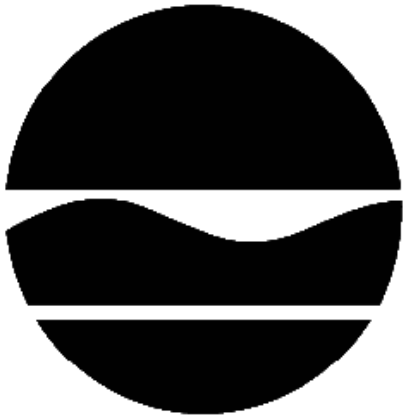
RECORD OF DECISION

Tonawanda Forge Site
Operable Unit Number 01: Soil Contamination
State Superfund Project
Tonawanda, Erie County
Site No. 915274
March 2020



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

DECLARATION STATEMENT - RECORD OF DECISION

Tonawanda Forge Site
Operable Unit Number: 01
State Superfund Project
Tonawanda, Erie County
Site No. 915274
March 2020

Statement of Purpose and Basis

This document presents the remedy for Operable Unit Number 01: Soil Contamination of the Tonawanda Forge site, a Class 2 inactive hazardous waste disposal site. The remedial program was chosen in accordance with the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (the Department) for Operable Unit Number 01: Soil Contamination of the Tonawanda Forge site and the public's input to the selected remedy presented by the Department. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Description of Selected Remedy

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;
- Reducing direct and indirect greenhouse gases and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;

- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
- Fostering green and healthy communities and working landscapes which balance ecological, economic, and social goals; and
- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Excavation and off-site disposal of contaminant source areas, including surface and subsurface soils:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- soil exceeding the 6 NYCRR Part 371 hazardous criteria for lead;
- non-aqueous phase liquids;
- soil with visual waste material or non-aqueous phase liquid; and
- subsurface soil containing total SVOCs exceeding 500 ppm.

Excavation and off-site disposal of all on-site soils which exceed industrial SCOs, as defined by 6 NYCRR Part 375-6.8, except in the landfill area at the east end of the site (AOC-1). This includes soils containing PCBs above 25 parts per million, as defined in 40 CFR Part 761.61(a)(4)(B)(1) and disposed of according to 40 CFR Part 761.61(a)(5)(i)(B).

Approximately 2,400 cubic yards of contaminated soil will be removed from the site. Excavation and removal of any underground storage tanks (USTs), fuel dispensers, underground piping, or other structures associated with a source of contamination will be completed. It is anticipated that a significant amount of piping will be encountered during the surface and subsurface excavation.

3. Backfill

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site.

4. Cover System

A site cover will be required to allow for industrial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer,

with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs. This excludes approximately 200 cubic feet of PCB contaminated concrete that will be demolished, removed, and properly disposed as PCB contaminated waste.

5. Contaminated Sewer Cleaning and Grouting

Approximately 19,000 linear feet of contaminated on-site sewer lines will be cleaned using jetting or a similar, practical sewer cleaning technology. Liquid and solid spoils from the cleaning will be collected, sampled, and either treated on-site or transported and disposed of off-site as appropriate. Sewer cleaning will immediately be followed by the sealing of sewers with flowable fill, pumped, or tremied, as appropriate.

6. Surface Water Control

A series of new, clean catch basins and storm water collection systems will be constructed to connect to the existing Town of Tonawanda municipal separate storm sewer system (MS4). The new catch basins and collection system will drain ponded water from the Parking Lot area, the ponded area between AOC-1 (Fig. 1B) and Kenmore Avenue, along with other areas of ponding on-site. Detention of the storm water collected, if necessary, to meet peak flow criteria established by the Town of Tonawanda, will be achieved within the collection system. Samples will be collected prior to discharge and must meet city discharge limits.

7. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for low occupancy, industrial use as defined by Part 375-1.8(g) and 40 CFR 761.3, although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

8. Site Management Plan

A Site Management Plan is required, which includes the following:

1. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

Institutional Controls: The Environmental Easement discussed in Paragraph 7 above.

Engineering Controls: The soil cover discussed in Paragraph 4 and the Surface Water Control discussed in Paragraph 6 above.

