4046): Determination of Soil Cleanup Objectives and Cleanup Levels (August, 2001)

SB = Site Background Levels
NA = Not Available
* = Indicates analysis is not within the quality control limits.
** = New York State Background
*** = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61ppm.
Average background levels in metropolitan or suburban areas, or near highways, typically range from 200-500ppm.
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N = Indicates spike sample recovery is not within the quality control limits.
U = Indicates element was analyzed for, but not detected at or above the reporting limit.
= Analyte detected above Eastern USA and Recommended Soil Cleanup Objectives
Bold = Indicates analyte appears present at an elevated site background concentration.

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, to reflect adjustments to the data by the data validator.

TABLE 7-5
LCS, Inc. JULY 2004 METALS SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

METALS SOIL DATA - ASP00 METHODS 6010/7470/7471									
Compound	**TP5 (6-8) 7/14/2004 mg/kg**	**TP6 (5-7) 7/14/2004 mg/kg**	**TP7 (0.3-3) 7/14/2004 mg/kg**	**TP7 (7-9) 7/14/2004 mg/kg**	**TP8 (0-2) 7/14/2004 mg/kg**	**TP8 (2-4) 7/14/2004 mg/kg**	**DUPLICATE 3 TP8 (2-4) mg/kg**	**Eastern USA Background Concentrations mg/kg**	**NYSDEC Guidance Value mg/kg**
Aluminum - Total	6430	8320	8450	8700	10700	11800	12800	33,000	SB
Antimony - Total	0.41 J	0.51 J	0.71 J	0.42 UJ	0.4 UJ	0.44 UJ	0.48 J	NA	SB
Arsenic - Total	9.1 J	9.8 J	8.3 J	4 J	9.6 J	10.7 J	10.4 J	3-12**	7.5 or SB
Barium - Total	124	112	89.6	138	101	176	233	15-600	300 or SB
Beryllium - Total	0.35 J	0.44 J	0.47 J	0.3 J	0.48 J	0.48 J	0.6 J	0-1.75	0.16 or SB
Cadmium - Total	0.36 J	0.04 U	0.04 U	0.04 U	0.04 U	0.22 J	0.18 J	0.1-1	1 or SB
Calcium - Total	47100	17600	8880	2010	9570	6660	9660	130-35,000**	SB
Chromium - Total	12.8	12.5	9.9	9.6	11.7	14.5	15	1.5-40**	10 or SB
Cobalt - Total	4.4 J	8.1	6.5	4.6 J	7.8	8	8.6	2.5-60**	30 or SB
Copper - Total	46.8	26.9	36.3	12.1	27.3	42.6	47.4	1-50	25 or SB
Iron - Total	15700	19300	18300	12200	19400	20500	20400	2,000-550,000	2,000 or SB
Lead - Total	91.6	189	240	28	37.2	184	176	***	SB**
Magnesium - Total	7520	4000	3250	1980	3250	3680	3910	100-5,000	SB
Manganese - Total	360	450	478	202	612	711	783	50-5,000	SB
Mercury - Total	0.045 J	0.304 J	0.21 J	0.043 J	0.051 J	0.17 J	0.221 J	0.001-0.2	0.1
Nickel - Total	13.3	17.3	14.6	11.1	16.5	20.1	19.2	0.5-25	13 or SB
Potassium - Total	876	1090	1100	766	955	1120	1580	8,500-43,000**	SB
Selenium - Total	0.52 UJ	0.5 UJ	0.53 UJ	0.54 UJ	0.51 UJ	0.57 UJ	0.58 UJ	0.1-3.9	2 or SB
Silver - Total	0.13 U	1.7	0.14 J	0.13 U	0.12 U	0.16 J	0.14 U	NA	SB
Sodium - Total	186 J	97.9 J	142 J	577	66.1 J	126 J	257 J	6,000-8,000	SB
Vanadium - Total	11.1	12.8	14.6	13	16.5	18.1	17.8	1-300	150 or SB
Zinc - Total	517	108	75.5	71.9	78.3	185	170	9-50	20 or SB

MG/KG = MILLIGRAMS PER KILOGRAM
NYSDEC Guidance Values = Division Technical and Administrative Guidance Memorandum No. 4046 (TAGM) 4046): Determination of Soil Cleanup Objectives and Cleanup Levels (August, 2001)
SB = Site Background Levels
NA = Not Available
* = Indicates analysis is not within the quality control limits.
** = New York State Background
*** = Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61ppm. Average background levels in metropolitan or suburban areas, or near highways, typically range from 200-500ppm.
B = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.
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N = Indicates spike sample recovery is not within the quality control limits.
U = Indicates element was analyzed for, but not detected at or above the reporting limit
= Analyte detected above Eastern USA and Recommended Soil Cleanup Objectives
Bold = Indicates analyte appears present at an elevated site background concentration.

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, to reflect adjustments to the data by the data validator.

TABLE 7-6
LCS, Inc. JULY 2004 CYANIDE AND pH SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

CYANIDE SOIL DATA - ASP00 METHOD 9012

Compound	BH42 (0-2) 7/7/2004 ug/kg	BH42 (6-8) 7/7/2004 ug/kg	BH43 (6-8) 7/7/2004 ug/kg	BH44 (0-2) 7/7/2004 ug/kg	BH44 (6-8) 7/7/2004 ug/kg	BH45 (0-2) 7/7/2004 ug/kg	BH45 (4-6) 7/7/2004 ug/kg	BH46 (0-2) 7/7/2004 ug/kg	BH46 (4-6) 7/7/2004 ug/kg	BH47 (0-2) 7/7/2004 ug/kg	Eastern USA Background Concentrations ug/kg	NYSDEC Guidance Value ug/kg
Cyanide - Total	4016 U	3670 U	NT	4202 U	4396 U	3891 U	4090 U	4000 U	4292 U	4000 U	NA	***
Leachable pH	NT	7.48	7.6	NT	7.88	NT	6.62	NT	11	NT	NA	NA

Compound	BH47 (10-12) 7/7/2004 ug/kg	DUPLICATE[1] BH47 (10-12) ug/kg	BH48 (0-2) 7/7/2004 ug/kg	BH48 (6-8) 7/7/2004 ug/kg	BH49 (0-2) 7/7/2004 ug/kg	BH49 (10-12) 7/7/2004 ug/kg	BH50 (10-12) 7/7/2004 ug/kg	BH51 (0-2) 7/8/2004 ug/kg	BH51 (6-8) 7/8/2004 ug/kg	BH53 (4-6) 7/8/2004 ug/kg	Eastern USA Background Concentrations ug/kg	NYSDEC Guidance Value ug/kg
Cyanide - Total	4000 U	4000 U	4000 U	4000 U	4000 U	NT	NT	3976 U	NT	NT	NA	***
Leachable pH	7.29	7.15	NT	7.3	NT	7.88	7.19	NT	7.72	7.67	NA	NA

Compound	BH54 (6-8) 7/8/2004 ug/kg	BH57 (12-14) 7/8/2004 ug/kg	BH58 (6-8) 7/8/2004 ug/kg	BH59 (0-2) 7/8/2004 ug/kg	BH59 (8-10) 7/8/2004 ug/kg	TP1 (0.3-3) 7/14/2004 ug/kg	TP1 (3-5) 7/14/2004 ug/kg	TP2 (0.3-3) 7/14/2004 ug/kg	TP2 (5-7) 7/14/2004 ug/kg	TP3 (4-6) 7/14/2004 ug/kg	Eastern USA Background Concentrations ug/kg	NYSDEC Guidance Value ug/kg
Cyanide - Total	4515 U	3899 U	NT	4219 U	4386 U	4938 U	3839 U	10400	5000 U	3810 U	NA	***
Leachable pH	8.43	8.31	7.44	NT	7.63	NT	5.42	7.51	NT	6.5	NA	NA

Compound	TP5 (6-8) 7/14/2004 ug/kg	TP6 (5-7) 7/14/2004 ug/kg	TP7 (0.3-3) 7/14/2004 ug/kg	TP7 (7-9) 7/14/2004 ug/kg	TP8 (0-2) 7/14/2004 ug/kg	TP8 (2-4) 7/14/2004 ug/kg	DUPLICATE 3 TP8 (2-4) ug/kg	Eastern USA Background Concentrations ug/kg	NYSDEC Guidance Value ug/kg
Cyanide - Total	4357 U	4065 U	4329 U	3945 U	3752 U	4566 U	4237 U	NA	***
Leachable pH	9.51	7.51	NT	6.74	NT	7.44	7.41	NA	NA

ug/kg = micrograms per kilogram
NYSDEC Guidance Values = Division Technical and Administrative Guidance Memorandum No. 4046
(TAGM) 4046): Determination of Soil Cleanup Objectives and Cleanup Levels (August, 2001)
NA = Not Available
NT = Not tested
U = Indicates element was analyzed for, but not detected at or above the reporting limit
*** = Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable.
Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.