This plan includes, but may not be limited to:

- an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
- descriptions of the provisions of the environmental easement, including any land use, and groundwater;
- a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
- a provision requiring a risk-based approval from the United States Environmental Protection Agency prior to any change of use to high occupancy, industrial use as defined by 40 CFR 761.3 and 40 CFR 761.61 (a)(4)(i)(B)(3)(v);
- a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
- provisions for the management and inspection of the identified engineering controls;
- maintaining site access controls and Department notification; and
- the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

2. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

- a schedule of monitoring and frequency of submittals to the Department; and
- monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

March 26, 2020
Date

Michael J. Ryan, P.E., Director
Division of Environmental Remediation

RECORD OF DECISION

Tonawanda Forge Site
Tonawanda, Erie County
Site No. 915274
March 2020

SECTION 1: SUMMARY AND PURPOSE

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the above referenced site. The disposal of hazardous wastes at the site has resulted in threats to public health and the environment that would be addressed by the remedy. The disposal or release of hazardous wastes at this site, as more fully described in this document, has contaminated various environmental media. Contaminants include hazardous waste and/or petroleum.

The New York State Inactive Hazardous Waste Disposal Site Remedial Program (also known as the State Superfund Program) is an enforcement program, the mission of which is to identify and characterize suspected inactive hazardous waste disposal sites and to investigate and remediate those sites found to pose a significant threat to public health and environment.

The Department has issued this document in accordance with the requirements of New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in the site-related reports and documents.

SECTION 2: CITIZEN PARTICIPATION

The Department seeks input from the community on all remedies. A public comment period was held, during which the public was encouraged to submit comment on the selected remedy. All comments on the remedy received during the comment period were considered by the Department in selecting a remedy for the site. Site-related reports and documents were made available for review by the public at the following document repository:

DECInfo Locator - Web Application
https://gisservices.dec.ny.gov/gis/dil/index.html?rs=915274

Buffalo and Erie County Public Library (and Elaine M. Panty Branch)
Attn: April Tompkins
1 Lafayette square
Buffalo, NY 14203
Phone: 716-858-7129

A public meeting was also conducted. At the meeting, the findings of the remedial investigation

(RI) and the feasibility study (FS) were presented along with a summary of the selected remedy. After the presentation, a question-and-answer period was held, during which verbal or written comments were accepted on the selected remedy.

Comments on the remedy received during the comment period are summarized and addressed in the responsiveness summary section of the ROD (Appendix A).

Receive Site Citizen Participation Information By Email

Please note that the Department's Division of Environmental Remediation (DER) is "going paperless" relative to citizen participation information. The ultimate goal is to distribute citizen participation information about contaminated sites electronically by way of county email listservs. Information will be distributed for all sites that are being investigated and cleaned up in a particular county under the State Superfund Program, Environmental Restoration Program, Brownfield Cleanup Program and Resource Conservation and Recovery Act Program. We encourage the public to sign up for one or more county listservs at http://www.dec.ny.gov/chemical/61092.html

SECTION 3: SITE DESCRIPTION AND HISTORY

Location: The Tonawanda Forge Site is a 33.2-acre site located in an urban area (Fig. 1A). The site is approximately 2,300 feet southeast of the intersection of Kenmore Avenue and Sheridan Drive.

Site Features: The site is relatively flat and primarily covered with asphalt, concrete, brick, and former building foundations. Two multi-story brick buildings, one single-story building, and one pole barn that were a part of the original manufacturing complex, which are currently unoccupied, abandoned or used for storage, remain. The eastern portion of the site, identified as Area of Concern 1 (AOC 1), is a grass covered landfill with an elevation approximately six feet above the surrounding grade (Fig. 1B). Multiple areas of ponding occur on the concrete and asphalt throughout the site.

Current Zoning and Land Use: The site is currently inactive and is zoned for heavy industrial use. The surrounding parcels are currently used for heavy industrial applications. The nearest residential area is approximately 700 feet directly south of the site.