TABLE 7-7
LCS, Inc. JULY 2004 PESTICIDES/HERBICIDES SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

PESTICIDES SOIL DATA - ASP00 METHOD 8081

Compound	BH44 (6-8) 7/7/2004 ug/kg	BH45 (4-6) 7/7/2004 ug/kg	BH46 (4-6) 7/7/2004 ug/kg	BH48 (6-8) 7/7/2004 ug/kg	BH49 (10-12) 7/7/2004 ug/kg	BH58 (6-8) 7/8/2004 ug/kg	BH59 (8-10) 7/8/2004 ug/kg	TP2 (0.3-3) 7/14/2004 ug/kg	TP7 (7-9) 7/14/2004 ug/kg	TP8 (2-4) 7/14/2004 ug/kg	DUPLICATE 3 TP8 (2-4) 7/14/2004 ug/kg	TAGM Recommended Soil Cleanup Objectives ug/kg
4,4'-DDD	72 U	18 U	32 J	18 U	19 U	40 J	38 U	97 U	18 U	77 U	77 U	2,900
4,4'-DDE	72 U	18 U	10 J	18 U	19 U	12 J	38 U	97 U	18 U	77 U	77 U	2,100
4,4'-DDT	19 J	4.5 J	28 J	18 U	19 U	32 J	15 J	97 U	18 U	77 U	77 U	2,100
alpha-Chlordane	180 U	44 U	60 J	46 U	48 U	180 U	94 U	240 U	44 U	190 U	190 U	NL
beta-BHC	41 J	0.74 J	50 J	9.3 U	9.6 U	42 J	14 J	48 U	8.9 U	38 U	38 U	200
delta-BHC	6.7 J	8.9 U	35 J	9.3 U	9.6 U	35 U	19 U	48 U	8.9 U	38 U	38 U	300
Dieldrin	72 U	18 U	5.8 J	18 U	19 U	71 U	38 U	97 U	18 U	77 U	77 U	44
Endrin	11 J	0.81 J	72 U	18 U	19 U	14 J	8.5 J	97 U	18 U	77 U	77 U	100
Endrin aldehyde	140 UJ	35 UJ	11 J	37 U	38 U	140 UJ	5.1 J	190 U	36 U	150 U	150 U	NL
Endrin ketone	72 UJ	18 U	44 J	18 U	19 U	47 J	38 UJ	97 U	18 U	77 U	3.2 J	NL
gamma-BHC (Lindane)	36 U	0.74 J	36 U	9.3 U	9.6 U	35 U	19 U	48 U	8.9 U	38 U	38 U	60
gamma-Chlordane	180 U	44 U	50 J	46 U	48 U	180 U	94 U	240 U	44 U	190 U	190 U	540
Heptachlor	1.6 J	8.9 U	36 U	9.3 U	9.6 U	35 U	19 U	48 U	8.9 U	38 U	38 U	100
Heptachlor epoxide	36 U	8.9 U	9.4 J	9.3 U	9.6 U	35 U	19 U	48 U	8.9 U	38 U	38 U	20
Methoxychlor	360 U	89 UJ	360 UJ	93 U	96 U	22 J	11 J	480 U	89 U	380 U	380 U	***

ug/kg = micrograms per kilogram

TAGM Recommended Soil Cleanup Objectives = Division Technical and Administrative Guidance Memorandum No. 4046 (TAGM 4046): Determination of Soil Cleanup Objectives and Cleanup Levels and addendum (August, 2001)

J = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit

U = Indicates element was analyzed for, but not detected at or above the reporting limit

*** = Total Pesticides < 10ppm

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, based on the results of the data validation of the SDGs for samples collected 7/7/04 and 7/8/04.

HERBICIDES SOIL DATA - ASP00 METHOD 8151

No analytes were detected.

TABLE 7-8
LCS, Inc. JULY 2004 PCB SOIL DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

PCBs SOIL DATA - ASP00 METHOD 8082									
Compound	**BH42 (6-8) 7/7/2004 ug/kg**	**BH44 (6-8) 7/7/2004 ug/kg**	**BH45 (4-6) 7/7/2004 ug/kg**	**BH46 (4-6) 7/7/2004 ug/kg**	**BH47 (10-12) 7/7/2004 ug/kg**	**DUPLICATE[1]BH47 (10-12) 7/7/2004 ug/kg**	**BH48 (6-8) 7/7/2004 ug/kg**	**BH49 (10-12) 7/7/2004 ug/kg**	**TAGM Recommended Soil Cleanup Objectives ug/kg**
Aroclor 1016	85 U	91 U	90 U	88 U	110 U	110 u	93 U	97 U	1,000/10,000
Aroclor 1248	85 U	91 U	90 U	88 U	110 U	110 U	93 U	97 U	1,000/10,000
Aroclor 1254	85 U	91 U	90 U	88 U	110 U	110 U	93 U	97 U	1,000/10,000

Compound	**BH54 (6-8) 7/8/2004 ug/kg**	**BH58 (6-8) 7/8/2004 ug/kg**	**BH59 (8-10) 7/8/2004 ug/kg**	**TP2 (0.3-3) 7/14/2004 ug/kg**	**TP7 (7-9) 7/14/2004 ug/kg**	**TP8 (2-4) 7/14/2004 ug/kg**	**DUPLICATE 3 TP8 (2-4) 7/14/2004 ug/kg**	**TAGM Recommended Soil Cleanup Objectives ug/kg**
Aroclor 1016	91 U	89 U	94 U	95 U	90 U	22 J	370 U	1,000/10,000
Aroclor 1248	91 U	89 U	29 J	190	90 U	96 U	370 U	1,000/10,000
Aroclor 1254	91 U	62 J	94 U	95 U	90 U	96 U	370 U	1,000/10,000

ug/kg = micrograms per kilogram

TAGM Recommended Soil Cleanup Objectives = Division Technical and Administrative Guidance Memorandum No. 4046 (TAGM 4046): Determination of Soil Cleanup Objectives and Cleanup Levels and addendum (August, 2001)

J = Indicates an estimated value.

U = Indicates compound was analyzed for, but not detected at or above the reporting limit.

1,000/10,000 = Surface/Subsurface

MALCOLM PIRNIE

TABLE 7-9
SUMMARY OF ANALYTICAL RESULTS - GROUNDWATER
FORMER AMES/HILLS PLAZA
JAMESTOWN, NEW YORK

Sample Location Collection Date	NYSDEC CLASS "GA" STANDARDS[1]	MW-1 02/04/05	MW-2 02/04/05	GW-DUP2 (MW-2) 02/04/05	MW-3 09/09/04	GW-DUP1 (MW-3) 09/09/2004	MW-4 09/09/04	MW-5 09/09/04
Volatile Organic Compounds - VOCs (ug/l)								
Acetone	50					12 J		10 J
Cyclohexane	NA				14	12		
Tentatively Identified Compounds - TICs	NA				246 J	235 J	125 J	
Semi-Volatile Organic Compounds - SVOCs (ug/l)								
2-Methylnaphthalene	NA				10	11		
Acenaphthene	(20)				0.9 J	0.9 J		
Bis(2-Ethylhexyl) Phthalate	5							
Fluorene	(50)				0.7 J	0.8 J		
Pentachlorophenol	1T				2 J			
Phenanthrene	(50)				1 J	2 J		
Tentatively Identified Compounds - TICs	NA				95 JN	59 JN	4 J	
TAL Inorganic Analytes (ug/l)								
Aluminum	NA	4,690 J	1,870 J	2,120 J	1,770	718	576	240
Antimony	3				79.2 J	20 J	9.6 J	
Arsenic	25	11.2				37.3 J		
Barium	1000	349 J	585 J	602 J	1200	1210	585	607
Beryllium	(3)				0.52 J	0.55 J	0.34 J	0.26 J
Calcium	NA	209,000 J	145,000 J	142,000	162,000	163,000	144,000	135,000
Chromium, Total	50	5.2			6.2 J	3.3 J	4.4 J	4.3 J
Cobalt	NA	5.2						
Copper	200	17.2 J	32.9 J	59.7 J				
Iron	300	9,250 J	24,300 J	21,400 J	27,900 J	26,600 J	4,870 J	14,300 J
Lead	25	41.4 J	92.6 J	172 J		5.5		
Magnesium	(35,000)	34,200 N	17,300 J	17,200 J	18,800	18,600	23,800	20,800
Manganese	300	10,600	3,740	3,700	4,210	4,300	2,670	2,540
Potassium	NA	18,600	13,500	12,800	20,600 J	20,800 J	42,500 J	16,600 J
Selenium	10							
Sodium	20,000	348,000 J	72,100 J	71,400 J	78,000 J	78,300 J	273,000 J	58,300 J
Thallium	(0.5)					38.7 J		
Vanadium	NA	7.8	5.1	6.9				
Zinc	(2,000)	53.7 J	62.4 J	96.4 J	9.1 J			

Notes:

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

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.

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

Values in ( ) represent Guidance Values.

[T] Applies to sum of all phenolic compounds.

NA - Not Applicable or Not Available.

J - Indicates and estimated value.

Created by: BW Date: 02/21/2005
Checked by: LG Date: 02/22/2005

TABLE 7-10
LCS, Inc. JULY 2004 METALS GROUNDWATER DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

METALS GROUNDWATER DATA - ASP00 METHODS 6010/7470/7471

Compound	TPMW1 7/14/2004 ug/l	DUPLICATE 2 TPMW1 ug/l	TPMW2 7/14/2004 ug/l	TPMW3 7/14/2004 ug/l	TPMW4 7/14/2004 ug/l	NYSDEC Groundwater Standard (Class GA) ug/l
Aluminum - Total	896	787	298	561	1160	NL
Antimony - Total	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3
Arsenic - Total	18	17.9	30.5	4.1 J	11.2	25
Barium - Total	1180	1200	433	295	269	1000
Beryllium - Total	0.48 J	0.28 J	0.36 J	0.40 J	0.24 U	3
Cadmium - Total	0.43 J	0.64 J	0.35 U	0.35 U	0.35 U	5
Calcium - Total	157000	161000	153000	209000	74300	NL
Chromium - Total	2.1 J	1.7 J	1.2 U	1.2 U	4.2 J	50
Cobalt - Total	1.4 J	1.5 J	1.4 J	1.6 J	0.98 J	NL
Copper - Total	5.2 J	5.2 J	2.5 J	6.8 J	8.0 J	200
Iron - Total	27000	27300	5990	1170	5500	300
Lead - Total	2.8 J	3.0 J	2.5 J	3.8	45.7	25
Magnesium - Total	20300	20800	33000	34400	8850	35000
Manganese - Total	6150	6280	2020	3850	3250	300
Mercury - Total	0.037 UJ	0.037 UJ	0.037 UJ	0.037 UJ	0.037 UJ	0.7
Nickel - Total	2.2 J	1.4 U	1.5 J	1.9 J	2.6 J	100
Potassium - Total	15000 J	15800 J	14600 J	14500 J	15700 J	NL
Selenium - Total	4.8 UJ	4.8 UJ	4.8 UJ	4.8 UJ	4.8 UJ	10
Silver - Total	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	50
Sodium - Total	156000	160000	294000	323000	290000	20000
Vanadium - Total	1.8 J	1.5 J	1.1 U	1.4 J	2.4 J	NL
Zinc - Total	12.7 J	11.2 J	6.5 J	7.2 J	32.7	2000

ug/l = micrograms per liter

NYSDEC Groundwater Standard (Class GA) = 6 NYCRR Part 703 (June 1998 and April 2000 Addendum)

NL = Not listed

B = Indicates a value greater than or equal to the instrument detection limit, but less than the quantitation limit.

U = Indicates element was analyzed for, but not detected at or above the reporting limit.

= Analyte detected above Recommended Groundwater Standard

Note: Results in RED TEXT indicate modifications to the LCS, Inc. data tables by Malcolm Pirnie, to reflect adjustments to the data by the data validator.

TABLE 7-11
LCS, Inc. JULY 2004 CYANIDE GROUNDWATER DATA
As Presented in "Focused Soil and Groundwater Investigation Report", August 2004

CYANIDE GROUNDWATER DATA - ASP00 METHOD 9012						
Compound	**TPMW1 7/14/2004 ug/l**	**DUPLICATE 2 TPMW1 ug/l**	**TPMW2 7/14/2004 ug/l**	**TPMW3 7/14/2004 ug/l**	**TPMW4 7/14/2004 ug/l**	**NYSDEC Grounwater Standard ug/l**
Cyanide - Total	40.0 U	40.0 U	40.0 U	40.0 U	40.0 U	200

ug/l = micrograms per liter

NYSDEC Groudwater Standard = 6 NYCRR Part 703 (June 1998 and April 2000 Addendum)

NA = Not Available

U = Indicates element was analyzed for, but not detected at or above the reporting limit

MALCOLM PIRNIE

TABLE 7-12

SUMMARY OF ANALYTICAL RESULTS - INDOOR AIR & SUBSLAB SOIL VAPOR CHARACTERIZATION [1]
FORMER AMES/HILLS PLAZA
JAMESTOWN, NEW YORK

Sample Area ID:	USEPA Draft Guidance for Vapor Intrusion		Outdoor Air		Indoor Air			Sub-Slab Soil Vapor				
Sample ID:	to Indoor Air Pathway [2]		OA-1	OA-2	IA-1	IA-2	IA-3 [3]	SSSV-1	SSSV-2	SSSV-3	SSSV-4	SSSV-5
Collection Date:	Generic Target Indoor Air Concentration R = 10^{-4}	Generic Target Shallow Soil Gas Concentration	12/21/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004
Units:	(ug/m^3)	(ug/m^3)	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
Parameter							Not analyzed					
1,1,1-Trichloroethane	2,200	22,000						13				
1,2,4-Trimethylbenzene	6.0	60						24	16	6.4	12	9.3
1,3,5-Trimethylbenzene	6.0	60						8.4	4.9	3.5	4.6	3.8
1,3-Butadiene	0.87	8.7						0.49			0.88	
2,2,4-Trimethylpentane								4		2.5		0.93
4-Ethyltoluene								20	9.8	7.9	8.4	6.9
Acetone	350	3,500						21	33	40	33	55
Benzene	31	310	1.9	0.96	1.5	1.2		14	4.5	20	18	5.8
Bromodichloromethane	14	140										2.3
Carbon Disulfide	700	7,000		1.8				4.4	56	9.3	25	4
Chloroform	11	110						13	4.3	6.3	3.7	8.3
Chloromethane			1.1	1.1		1.1						
Cyclohexane								6.2	2.8	9.6	20	5.9
Dichlorodifluoromethane	200	2,000	2.8	2.9	4.2	2.6		3.5	2.6	3.4	3.3	3.6
Ethylbenzene	220	2,200						13	6.5	23	14	6.5
Methyl Ethyl Ketone	1,000	10,000		3.5				4.4	8	7.4	7.7	7.1
Methyl tert-Butyl Ether	3,000	30,000						3.4		3.6	2.7	
Methylene Chloride	520	5200						4.2	2.2	2.6	2.1	2.5
n-Heptane			2.5	2.6	1.2	0.94		16	5.3	19	74	11
n-Hexane	200	2,000	1.4		0.95	0.88		11	3.4	11	33	9.5
Tetrachloroethene	81	810						8.8	1.9	3.9	13	5.8
Toluene	400	4,000	17	27	11	8.3		60	22	72	53	30
Trichloroethene	2.2	22		5.2				5				
Trichlorofluoromethane	700	7,000	1.3	1.4	26	20		110	120	110	84	62
Xylene (m,p)	7,000	70,000		1.3	1.4	1.6		48	39	120	48	27
Xylene (o)	7,000	70,000						18	27	32	16	9.6
Xylene (total)	7,000	70,000		1.3	1.4	1.7		65	69	150	65	37

Notes:
(1) Only those analytes with concentrations greater than the reporting limt, and at a minimum of one location are shown. Blank cell indicates compound not detected.
(2) USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater to Soils (Subsurface Vapor Intrusion Guidance).
(3) IA-3 not analyzed due to flow controller malfunction.
IA = Indoor Air Sample
OA = Outdoor Air Sample
SSSV = Sub-Slab Soil Vapor Sample

Created by: BW/SRC Date: 02/03/05
Checked by: BW Date 02/07/05

TABLE 8-1
SUMMARY OF SURFACE SOIL DATA AND COMPARISON TO SCREENING CRITERIA
JANUARY 2005
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Detected compounds	Frequency of Detection	Range of Detected Concentrations	NYSDEC TAGM 4046 [1]	Urban Background Concentrations [2][3]
Volatile Organic Compounds - VOCs (ug/kg)				
Dichlorodifluoromethane	3 / 5	2 - 3	NA	NA
Methyl acetate	1 / 5	4	NA	NA
Total VOCs	4 / 5	2 - 4	10,000	NA
Semi-Volatile Organic Compounds - SVOCs (ug/kg)				
2-Methylnaphthalene	1 / 5	120	36,400	NA
Acenaphthene	2 / 5	370 - 810	50,000 [6]	NA
Acetophenone	3 / 5	110 - 680	50,000 [6]	NA
Anthracene	3 / 5	300 - 1,500	50,000 [6]	NA
Benzo(a)anthracene	4 / 5	**380 - 6,200**	224 or MDL	169 - 59,000
Benzo(a)pyrene	5 / 5	**260 - 5,800**	61	165 - 220
Benzo(b)fluoranthene	4 / 5	550 - **8,300**	1,100	15,000 - 62,000
Benzo(g,h,i)perylene	2 / 5	530 - 750	50,000 [6]	900 - 47,000
Benzo(k)fluoranthene	4 / 5	440 - **4,700**	1,100	300 - 26,000
Benzylbutyl phthalate	2 / 5	370 - 7,400	50,000 [6]	NA
Bis(2-ethylhexyl) phthalate	4 / 5	200 - 2,800	50,000 [6]	NA
Caprolactam	2 / 5	270 - 2,300	50,000 [6]	NA
Carbazole	3 / 5	270 - 1,400	50,000 [6]	NA
Chrysene	5 / 5	400 - **9,400**	400	251 - 640
Dibenz(a,h)anthracene	3 / 5	**340 - 1,300**	14 or MDL	NA
Dibenzofuran	2 / 5	160 - 420	6,200	NA
Di-n-butyl phthalate	1 / 5	**4400**	810	NA
Fluoranthene	5 / 5	1,000 - 19,000	50,000 [6]	200 - 166,000
Fluorene	2 / 5	340 - 720	50,000 [6]	NA
Indeno(1,2,3-c,d)pyrene	3 / 5	720 - 2,800	50,000 [6]	8,000 - 61,000
Naphthalene	1 / 5	210	13,000	NA
Phenanthrene	5 / 5	430 - 12,000	50,000 [6]	NA
Phenol	1 / 5	**160**	30 or MDL	NA
Pyrene	5 / 5	620 - 15,000	50,000 [6]	145 - 147,000
TAL Metals (mg/kg)				
Aluminum	5 / 5	4,710 - 9,100	SB	33,000
Arsenic	5 / 5	6.4 - **12.4**	7.5 or SB	3 - 12 [4]
Barium	5 / 5	44.4 - 97.6	300 or SB	15 - 600
Beryllium	5 / 5	0.25 - 0.44	0.16 or SB	0 - 1.75
Cadmium	3 / 5	0.21 - **1.5**	1 or SB	0.1 - 1
Calcium	5 / 5	4,390 - 19,500	SB	130 - 35,000
Chromium, Total	5 / 5	8.4 - 115	10 or SB	1.5 - 40 [4]
Cobalt	5 / 5	4.3 - 9	30 or SB	2.5 - 60 [4]
Copper	5 / 5	32.1 - **87.8**	25 or SB	1 - 50
Iron	5 / 5	13,600 - 23,900	2,000 or SB	2,000 - 550,000
Lead	5 / 5	24.5 - **484**	400 [7]	[5]
Magnesium	5 / 5	3,090 - 4,460	SB	100 - 5,000
Manganese	5 / 5	413 - 892	SB	50 - 5,000
Nickel	5 / 5	13.5 - **27.6**	13 or SB	0.5 - 25
Potassium	5 / 5	542 - 992	SB	8,500 - 43,000 [4]
Vanadium	5 / 5	8.9 - 17.4	150 or SB	1 - 300
Zinc	5 / 5	**84.2 - 602**	20 or SB	9 - 50
Mercury	5 / 5	0.027 - 0.137	0.1 or SB	0.001 - 0.2

Notes:

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

(1) Recommended Soil Cleanup Objectives, New York State Dept. of Environmental Conservation TAGM 4046, Dec. 2000.

(2) Eastern USA Background, NYSDEC TAGM 4046, Dec. 2000.

(3) PAH background concentrations are from the Agency for Toxic Substances and Disease Registry, 1995.

(4) New York State background, NYSDEC TAGM 4046, Dec. 2000.

(5) Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4 - 61 ppm.

(6) NYSDEC TAGM, Recommended Soil Cleanup Objectives, Dec. 2000, Total SVOCs < 500 ppm, Individual SVOCs < 50 ppm

(7) USEPA soil screening level for residential soils.