Past Use of the Site: The site property was originally part of the General Motors - Tonawanda Engine Plant facility that borders the site to the north, west and south. The site was sold in 1994 to American Axle and Manufacturing, Inc. (American Axle). In 2008, American Axle sold the property to the current owner, Lewis Brothers, LLC (Lewis), of Richmond, Virginia. Lewis began the demolition of the main facility building starting with the removal of the interior equipment and ending with the demolition of all but four of the buildings.

Lewis failed to expeditiously address petroleum contamination on the site, in violation of a stipulation agreement with the Department. The Department proceeded with the remediation of petroleum contamination and a Site Characterization of the property under Spill number 0911809. During the demolition of the building (near the die room, maintenance section, and I.T. room), a

subcontractor did not properly manage a PCB transformer, which resulted in a release of PCB oil within the facility. Again, upon the subcontractor and property owner's failure to adequately address the spill in a timely manner, DEC commenced clean-up under Spill number 1112690. While a majority of this contamination has been addressed, several areas of the site exhibit PCB concentrations above the regulatory criteria for a hazardous waste.

Operable Units: This site was divided into two operable units. An operable unit represents a portion of a remedial program for a site that for technical or administrative reasons can be addressed separately to investigate, eliminate, or mitigate a release, threat of release or exposure pathway resulting from the site contamination.

Operable unit 1 (OU1) addresses the on-site soil, sewer sediment, and surface water contamination. OU2 consists of the on-site groundwater.

Site Geology and Hydrogeology: Soil boring results from the subsurface investigation revealed brown silt and clay with some clay containing trace amounts of gravel. Bedrock was not encountered at depths up to 24 feet below ground surface (bgs) but is believed to consist of the Upper Silurian-aged Salina Group, which is generally shale and dolostone.

Depth to groundwater at the property ranged from 0.5 feet to 15.82 feet. The local groundwater flow direction is presumed to be west towards the Niagara River, and may be influenced by local drainage features, seasonal groundwater level fluctuations, subsurface geology, surface topography, and/or other local site features.

Operable Unit (OU) Number 01 is the subject of this document.

A Record of Decision will be issued for OU 02 in the future.

A site location map is attached as Figure 1A.

SECTION 4: LAND USE AND PHYSICAL SETTING

The Department may consider the current, intended, and reasonably anticipated future land use of the site and its surroundings when evaluating a remedy for soil remediation. For this site, alternatives that restrict the use of the site to industrial use as described in Part 375-1.8(g) were evaluated in addition to an alternative which would allow for unrestricted use of the site.

A comparison of the results of the RI to the appropriate standards, criteria and guidance values (SCGs) for the identified land use and the unrestricted use SCGs for the site contaminants is included in the Tables for the media being evaluated in Exhibit A.

SECTION 5: ENFORCEMENT STATUS

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

The PRPs for the site, documented to date, include:

Lewis Brothers, LLC

American Axle and Manufacturing, Inc.

General Motors Corporation (GMC)

General Motors, LLC (GM)

The PRPs for the site declined to implement a remedial program when requested by the Department. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the Department will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the state for recovery of all response costs the state has incurred.

SECTION 6: SITE CONTAMINATION

6.1: Summary of the Remedial Investigation

A Remedial Investigation (RI) has been conducted. The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The field activities and findings of the investigation are described in the RI Report.

The following general activities are conducted during an RI:

- Research of historical information,
- Geophysical survey to determine the lateral extent of wastes,
- Test pits, soil borings, and monitoring well installations,
- Sampling of waste, surface and subsurface soils, groundwater, and soil vapor,
- Sampling of surface water and sediment,
- Ecological and Human Health Exposure Assessments.

The analytical data collected on this site includes data for:

- groundwater
- surface water
- soil
- storm sewer sediment

6.1.1: Standards, Criteria, and Guidance (SCGs)

The remedy must conform to promulgated standards and criteria that are directly applicable or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, Criteria and Guidance are hereafter called SCGs.