NA - Not Applicable or Not Available.

SB - Site Background

Bold organic concentration values exceed the NYSDEC TAGM.

Bold organic concentration values exceed both the NYSDC TAGM and Eastern US Background Range.

TABLE 8-2
SUMMARY OF SURFACE SOIL DATA AND COMPARISON TO SCREENING CRITERIA
JULY 2004
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Detected compounds	Frequency of Detection	Range of Detected Concentrations	NYSDEC TAGM 4046 (1)	Eastern U.S. Background Concentrations
Metals (mg/kg)				
Aluminum	10 / 10	6,400 - 12,000	SB	33,000
Antimony	5 / 10	0.43 - 0.7	SB	<1 - 8.8 (5)
Arsenic	10 / 10	7.6 - 11	7.5 or SB	3 - 12 (3)
Barium	10 / 10	73.6 - 499	300 or SB	15 - 600
Beryllium	10 / 10	0.29 - 0.6	0.16 or SB	0 - 1.75
Cadmium	1 / 10	0.06	1 or SB	0.1 - 1
Calcium	10 / 10	1,560 - 28,300	SB	130 - 35,000
Chromium - Total	10 / 10	7.6 - 15	10 or SB	1.5 - 40 (3)
Cobalt	10 / 10	5.5 - 10	30 or SB	2.5 - 60 (3)
Copper	10 / 10	10.6 - **177**	25 or SB	1 - 50
Iron	10 / 10	16,300 - 22,800	2,000 or SB	2,000 - 550,000
Lead	10 / 10	9.3 - 136	400 (7)	(4)
Magnesium	10 / 10	2,440 - 7,310	SB	100 - 5,000
Manganese	10 / 10	430 - 790	SB	50 - 5,000
Mercury	5 / 10	0.019 - **0.274**	0.1	0.001 - 0.2
Nickel	10 / 10	11.7 - 21	13 or SB	0.5 - 25
Potassium	10 / 10	808 - 1,290	SB	8,500 - 43,000 (3)
Silver	2 / 10	0.18 - 0.19	SB	ND - 5.0 (6)
Sodium	10 / 10	36.3 - 642	SB	6,000 - 8,000
Vanadium	10 / 10	9.1 - 18	150 or SB	1 - 300
Zinc	10 / 10	37.3 - **109**	20 or SB	9 - 50

Notes:

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

(1) Recommended Soil Cleanup Objectives, New York State Dept. of Environmental Conservation TAGM 4046, Dec. 2000.

(2) Eastern USA Background, NYSDEC TAGM 4046, Dec. 2000.

(3) New York State background, NYSDEC TAGM 4046, Dec. 2000.

(4) Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4 - 61 ppm.

(5) Value from Elements in North American Soils, Eastern USA Soils, Dragun and Chiasson, 1991

(6) Value from Elements in North American Soils, Soils of the Conterminous USA, Dragun and Chiasson, 1991

(7) USEPA soil screening level for residential soils.

NA - Not Applicable or Not Available.

SB - Site Background

Bold inorganic concentration values exceed Eastern US Background Concentration Range.

TABLE 8-3
SUMMARY OF SUBSURFACE SOIL DATA AND COMPARISON TO SCREENING CRITERIA
JANUARY 2005
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Detected compounds	Frequency of Detection	Range of Detected Concentrations	NYSDEC TAGM 4046 [1]	Urban Background Concentrations [2][3]
Volatile Organic Compounds - VOCs (ug/kg)				
Acetone	3 / 7	28 - 73	200	NA
Carbon disulfide	2 / 7	1 - 2	2,700	NA
Cyclohexane	1 / 7	21	NA	NA
Dichlorodifluoromethane	1 / 7	2	NA	NA
Isopropylbenzene (Cumene)	1 / 7	25	NA	NA
Methyl ethyl ketone (2-Butanone)	2 / 7	8 - 14	NA	NA
Methylcyclohexane	1 / 7	170	NA	NA
Methylene chloride	2 / 7	7 - 21	100	NA
Semi-Volatile Organic Compounds - SVOCs (ug/kg)				
Acenaphthene	1 / 7	1,100	50,000 [8]	NA
Anthracene	1 / 7	2,200	50,000 [8]	NA
Benzo(a)anthracene	3 / 7	**460** - **3,000**	224 or MDL	169 - 59,000
Benzo(a)pyrene	3 / 7	**480** - **2,400**	61	165 - 220
Benzo(b)Fluoranthene	3 / 7	420 - **2,100**	1,100	15,000 - 62,000
Benzo(g,h,i)perylene	3 / 7	310 - 1,700	50,000 [8]	900 - 47,000
Benzo(k)fluoranthene	3 / 7	340 - **1,800**	1,100	300 - 26,000
Bis(2-ethylhexyl) phthalate	1 / 7	220	50,000 [8]	NA
Carbazole	1 / 7	760	50,000 [8]	NA
Chrysene	3 / 7	**560** - **3,100**	400	251 - 640
Dibenzofuran	1 / 7	720 - 720	6,200	NA
Di-n-octylphthalate	2 / 7	36 - 67	50,000 [8]	NA
Fluoranthene	4 / 7	290 - 7,600	50,000 [8]	200 - 166,000
Fluorene	1 / 7	1,300	50,000 [8]	NA
Indeno(1,2,3-c,d)pyrene	2 / 7	290 - 320	50,000 [8]	8,000 - 61,000
Phenanthrene	4 / 7	300 - 8,200	50,000 [8]	NA
Pyrene	4 / 7	230 - 5,900	50,000 [8]	145 - 147,000
Petroleum Products - Method 310.13 (mg/kg)				
Fuel oil #2	1 / 7	35	NA	NA
Metals (mg/kg)				
Aluminum	7 / 7	4,710 - 11,000	SB	33,000
Arsenic	7 / 7	4.3 - **16.2**	7.5 or SB	3 - 12 [4]
Barium	7 / 7	57.9 - 214	300 or SB	15 - 600
Beryllium	7 / 7	0.29 - 1.1	0.16 or SB	0 - 1.75
Cadmium	4 / 7	0.24 - 0.39	1 or SB	0.1 - 1
Calcium	7 / 7	3,120 - 70,400	SB	130 - 35,000
Chromium, Total	7 / 7	6 - 14.2	10 or SB	1.5 - 40 [4]
Cobalt	7 / 7	4 - 8.4	30 or SB	2.5 - 60 [4]
Copper	7 / 7	25.4 - **68.1**	25 or SB	1 - 50
Iron	7 / 7	9,240 - 22,300	2,000 or SB	2,000 - 550,000
Lead	7 / 7	23.4 - 239	400 [9]	[5]
Magnesium	7 / 7	1,230 - 7,810	SB	100 - 5,000
Manganese	7 / 7	338 - 911	SB	50 - 5,000
Nickel	7 / 7	9.3 - 21.2	13 or SB	0.5 - 25
Potassium	7 / 7	460 - 1,210	SB	8,500 - 43,000 [4]
Sodium	2 / 7	161 - 281	SB	6,000 - 8,000
Vanadium	7 / 7	8.4 - 18.5	150 or SB	1 - 300
Zinc	7 / 7	**60.7** - **185**	20 or SB	9 - 50
Mercury	6 / 7	0.118 - **0.421**	0.1 or SB	0.001 - 0.2

Notes:
Only those analytes detected at a minimum of one location and greater than the reporting limit are shown.
(1) Recommended Soil Cleanup Objectives, New York State Dept. of Environmental Conservation TAGM 4046, Dec. 2000.
(2) Eastern USA Background, NYSDEC TAGM 4046, Dec. 2000.
(3) PAH background concentrations are from the Agency for Toxic Substances and Disease Registry, 1995.
(4) New York State background, NYSDEC TAGM 4046, Dec. 2000.
(5) Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4 - 61 ppm.
(7) Value from Elements in North American Soils, Eastern USA Soils, Dragun and Chiasson, 1991
(8) NYSDEC TAGM, Recommended Soil Cleanup Objectives, Dec. 2000, Total SVOCs < 500 ppm, Individual SVOCs < 50 ppm
(9) USEPA soil screening level for residential soils.
NA - Not Applicable or Not Available.
SB - Site Background
Bold organic concentration values exceed the NYSDEC TAGM.
Bold organic concentration values exceed both the NYSDC TAGM and Eastern US Background Range.

TABLE 8-4
SUMMARY OF SUBSURFACE SOIL DATA AND COMPARISON TO SCREENING CRITERIA
JULY 2004
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Cobalt	15 / 15	4.4 - 8.6	30 or SB	2.5 - 60 (5)
Copper	15 / 15	10.8 - **117**	25 or SB	Jan-50
Iron	15 / 15	12,200 - 23,600	2,000 or SB	2,000 - 550,000
Lead	15 / 15	13.7 - 240	400 (10)	(6)
Magnesium	15 / 15	1,920 - 8,190	SB	100 - 5,000
Manganese	15 / 15	202 - 4,130	SB	50 - 5,000
Mercury	12 / 15	0.032 - **0.445**	0.1	0.001 - 0.2
Nickel	15 / 15	11.1 - 20.1	13 or SB	0.5 - 25
Potassium	15 / 15	718 - 1,580	SB	8,500 - 43,000 (5)
Selenium	1 / 15	0.75	2 or SB	0.1 - 3.9
Silver	8 / 15	0.14 - 1.70	SB	ND - 5.0 (8)
Sodium	15 / 15	67.6 - 577	SB	6,000 - 8,000
Vanadium	15 / 15	10.2 - 18.9	150 or SB	1 - 300
Zinc	15 / 15	51.4 - **517**	20 or SB	Sep-50

Notes:

Only those analytes detected at a minimum of one location and greater than the reporting limit are shown.
(1) Recommended Soil Cleanup Objectives, New York State Dept. of Environmental Conservation TAGM 4046, Dec. 2000.
(2) Eastern USA Background, NYSDEC TAGM 4046, Dec. 2000.
(3) PAH background concentrations are from the Agency for Toxic Substances and Disease Registry, 1995.
(4) PCB value is for Total PCBs
(5) New York State background, NYSDEC TAGM 4046, Dec. 2000.
(6) Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4 - 61 ppm.
(7) Value from Elements in North American Soils, Eastern USA Soils, Dragun and Chiasson, 1991
(8) Value from Elements in North American Soils, Soils of the Conterminous USA, Dragun and Chiasson, 1991
(9) NYSDEC TAGM, Recommended Soil Cleanup Objectives, Dec. 2000, Total SVOCs < 500 ppm, Individual SVOCs < 50 ppm
(10) USEPA soil screening level for residential soils.
NA - Not Applicable or Not Available.
SB - Site Background
Bold organic concentration values exceed both the NYSDC TAGM and Eastern US Background Range.

TABLE 8-5
SUMMARY OF GROUNDWATER DATA AND COMPARISON TO SCREENING CRITERIA
SEPTEMBER 2004 AND FEBRUARY 2005
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Detected compounds	Frequency of Detection	Range of Detected Concentrations	NYSDEC Class "GA" Standards [1]
Volatile Organic Compounds - VOCs (ug/l)			
Acetone	2 / 5	10 - 12	50 [2]
Cyclohexane	1 / 5	14	NA
Semi-Volatile Organic Compounds - SVOCs (ug/l)			
2-Methylnaphthalene	1 / 5	11	NA
Acenaphthene	1 / 5	1	20 [2]
Bis(2-ethylhexyl) phthalate	2 / 5	1	5
Fluorene	1 / 5	1	50 [2]
Pentachlorophenol	1 / 5	**2**	1 [3]
Phenanthrene	1 / 5	2	50 [2]
Metals (ug/l)			
Aluminum	5 / 5	240 - 4,690	NA
Antimony	2 / 5	**10** - **79**	3
Arsenic	2 / 5	11 - **37**	25
Barium	5 / 5	349 - **1,210**	1,000
Beryllium	3 / 5	0 - 1	3 [2]
Calcium	5 / 5	135,000 - 209,000	NA
Chromium, Total	4 / 5	4 - 6	50
Cobalt	1 / 5	5	NA
Copper	2 / 5	17 - 60	200
Iron	5 / 5	**4,870** - **27,900**	300
Lead	3 / 5	6 - **172**	25
Magnesium	5 / 5	17,300 - **34,200**	35,000 [2]
Manganese	5 / 5	**2,540** - **10,600**	300
Potassium	5 / 5	13,500 - 42,500	NA
Selenium	2 / 5	4 - 4	10
Sodium	5 / 5	58,300 - 348,000	20,000
Thallium	1 / 5	**39**	0.5 [2]
Vanadium	2 / 5	7 - 8	NA
Zinc	3 / 5	9 - 96	2,000 [2]

Notes:

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

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

(2) Values represent Guidance Values.

(3) Applies to sum of all phenolic compounds.

NA - Not Applicable or Not Available.

Bold concentration values exceed NYSDEC Class GA standards.

TABLE 8-6
SUMMARY OF GROUNDWATER DATA AND COMPARISON TO SCREENING CRITERIA
JULY 2004
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Detected compounds	Frequency of Detection	Range of Detected Concentrations	NYSDEC CLASS "GA" STANDARDS[1]
Metals (ug/l)			
Aluminum	3 / 3	561 - 1,160	NA
Arsenic	3 / 3	4.1 - 18	25
Barium	3 / 3	269 - **1,200**	1,000
Beryllium	2 / 3	0.4 - 0.48	3 [2]
Cadmium	1 / 3	0.64	5
Calcium	3 / 3	74,300 - 209,000	NA
Chromium - Total	2 / 3	2.1 - 4.2	50
Cobalt	3 / 3	0.98 - 1.6	NA
Copper	3 / 3	5.2 - 8	200
Iron	3 / 3	**1,170** - **27,300**	300
Lead	3 / 3	3 - **45.7**	25
Magnesium	3 / 3	8,850 - 34,400	35,000 [2]
Manganese	3 / 3	**3,250** - **6,280**	300
Nickel	3 / 3	1.9 - 2.6	100
Potassium	3 / 3	14,500 - 15,800	NA
Sodium	3 / 3	160,000 - 323,000	20,000
Vanadium	3 / 3	1.4 - 2.4	NA
Zinc	3 / 3	7.2 - 32.7	2,000 [2]

Notes:

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

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

(2) Values represent Guidance Values.

NA - Not Applicable or Not Available.

Bold concentration values exceed NYSDEC Class GA standards.

TABLE 8-7
SUMMARY OF AIR DATA AND COMPARISON TO SCREENING CRITERIA
DECEMBER 2004
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

Detected compounds	Frequency of Detection	Range of Detected Concentrations	USEPA Draft Guidance for Vapor Intrusion to Indoor Air Pathway (1)	Background Concentrations
Indoor Air Volatile Organic Compounds - VOCs (ug/m^3)			Generic Target Indoor Air Concentration R = 10^{-4} (ug/m^3)	
Benzene	2 / 2	1.2 - 1.5	31	1.9
Chloromethane	1 / 2	1.1 - 1.1	NA	1.1
Dichlorodifluoromethane	2 / 2	2.6 - 4.2	200	2.9
n-Heptane	2 / 2	0.94 - 1.2	NA	2.6
n-Hexane	2 / 2	0.88 - 0.95	200	1.4
Toluene	2 / 2	8.3 - 11	400	27
Trichlorofluoromethane	2 / 2	20 - 26	700	1.4
Xylene (m,p)	2 / 2	1.4 - 1.6	7,000	1.3
Xylene, Total	2 / 2	1.4 - 1.7	7,000	1.3
Sub-Slab Soil Gas Volatile Organic Compounds - VOCs (ug/m^3)			Generic Target Shallow Soil Gas Concentration (ug/m^3)	
1,1,1-Trichloroethane	1 / 5	13 - 13	22,000	NA
1,2,4-Trimethylbenzene	5 / 5	6.4 - 24	60	NA
1,3,5-Trimethylbenzene	5 / 5	3.5 - 8.4	60	NA
1,3-Butadiene	2 / 5	0.49 - 0.88	8.7	NA
2,2,4-Trimethylpentane	3 / 5	0.93 - 4	NA	NA
4-Ethyltoluene	5 / 5	6.9 - 20	NA	NA
Acetone	5 / 5	21 - 55	3,500	NA
Benzene	5 / 5	4.5 - 20	310	NA
Bromodichloromethane	1 / 5	2.3 - 2.3	140	NA
Carbon disulfide	5 / 5	4 - 56	7,000	NA
Chloroform	5 / 5	3.7 - 13	110	NA
Cyclohexane	5 / 5	2.8 - 20	NA	NA
Dichlorodifluoromethane	5 / 5	2.6 - 3.6	2,000	NA
Ethylbenzene	5 / 5	6.5 - 23	2,200	NA
Methyl ethyl ketone	5 / 5	4.4 - 8	10,000	NA
Methyl tert-butyl ether	3 / 5	2.7 - 3.6	30,000	NA
Methylene chloride	5 / 5	2.1 - 4.2	5200	NA
n-Heptane	5 / 5	5.3 - 74	NA	NA
n-Hexane	5 / 5	3.4 - 33	2,000	NA
Tetrachloroethene	5 / 5	1.9 - 13	810	NA
Toluene	5 / 5	22 - 72	4,000	NA
Trichloroethene	1 / 5	5 - 5	22	NA
Trichlorofluoromethane	5 / 5	62 - 120	7,000	NA
Xylene (m,p)	5 / 5	27 - 120	70,000	NA
Xylene (o)	5 / 5	9.6 - 32	70,000	NA
Xylene, Total	5 / 5	37 - 150	70,000	NA

Notes:

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

(1) USEPA Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance).

NA - Not Applicable or Not Available.

TABLE 8-8
CHEMICALS OF POTENTIAL CONCERN
FORMER AMES/HILLS PLAZA SITE
JAMESTOWN, NEW YORK

CHEMICAL	Surface Soil	Subsurface Soil	Groundwater	Indoor Air	Sub-Slab Soil Gas
Volatile Organic Compounds					
Cyclohexane	-	X	X	-	X
Dichlorodifluoromethane	X	X	-	•	•
4-Ethyltoluene	-	-	-	-	X
n-Heptane	-	-	-	•	X
Isopropylbenzene (Cumene)	-	X	-	-	-
Methyl acetate	X	-	-	-	-
Methylcyclohexane	-	X	-	-	-
Methyl ethyl ketone (2-Butanone)	-	X	-	-	•
2,2,4-Trimethylpentane	-	-	-	-	X
Semivolatile Organic Compounds					
Benzo(a)anthracene	X	X	-	-	-
Benzo(a)pyrene	X	X	-	-	-
Benzo(b)fluoranthene	X	X	-	-	-
Benzo(k)fluoranthene	X	X	-	-	-
Chrysene	X	X	-	-	-
Dibenzo(a,h)anthracene	X	X	-	-	-
Di-n-butyl phthalate	X	•	-	-	-
2-Methylnaphthalene	•	•	X	-	-
Pentachlorophenol	-	-	X	-	-
Phenol	X	-	-	-	-
Pesticides					
Endrin aldehyde	-	X	-	-	-
Endrin ketone	-	X	-	-	-
Petroleum					
Fuel oil #2	-	X	-	-	-
Metals					
Aluminum	•	•	X	-	-
Antimony	•	•	X	-	-
Arsenic	X	X	X	-	-
Barium	•	•	X	-	-
Cadmium	X	•	•	-	-
Cobalt	•	•	X	-	-
Copper	X	X	-	-	-
Iron	•	•	X	-	-
Lead	X	•	X	-	-
Manganese	•	•	X	-	-
Mercury	X	X	•	-	-
Nickel	X	•	•	-	-
Thallium	-	-	X	-	-
Vanadium	•	•	X	-	-
Zinc	X	X	•	-	-

X : Selected as a Chemical of Potential Concern (COPC).
Shaded entries are COPCs selected based on exceedance of the screening criteria. Unshaded entries are COPCs for which no screening
• : Detected, but not selected as a COPC.
- : Not Analyzed or Not Detected.