To determine whether the contaminants identified in various media are present at levels of concern, the data from the RI were compared to media-specific SCGs. The Department has developed SCGs for groundwater, surface water, sediments, and soil. The NYSDOH has developed SCGs for drinking water and soil vapor intrusion. The tables found in Exhibit A list the applicable SCGs in the footnotes. For a full listing of all SCGs see: http://www.dec.ny.gov/regulations/61794.html

6.1.2: RI Results

The data have identified contaminants of concern. A "contaminant of concern" is a hazardous waste that is sufficiently present in frequency and concentration in the environment to require evaluation for remedial action. Not all contaminants identified on the property are contaminants of concern. The nature and extent of contamination and environmental media requiring action are summarized in Exhibit A. Additionally, the RI Report contains a full discussion of the data. The contaminants of concern identified for this Operable Unit at this site are:

arsenic
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
chrysene
indeno(1,2,3-CD)pyrene
dibenz[a,h]anthracene
iron
lead
mercury
pyrene
polychlorinated biphenyls (PCB)

As illustrated in Exhibit A, the contaminants of concern exceed the applicable SCGs for:

- surface water
- soil

6.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before issuance of the Record of Decision.

The following IRMs have been completed at this site based on conditions observed during the RI.

Interim Remedial Measures

The Department initiated the first IRM at this site in 2015. The remedial measure involved the removal of construction and demolition debris from the site. The main goal of this IRM was to remove contaminated surficial debris that was hindering investigations required to properly complete the ongoing RI. Specifically, the IRM included the removal, transportation, and off-site

disposal of three large surficial piles containing approximately 6,000 tons of construction and demolition debris contaminated with asbestos and/or polychlorinated biphenyls (PCBs). The IRM was completed in January 2016 and the Construction Completion Report (CCR) was approved in August 2016.

In November 2016, 15.5 feet of oil was observed in groundwater monitoring well AOC-14-MW-21I. This Light Non-Aqueous Phase Liquid (LNAPL) was shown to contain a PCB concentration of 270 parts per million (ppm). An additional investigation in November 2018 was conducted to locate and remove the source of the PCB LNAPL that appeared in monitoring well AOC-14-MW-21I. A ground penetrating radar (GPR) survey identified a pipeline adjacent to AOC-14-MW-21I that extends approximately 260 feet to the southeast, ending at a vault in AOC-02, approximately 100 feet west of the Administration Building. However, the source was not found. The Department recovered approximately 155 gallons of LNAPL in AOC-14-MW-21I from November 2016 to May 2019.

6.3: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts may include existing and potential future exposure pathways to fish and wildlife receptors, wetlands, groundwater resources, and surface water.

The Fish and Wildlife Resources Impact Analysis (FWRIA), which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The results of the FWRIA indicate that there is limited potential for wildlife at the site due to lack of suitable habitat. Furthermore, the site does not provide any current or potential value to humans as a nature recreation area.

Groundwater, surface water, soil, and sewer sediments were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, PCBs, and pesticides. Groundwater was also sampled for emerging contaminants (ECs). Based upon investigations conducted to date, the primary contaminants of concern include SVOCs, PCBs, and metals for groundwater, SVOCs (i.e. polycyclic aromatic hydrocarbons [PAHs]), PCBs, and various metals (i.e. arsenic, chromium, and mercury) for soil, and PAHs, iron, and lead for surface water (see Exhibit A for details).

Groundwater – With the exception of acetone and methylene chloride, no VOCs were detected in groundwater at concentrations exceeding NYSDEC TOGS (1.1.1) Class GA groundwater standards (SCG). However, SVOCs, PCBs, and metals exceed their corresponding SCGs. The maximum concentration of a single PAH, acenaphthene, was 61 parts per billion (ppb), exceeding the standard of 20 ppb. PCBs were detected in groundwater at concentrations exceeding the SCG of 0.09 ppb at numerous locations across the site. In general, PCB impacts are relatively low. However, PCB impacts in AOC-13 (Fig. 1B) are considerably higher (19.8 ppb) than at other locations across the site. Various metals exceeded applicable groundwater standards. For example, maximum concentrations of arsenic (230 ppb), chromium (total; 85 ppb), and lead (70 ppb) exceeded standards of 25 ppb, 50 ppb, and 25 ppb, respectively.