TABLE 8-9
CHEMICAL RELEASE MECHANISMS IN THE ABSENCE OF REMEDIAL ACTION
FORMER AMES/HILLS PLAZA Site - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

Release Source	Release Mechanism	Receiving Medium	Site Conditions	Viable Current Release Scenario?	Viable Future Release Scenario?
On-Site Soil	--	Surface Soil	The majority of the Site's surface is currently covered with either asphalt paved parking lots, access roadways, or the building. Surficial fill material was placed on the property as part of Jamestown's urban renewal effort in the 1970s. In addition, historic use of the land by manufacturing and service facilities may have contaminated the grounds over the many decades of human activities. Currently, there are several small areas of exposed surface soil: on medians and landscape planters and grass fields immediately north and south of the building. In addition, the river walk park adjacent to the parking lot is a large grass field with a paved trail.	Yes - COPC has been found in surface soil in covered and uncovered areas of the Site. As such, chemicals present in soils may be released to transient workers and minimally to visitors.	Yes - in the absence of Site remediation, future release will not differ from current scenario.
On-Site Soil	--	Subsurface Soil	See description of "On-Site Soil" above. Although there are subsurface soil COPC present, the majority of the Site is covered.	No - subsurface soil is not expected to be disturbed by current activities or visitors.	Yes - in the absence of Site remediation, chemicals present in subsurface soils may be released by future construction activities.
On-Site Soil and/or Groundwater	Vapor Intrusion	Indoor Air	See description of "On-Site Soil" above. The building is built on-slab and is approximately 100 yards by 100 yards in area. The building is not being maintained for occupancy. COPC are present in the soil vapor and groundwater below the building.	No - indoor air has been sampled and no COPC have been detected.	Yes - in the absence of Site remediation and when the building becomes occupied, chemicals may enter the building.
On-Site Soil	Leaching	Groundwater	See description of "On-Site Soil" above. Groundwater flows under the Site towards the Chadakoin River.	Yes - chemicals may have been transported from soil to groundwater.	Yes - in the absence of Site remediation, chemicals may continue to be transported to groundwater.

TABLE 8-9
CHEMICAL RELEASE MECHANISMS IN THE ABSENCE OF REMEDIAL ACTION
FORMER AMES/HILLS PLAZA Site - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

Release Source	Release Mechanism	Receiving Medium	Site Conditions	Viable Current Release Scenario?	Viable Future Release Scenario?
On-Site Soil	Surface Runoff	Surface Water / Sediment	Surface water runoff from the non-paved areas (grass fields immediately north and south of the building) may transport chemicals from the Site to the Chadakoin River adjacent to the Site. Surface water from paved areas flows into a storm drain system or are trapped by catch basins that also discharged into the river.	Yes - chemicals may be transported to the river via surface runoff and may have been transported to the river in the past via surface runoff prior to the Site areas being paved.	Yes - in the absence of Site remediation, chemicals may continue to be transported to the river via runoff.
Contaminated Groundwater	Discharge	Surface Water / Sediment	Groundwater under the Site flows toward the Chadakoin River. Groundwater migration may transport chemicals from the groundwater to the river.	Yes - chemicals may be transported to the river via sub-surface migration.	Yes - in the absence of Site remediation, chemicals may continue to be transported to the river.
Surface Water / Sediment	Uptake	Biota	The Site is located 100 to 200 feet south and west of the Chadakoin River. The Chadakoin River flows from Lake Chautauqua, which is well stocked with fish. The Site is less than a mile from the lake. Therefore, fish are expected to occupy and/or traverse the portion of the river adjacent to the Site.	Yes - there is the potential for biota exposure which, therefore, may represent a possible source for human exposure.	Yes - in the absence of Site remediation, there is the potential for biota exposure which, therefore, may represent a possible source for human exposure.

TABLE 8-10
NON-CARCINOGENIC HEALTH EFFECTS OF CHEMICALS OF POTENTIAL CONCERN
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

CHEMICAL	CAS #	NON-CARCINOGENIC ORAL CRITICAL EFFECT	NON-CARCINOGENIC INHALATION CRITICAL EFFECT
Volatile Organic Compounds			
Cyclohexane	110-82-7	--	Reduced birth weight
Dichlorodifluoromethane	75-71-8	Reduced body weight	--
4-Ethyltoluene	622-96-8	--	--
n-Heptane	142-82-5	--	--
Isopropylbenzene (Cumene)	98-82-8	Increased average kidney weight	Increased kidney weight and adrenal weight
Methyl acetate	79-20-9	Liver; increased alkaline phosphatase and SGPT	--
Methylcyclohexane	108-87-2	--	--
Methyl ethylketone (2-Butanone)	78-93-3	Decreased fetal birth weight	Developmental toxicity
2,2,4-Trimethylpentane	540-84-1	--	--
Semi-Volatile Organic Compounds			
Benzo(a)anthracene	56-55-3	--	--
Benzo(a)pyrene	50-32-8	--	--
Benzo(b)fluoranthene	205-99-2	--	--
Benzo(k)fluoranthene	208-08-9	--	--
Chrysene	218-01-9	--	--
Dibenzo(a,h)anthracene	53-70-3	--	--
Di-n-butyl phthalate	84-74-2	Increased mortality	
2-Methylnaphthalene	91-57-6	Pulmonary alveolar proteinosis	--
Pentachlorophenol	87-86-5	Liver and kidney effects	--
Phenol	108-95-2	Decreased maternal weight gain	--
Pesticides			
Endrin aldehyde	7421-93-4	Mild lesions in liver; occasional convulsions	--
Endrin ketone	53494-70-5	Mild lesions in liver; occasional convulsions	--
Petroleum			
Fuel oil #2	68476-30-2	--	--
Metals			
Aluminum	121-82-4	Minimal neurotoxicity	Psychomotor and cognitive impairment
Antimony	7440-36-0	Decreased longevity, decreased blood glucose levels, and altered cholesterols levels	--
Arsenic	7440-38-2	Hyperpigmentation, keratosis and possible vascular complications	--
Barium	7440-39-3	Increased kidney weight	--
Cadmium	7440-43-9	Significant proteinuria	--
Cobalt	7440-48-4	--	--
Copper	7440-50-8	--	--
Iron	7439-89-6	--	--
Lead	7439-92-1	--	--
Manganese	7439-96-5	Central nervous system effects (other effect: Impairment of neurobehavioral function)	Impairment of neurobehavioral function
Mercury (as Mercuric chloride)	7487-94-7	Autoimmune effects	--
Nickel (as soluble salts)	7440-02-0	Decreased body and organ weights	--
Thallium(I)sulfate	7446-18-6	No observed adverse effects	--
Vanadium pentoxide	1314-62-1	Decreased Hair Cystine	--
Zinc	7440-66-6	Decrease in erythrocyte superoxide dismutase (ESOD) concentrations	--

Source: USEPA Integrated Risk Information System (IRIS)

TABLE 8-11
CARCINOGENIC HEALTH EFFECTS OF CHEMICALS OF POTENTIAL CONCERN
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

CHEMICAL	CAS #	ORAL CARCINOGENIC CANCER TYPE	INHALATION CARCINOGENIC CANCER TYPE	Weight-of-Evidence (WOE) Classification (*)
Volatile Organic Compounds				
Cyclohexane	110-82-7	--	--	--
Dichlorodifluoromethane	75-71-8	--	--	--
4-Ethyltoluene	622-96-8	--	--	
n-Heptane	142-82-5	--	--	--
Isopropylbenzene (Cumene)	98-82-8	--	--	D
Methyl acetate	79-20-9	--	--	--
Methylcyclohexane	108-87-2			
Methyl ethyl ketone (2-Butanone)	78-93-3	--	--	D
2,2,4-Trimethylpentane	540-84-1	--	--	
Semi-Volatile Organic Compounds				
Benzo(a)anthracene	56-55-3	--	--	B2
Benzo(a)pyrene	50-32-8	Forestomach, squamous cell papillomas, and carcinomas	--	B2
Benzo(b)fluoranthene	205-99-2	--	--	B2
Benzo(k)fluoranthene	207-08-9	--	--	B2
Chrysene	218-01-9	--	--	B2
Dibenzo(a,h)anthracene	53-70-3	--	--	B2
Di-n-butyl phthalate	84-74-2	--	--	D
2-Methylnaphthalene	91-57-6	--	--	D
Pentachlorophenol	87-86-5	Liver and kidney effects	--	B2
Phenol	108-95-2	--	--	D
Pesticides				
Endrin aldehyde	7421-93-4	--	--	--
Endrin ketone	53494-70-5	--	--	--
Petroleum				
Fuel oil #2	68476-30-2	--	--	--
Metals				
Aluminum	121-82-4	--	--	D
Antimony	7440-36-0	--	--	--
Arsenic	7440-38-2	Increased mortality from multiple internal organ cancers (liver, kidney, lung, bladder), and increased incidence of skin cancer	Lung cancer	A
Barium	7440-39-3	--	--	D
Cadmium	7440-43-9	--	Lung, trachea, and bronchus cancer deaths	B1
Cobalt	7440-48-4	--	--	--
Copper	7440-50-8	--	--	D
Iron	7439-89-6	--	--	--

TABLE 8-11
CARCINOGENIC HEALTH EFFECTS OF CHEMICALS OF POTENTIAL CONCERN
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

CHEMICAL	CAS #	ORAL CARCINOGENIC CANCER TYPE	INHALATION CARCINOGENIC CANCER TYPE	Weight-of-Evidence (WOE) Classification (*)
Lead	7439-92-1	Increased renal tumors; suppressed gene expression	--	B2
Manganese	7439-96-5	--	--	D
Mercury (as Mercuric chloride)	7487-94-7	--	--	C
Nickel (as soluble salts)	7440-02-0	--	--	--
Thallium(I)sulfate	7446-18-6	--	--	D
Vanadium pentoxide	1314-62-1	--	--	--
Zinc	7440-66-6	--	--	D

(*): USEPA Weight-of-Evidence Classification:
A: Human carcinogen
B1: Probable human carcinogen; limited human data are available
B2: Probably human carcinogen; sufficient evidence in animals and inadequate or no evidence in humans
C: Possible human carcinogen
D: Not classifiable as to human carcinogenicity
--: Not evaluated
Source: USEPA Integrated Risk Information System (IRIS)

TABLE 8-12
SUMMARY OF HUMAN HEALTH EVALUATION RISK CHARACTERIZATION
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

Scenario Timeframe	Receptor Population	Environmental Medium	Exposure Route			Likelihood of Exposure		
						Not Expected	Possible	Likely
Current/ Future	Transient Worker	Surface Soil	Dermal Contact	Inhalation	Ingestion		X	
		Subsurface Soil	Dermal Contact	Inhalation	Ingestion		X	
		Surface Water/Sediment	Dermal Contact		Ingestion		X	
	Park Visitor	Surface Soil	Dermal Contact	Inhalation	Ingestion	X		
		Surface Water/Sediment	Dermal Contact		Ingestion		X	
		Biota			Ingestion		X	
	Trespasser	Surface Soil	Dermal Contact	Inhalation	Ingestion	X		
		Surface Water/Sediment	Dermal Contact		Ingestion	X		
Future	Construction / Utility Worker	Surface Soil	Dermal Contact	Inhalation	Ingestion			X
		Sub-surface Soil	Dermal Contact	Inhalation	Ingestion			X
		Groundwater	Dermal Contact	Inhalation	Ingestion		X	
	Maintenance Worker	Surface Soil	Dermal Contact	Inhalation	Ingestion		X	
		VOCs via Vapor Intrusion		Inhalation			X	
	On-Site Worker	VOCs via Vapor Intrusion		Inhalation			X	
	Commercial Visitor	VOCs via Vapor Intrusion		Inhalation			X	

TABLE 9-1
COMPARISON OF MPI SOIL (0-4 FEET) CONCENTRATIONS TO SCREENING CRITERIA
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

Detected Constituents	Frequency of detection	Range of detected concentrations	Toxicological Benchmarks[(1)]	Background Concentrations[(2,3)]
Volatile Organics (ug/kg)				
Dichlorodifluoromethane	3 / 5	2 - 3	NA	NA
Methyl Acetate	1 / 5	4	NA	NA
Semi-Volatile Organics (ug/kg)				
Acenapthene	2 / 5	370 - 810	NA	NA
Acetophenone	3 / 5	110 - 680	NA	NA
Anthracene	3 / 5	300 - 1,500	NA	NA
Benzo(a)anthracene	4 / 5	380 - 6,200	NA	169 - 59,000
Benzo(a)pyrene	5 / 5	260 - 5,800	6,990	165 - 220
Benzo(b)fluoranthene	4 / 5	550 - 8,300	NA	15,000 - 62,000
Benzo(g,h,i)perylene	2 / 5	530 - 750	NA	900 - 47,000
Benzo(k)fluoranthene	4 / 5	440 - 4,700	NA	300 - 26,000
Benzyl Butyl Phthalate	2 / 5	370 - 7,400	NA	NA
bis(2-Ethylhexyl)phthalate	4 / 5	200 - 2,800	128,000	NA
Caprolactam	2 / 5	270 - 2,300	NA	NA
Carbazole	3 / 5	270 - 1,400	NA	NA
Chrysene	5 / 5	400 - 9,400	NA	251 - 640
Dibenzo(a,h)anthracene	3 / 5	340 - 1,300	NA	NA
Dibenzofuran	2 / 5	160 - 420	NA	NA
Di-n-butylphthalate	1 / 5	4,400	3,846,000	NA
Fluoranthene	5 / 5	1,000 - 19,000	NA	200 - 166,000
Fluorene	2 / 5	340 - 720	NA	NA
Indeno(1,2,-cd)pyrene	3 / 5	720 - 2,800	NA	8,000 - 61,000
2-Methylnaphthalene	1 / 5	120	NA	NA
Naphthalene	1 / 5	210	NA	NA
Phenanthrene	5 / 5	430 - 12,000	NA	NA
Phenol	1 / 5	160	NA	NA
Pyrene	5 / 5	620 - 15,000	NA	145 - 147,000
Inorganics (mg/kg)				
Aluminum	5 / 5	4,710 - 9,100	13.495	33,000
Arsenic	5 / 5	6.4 - **12.4**	0.881	3 - 12
Barium	5 / 5	44.4 - 97.6	69.6	15 - 600
Beryllium	5 / 5	0.25 - 0.44	8.53	0 - 1.75
Cadmium	3 / 5	0.24 - 1.5	12.465	0.1 - 1
Calcium	5 / 5	4390 - 19,500	NA	130 - 35,000
Chromium	5 / 5	8.4 - 115	35,370[a]	1.5 - 40
Cobalt	5 / 5	4.3 - 9	NA	2.5 - 60
Copper	5 / 5	32.1 - 87.8	196.6	1 - 50
Iron	5 / 5	13,600 - 23,900	NA	2,000 - 550,000
Lead	5 / 5	24.5 - 484	103.38	200 - 500
Magnesium	5 / 5	3090 - 4,460	NA	100 - 5,000
Manganese	5 / 5	413 - 892	1137	50 - 5,000
Mercury	5 / 5	0.027 - 0.137	16.80	0.001 - 0.2
Nickel	5 / 5	13.5 - 27.6	516.91	0.5 - 25
Potassium	5 / 5	542 - 992	NA	8,500 - 43,000
Vanadium	5 / 5	8.9 - 17.4	2.519	1 - 300
Zinc	5 / 5	**84.2 - 602**	14.684	9 - 50

Notes:

Bold values indicate exceedance of the benchmarks for most organics and exceedance of the benchmarks and background for several PAHs and the inorganics.

NA = Not available

1 = Toxicological Benchmarks for Wildlife: 1996 Revision (NOAEL-based benchmarks for food for white-footed mouse) (Sample et al., 1996).

2 = Inorganic analytes from Eastern USA Background as shown in NYSDEC TAGM 4046, Dec. 2000.

3 = SVOC analytes from *Toxicological Profile for Polycyclic Aromatic Hydrocarbons (* ATSDR, 1995).

a = for Cr III as Cr_2O_3

TABLE 9-2
COMPARISON OF LCS SOIL (0-4 FEET) CONCENTRATIONS TO SCREENING CRITERIA
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

Detected Constituents	Frequency of detection	Range of detected concentrations	Toxicological Benchmarks[(1)]	Background Concentrations[(2,3)]
Volatile Organics (ug/kg)				
2-Butanone	2 / 3	7.00 - 29	22,886,000	NA
Acetone	3 / 3	10 - 100	129,200	NA
Carbon Disulfide	1 / 3	2.00	NA	NA
Dichlorodifluoromethane	1 / 3	3.00	NA	NA
Methylene chloride	3 / 3	10 - 12	75,600	NA
Semi-Volatile Organics (ug/kg)				
Benzo(a)anthracene	1 / 2	52	NA	169 - 59,000
Benzo(a)pyrene	1 / 2	42	6,990	165 - 220
Benzo(b)fluoranthene	1 / 2	29	NA	15,000 - 62,000
Benzo(g,h,i)perylene	1 / 2	35	NA	900 - 47,000
Benzo(k)fluoranthene	1 / 2	46	NA	300 - 26,000
bis(2-Ethylhexyl)phthalate	2 / 2	24 - 34	128,000	NA
Chrysene	1 / 2	47	NA	251 - 640
Dibenzo(a,h)anthracene	1 / 2	9	NA	NA
Fluoranthene	2 / 2	21 - 78	NA	200 - 166,000
Indeno(1,2,-cd)pyrene	1 / 2	29	NA	8,000 - 61,000
Phenanthrene	1 / 2	15	NA	NA
Pyrene	2 / 2	16 - 87	NA	145 - 147,000
Pesticides/PCBs (ug/kg)				
Endrin ketone	1 / 1	3.2	643[d]	NA
Aroclor 1016	1 / 1	22	23,020	NA
Inorganics (mg/kg)				
Aluminum	13 / 13	3,680 - 12,800	13.495	33,000
Antimony	8 / 13	0.43 - 4.5	0.874	<1 - 8.8[b]
Arsenic	13 / 13	7.6 - **24.1**	0.881	3 - 12
Barium	13 / 13	69.5 - 499	69.6	15 - 600
Beryllium	13 / 13	0.29 - 0.62	8.53	0 - 1.75
Cadmium	2 / 13	0.06 - 0.22	12.465	0.1 - 1
Calcium	13 / 13	1560 - 28,300	NA	130 - 35,000
Chromium	13 / 13	7.6 - 25.1	35,370[a]	1.5 - 40
Cobalt	13 / 13	5.5 - 12	NA	2.5 - 60
Copper	13 / 13	10.6 - 177	196.6	1 - 50
Iron	13 / 13	16,300 - 153,000	NA	2,000 - 550,000
Lead	13 / 13	9.3 - 240	103.38	200 - 500
Magnesium	13 / 13	600 - **7,310**	NA	100 - 5,000
Manganese	13 / 13	430 - 844	1,137	50 - 5,000
Mercury	8 / 13	0.019 - 0.274	16.8	0.001 - 0.2
Nickel	13 / 13	11.7 - 27	516.91	0.5 - 25
Potassium	13 / 13	547 - 1,580	NA	8,500 - 43,000
Silver	5 / 13	0.14 - 0.37	NA	ND - 5.0[c]
Sodium	13 / 13	36.3 - 642	NA	6,000 - 8,000
Vanadium	13 / 13	9.1 - 54.4	2.519	1 - 300
Zinc	13 / 13	37.3 - 185	2,067.6	9 - 50

Notes

Bold values indicate exceedance of the benchmarks for most organics and exceedance of the benchmarks and background for several PAHs and the inorganics.

NA = Not available

1 = Toxicological Benchmarks for Wildlife: 1996 Revision (NOAEL-based benchmarks for food for white-footed mouse) (Sample et al., 1996).