On-site groundwater was also sampled for ECs, which include per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. For PFAS, perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) were reported at concentrations of up to 4.2 and 0.99 parts per trillion (ppt), respectively, below the 10 ppt screening levels for groundwater for each. No other individual PFAS exceeded the 100 ppt screening level. The total concentration of PFAS, including PFOA and PFOS, were reported at concentrations of up to 19.37 ppt, below the 500 ppt screening level for total PFAS in groundwater. 1,4-dioxane was reported at concentrations of up to 0.17 ppb, below the 1 ppb screening level in groundwater.

The groundwater is not used as a source of drinking water. There are no known wells used as sources of drinking water within at least one-half mile of the site. The Town of Tonawanda provides drinking water to the site vicinity from a separate source that is not affected by this contamination.

Surface water – While the storm water sewer system remains in place, the outlets have been blocked at the property boundaries by the adjacent property owner, General Motors, LLC (GM), in order to prevent contaminated surface water from entering their property. This has resulted in storm water ponding across the site. Neither VOCs nor PCBs were detected above Class A Ambient Water Quality Standards and Guidance Values. However, PAHs and metals (aluminum, iron, lead, and zinc) were present above the Class A standards (generally between 0.0012 and 0.002 ppb, 100 ppb, 300 ppb, 7 ppb, and 134 ppb, respectively).

Soil – No VOCs exceed Soil Cleanup Objectives (SCO) for Industrial Use. SVOCs, PCBs, and metals were found in surface and subsurface soil samples across the site. As groundwater is present at shallow depths (1-2 feet bgs), the majority of the subsurface soils are present in the saturated zone. Of the SVOCs analyzed, six constituents (primarily PAHs) had maximum concentrations that exceeded SCOs: benzo(A)anthracene (190 ppm; SCO 11 ppm), benzo(A)pyrene (170 ppm; SCO 1.1 ppm), benzo(B)fluoranthene (240 ppm; SCO 11 ppm), chrysene (200 ppm; SCO 110 ppm), dibenz(A,H)anthracene (10 ppm; SCO 1.1 ppm), and indeno(1,2,3-C,D)pyrene (32 ppm; SCO 11 ppm). Metals (arsenic and mercury) exceeded industrial use SCOs of 16 ppm and 5.7 ppm with maximum concentrations of 93.2 ppm and 6.6 ppm, respectively.

The highest PCB levels in soils were found in AOC-8 (54 ppm), AOC-12 (167 ppm), AOC-13 (54 ppm), and AOC-15 (260 ppm; Fig. 1B), which exceed the SCOs for industrial use (25 ppm). PCBs were also present in stained concrete. Metals such as arsenic (93 ppm) and mercury (6.6 ppm) also exceed industrial use SCOs (16 ppm and 5.7 ppm, respectively). Asbestos containing material (ACM) is present on the ground surface in every AOC except for AOC-1, AOC-7, and AOC-8 (Fig. 2). These materials are primarily roofing material left over from the demolition, and sealant used between concrete sections. ACM does not require removal; however, if excavation is performed in areas where asbestos is present, proper disposal according to the appropriate New York State Department of Labor regulations is required.

Storm Sewer Sediments – Although no specific criteria exist for sewer sediment contaminant concentrations, they are compared to the Class A Sediment Guidance Values (SGV). Aside from two exceedances of 1,1-dichloroethene (maximum concentration of 1.2 ppm with an SGV of 0.52 ppm) and toluene (maximum concentration of 6.9 ppm with an SGV of 0.93 ppm), there are no

exceedances of VOCs or SVOCs. Metals and PCBs are present in the vast majority of the sediment samples. Exceedances of total PCBs were found in 43 of 48 samples and range from 0.59 to 880 ppm (SGV of 0.1 ppm).