2 = Inorganic analytes from Eastern USA Background as shown in NYSDEC TAGM 4046, Dec. 2000.

3 = SVOC analytes from *Toxicological Profile for Polycyclic Aromatic Hydrocarbons (*ATSDR, 1995).

a = for Cr III as Cr_2O_3

b = Value from Elements in North American Soils, Eastern USA Soils, Dragun and Chiasson, 1991

c = Value from Elements in North American Soils, Soils of the Conterminous USA, Dragun and Chiasson, 1991

d = for Endrin

TABLE 9-3
CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

CHEMICAL	Soil (0-4')	Groundwater
Volatile Organics (ug/kg)		
Acetone	•	•
2-Butanone	•	-
Carbon disulfide	X	-
Cyclohexane	-	X
Dichlorodifluoromethane	X	-
Methyl acetate	X	-
Methylene Chloride	•	-
Vinyl chloride	•	-
Semivolatile Organics (ug/kg)		
Acenapthene	X	•
Acetophenone	X	-
Anthracene	X	-
Benzo(a)anthracene	•	-
Benzo(a)pyrene	•	-
Benzo(b)fluoranthene	•	-
Benzo(g,h,i)perylene	•	-
Benzo(k)fluoranthene	•	-
Benzyl butyl phthalate	X	-
bis(2-Ethylhexyl)phthalate	•	X
Caprolactum	X	
Carbazole	X	-
Chrysene	X	-
Dibenzo(a,h)anthracene	X	-
Dibenzofuran	X	-
Di-n-butylphthalate	•	-
Fluoranthene	•	-
Fluorene	X	X
Indeno(1,2,-cd)pyrene	•	-
2-Methylnaphthalene	X	X
Naphthalene	X	-
Pentachlorophenol	-	•
Phenanthrene	X	•
Phenol	X	-
Pyrene	•	-
Pesticides/PCBs (ug/kg)		
Endrin ketone	•	-
Aroclor-1016	•	-
Inorganics (mg/kg)		
Aluminum	•	X
Antimony	•	X
Arsenic	X	•
Barium	•	X
Beryllium	•	X
Cadmium	•	-
Calcium		X
Chromium	•	•
Cobalt	•	X
Copper	•	X
Iron	•	X
Lead	•	X
Magnesium	X	•
Manganese	•	X
Mercury	•	-
Nickel	•	•
Selenium	•	-
Silver	•	-
Thallium		X
Vanadium	•	-
Zinc	X	•
Total Cyanide	•	-

X : Selected as a Chemical of Potential Ecological Concern (COPEC).
Shaded entries are COPECs selected based on exceedance of the screening criteria. Unshaded entries are COPECs for which no screening criteria are available.
• : Detected, but not selected as a COPEC.
- : Not Analyzed or Not Detected.

TABLE 9-4
COMPARISON OF MPI GROUNDWATER CONCENTRATIONS TO SURFACE WATER QUALITY STANDARDS
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

Detected Constituents	Frequency of detection	Range of detected concentrations	NYSDEC Surface Water Quality Standard [1]	Toxicological Benchmarks [2]	
Volatile organics (ug/L)					
Acetone	2 / 5	10 - 12	NA	1,500	a
Cyclohexane	1 / 5	14	NA	NA	
Semi-volatile organics (ug/L)					
2-Methylnaphthalene	1 / 5	**11**	4.7 [a]	2.1	a,b
Acenaphthene	1 / 5	0.9	5.3 [a]	NA	
bis(2-Ethylhexyl) phthalate	2 / 5	**0.9**	0.6	3	a
Fluorene	1 / 5	**0.8**	0.54 [a]	3.9	a,c
Pentachlorophenol	1 / 5	2.0	5.0 [b]	NA	
Phenanthrene	1 / 5	2.0	5.0 [a]	NA	
Inorganics (ug/L)					
Aluminium	5 / 5	**240 - 4,690**	100	87	d
Antimony	2 / 5	9.6 - **79.2**	NA	30[i]	a
Arsenic	2 / 5	11.2 - 37.3	150	190 (3.1)	d(e)
Barium	5 / 5	**349 - 1,210**	NA	4	a
Beryllium	3 / 5	0.3 - **1**	11.0 [c]	0.66	a
Calcium	5 / 5	135,000 - **209,000**	NA	116,000[h]	f
Chromium	4 / 5	4.3 - 6.2	74.1 [d]	210+[g]	d
Cobalt	1 / 5	**5.2**	5	23[f]	a
Copper	2 / 5	**17.2 - 59.7**	9 [e]	12+	d
Iron	5 / 5	**4,870 - 27,900**	300	1,000[g]	d
Lead	3 / 5	**5.5 - 172**	3.78 [f]	3.2+[g]	d
Magnesium	5 / 5	17,300 - 34,200	NA	82,000[h]	f
Manganese	5 / 5	**2,540 - 10,600**	NA	120[f]	a
Potassium	5 / 5	13,500 - 42,500	NA	53,000[h]	f
Selenium	2 / 5	4 - 4	4.6	5	d
Sodium	5 / 5	58,300 - 348,000	NA	680,000[h]	f
Thallium	1 / 5	**39**	8.0	12	a
Vanadium	2 / 5	7 - 8	14.0	20	a
Zinc	3 / 5	9.1 - 96.4	82.6 [g]	110+[g]	d

Notes

Bold values indicate exceedance of either NYSDEC Surface Water Quality Standards or toxicological benchmarks or both.

NA = Not available

1 = corresponding to a NYSDEC Classified "Class C" waterway, based on Aquatic Type standards for fish propagation or survival and apply to the dissolved form.

a = guidance value

b = exp(1.005* [pH] - 5.134); using a site-specific pH of 6.7 from MW-1 and MW-2 from the September 2004 sampling event.

c = 11 µg/L when hardness is less than or equal to 75 ppm; 1,100 µg/L when hardness is greater than 75 ppm.

d = (0.86) exp[0.819 * ln(ppm hardness) + 0.6848]; default hardness of 100 ppm

e = 0.96*{exp(0.8545 * [ln(ppm hardness)] - 1.702)}; default hardness of 100 ppm

f = {1.46203 - [ln(ppm hardness)*(0.145712)]} exp [1.273 * ln(ppm hardness) - 4.297]; default hardness of 100 ppm

g = exp(0.85 * [ln(ppm hardness)] + 0.5); default hardness of 100 ppm

2 = Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision (Suter and Tsao, 1996).

a = Tier II values, secondary chronic value

b = for 1-Methylnaphthalene

c = value calculated for OSWER (1996).

d = Chronic National Ambirnt Water Quality Criterion.

e = (3.1) is a Tier II value for As V.

f = Lowest chronic value for all organisms.

+ = Hardness dependent criterion normalized to 100 mg/L.

TABLE 9-5
COMPARISON OF LCS GROUNDWATER CONCENTRATIONS TO SURFACE WATER QUALITY STANDARDS
FORMER AMES/HILLS PLAZA SITE - REMEDIAL INVESTIGATION
JAMESTOWN, NEW YORK

Detected Constituents	Frequency of detection	Range of detected concentrations	NYSDEC Surface Water Quality Standard (1)	Toxicological Benchmarks (2)
Inorganics (ug/L)				
Aluminum	3 / 3	**561 - 1,160**	100	87 [a]
Arsenic	3 / 3	4.1 - 18.0	150	190 (3.1) [a(b)]
Barium	3 / 3	**269 - 1,200**	NA	4 [c]
Beryllium	2 / 3	0.4 - 0.48	11.0 [a]	0.66 [c]
Cadmium	1 / 3	0.6	2.1 [b]	1.1+ [a]
Calcium	3 / 3	74,300 - **209,000**	NA	116,000[h] [d]
Chromium	2 / 3	2.1 - 4.2	74.1 [c]	210+[g] [a]
Cobalt	3 / 3	1.0 - 1.6	5	23[f] [c]
Copper	3 / 3	5.2 - 8.0	9 [d]	12+ [a]
Iron	3 / 3	**1,170 - 27,300**	300	1,000[g] [a]
Lead	3 / 3	3.0 - **45.7**	3.78 [e]	3.2+[g] [a]
Magnesium	3 / 3	8,850 - 34,400	NA	82,000[h] [d]
Manganese	3 / 3	**3,250 - 6,280**	NA	120[f] [c]
Nickel	3 / 3	1.9 - 2.6	52.01 [f]	160+[g] [a]
Potassium	3 / 3	14,500 - 15,800	NA	53,000[h] [d]
Sodium	1 / 3	5	NA	680,000[h] [d]
Vanadium	3 / 3	1 - 2	14.0	20 [c]
Zinc	3 / 3	7.2 - 32.7	82.6 g	110+[g] [a]

Notes

Bold values indicate exceedance of the either NYSDEC Surface Water Quality Standards or toxicological benchmarks or both.

NA = Not available

1 = corresponding to a NYSDEC Classified "Class C" waterway, based on Aquatic Type standards for fish propagation or survival and apply to the dissolved form.

a = 11 µg/L when hardness is less than or equal to 75 ppm; 1,100 µg/L when hardness is greater than 75 ppm.

b = 0.85*exp(0.7852 * [ln(ppm hardness)] - 2.715); default hardness of 100 ppm

c = (0.86) exp[0.819 * ln(ppm hardness) + 0.6848]; default hardness of 100 ppm

d = 0.96*{exp(0.8545 * [ln(ppm hardness)] - 1.702)}; default hardness of 100 ppm

e = {1.46203 - [ln(ppm hardness)*(0.145712)]} exp [1.273 * ln(ppm hardness) - 4.297]; default hardness of 100 ppm

f = (0.997) exp (0.846 * [ln (ppm hardness)] + 0.0584); default hardness of 100 ppm

g = exp(0.85 * [ln(ppm hardness)] + 0.5); default hardness of 100 ppm

2 = Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision (Suter and Tsao, 199

a = Chronic National Ambient Water Quality Criterion.

b = (3.1) is a Tier II value for As V.

c = Tier II values, secondary chronic value

d = Lowest chronic value for all organisms.

+ = Hardness dependent criterion normalized to 100 mg/L.