6.4: Summary of Human Exposure Pathways

This human exposure assessment identifies ways in which people may be exposed to site-related contaminants. Chemicals can enter the body through three major pathways (breathing, touching or swallowing). This is referred to as *exposure.*

The site is fenced and mostly covered by pavement and building slabs. Four small, unoccupied structures remain on-site after the manufacturing building was demolished. Trespassers may come into contact with contaminated surface soils and ponded surface water. Contact with contaminated sewer sediments is unlikely due to the physical locations of the sediment. People may come into contact with contaminated surface water runoff from a former landfill/disposal area, as the runoff is not contained. Contaminated groundwater at the site is not used for drinking purposes and the area is served by a public water supply that is not affected by this contamination. Volatile organic compounds in contaminated soil or contaminated groundwater may move into the soil vapor (air spaces within the soils), which in turn, may move into overlying structures and affect the indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion. Inhalation of site contaminants in indoor air is not a current concern as the site buildings are unoccupied. An evaluation of the potential for soil vapor intrusion to occur is recommended prior to occupancy in re-developed or occupied buildings.

6.5: Summary of the Remediation Objectives

The objectives for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. The goal for the remedial program is to restore the site to pre-disposal conditions to the extent feasible. At a minimum, the remedy shall eliminate or mitigate all significant threats to public health and the environment presented by the contamination identified at the site through the proper application of scientific and engineering principles.

The remedial action objectives for this site are:

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Surface Water

RAOs for Public Health Protection

- Prevent ingestion of water impacted by contaminants.

- Prevent contact or inhalation of contaminants from impacted water bodies.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

To be selected, the remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. The remedy must also attain the remedial action objectives identified for the site, which are presented in Section 6.5. Potential remedial alternatives for the Site were identified, screened and evaluated in the Feasibility Study (FS) report.

A summary of the remedial alternatives that were considered for this site is presented in Exhibit B. Cost information is presented in the form of present worth, which represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved. A summary of the Remedial Alternatives Costs is included as Exhibit C.

The basis for the Department's remedy is set forth at Exhibit D.

The selected remedy is referred to as the Cover System, Contaminated Sewer Cleaning and Grouting, Surface Water Control, and Surface and Subsurface Soil Excavations with an Institutional Control and Site Management Plan remedy.

The estimated present worth cost to implement the remedy is $7,174,000. The cost to construct the remedy is estimated to be $7,003,000 and the estimated average annual cost is $11,400.

The elements of the selected remedy are as follows:

1. Remedial Design

A remedial design program will be implemented to provide the details necessary for the construction, operation, optimization, maintenance, and monitoring of the remedial program. Green remediation principles and techniques will be implemented to the extent feasible in the design, implementation, and site management of the remedy as per DER-31. The major green remediation components are as follows:

- Considering the environmental impacts of treatment technologies and remedy stewardship over the long term;

- Reducing direct and indirect greenhouse gases and other emissions;
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- Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered a waste;
- Maximizing habitat value and creating habitat when possible;
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- Integrating the remedy with the end use where possible and encouraging green and sustainable re-development.

2. Excavation

Excavation and off-site disposal of contaminant source areas, including surface and subsurface soils:

- grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u);
- soil exceeding the 6 NYCRR Part 371 hazardous criteria for lead;
- non-aqueous phase liquids;
- soil with visual waste material or non-aqueous phase liquid; and
- subsurface soil containing total SVOCs exceeding 500 ppm.

Excavation and off-site disposal of all on-site soils which exceed industrial SCOs, as defined by 6 NYCRR Part 375-6.8, except in the landfill area at the east end of the site (AOC-1). This includes soils containing PCBs above 25 parts per million, as defined in 40 CFR Part 761.61(a)(4)(B)(1) and disposed of according to 40 CFR Part 761.61(a)(5)(i)(B).

Approximately 2,400 cubic yards of contaminated soil will be removed from the site. Excavation and removal of any underground storage tanks (USTs), fuel dispensers, underground piping, or other structures associated with a source of contamination will be completed. It is anticipated that a significant amount of piping will be encountered during the surface and subsurface excavation.

3. Backfill

Clean fill meeting the requirements of 6 NYCRR Part 375-6.7(d) will be brought in to replace the excavated soil and establish the designed grades at the site.

4. Cover System

A site cover will be required to allow for industrial use of the site in areas where the upper one foot of exposed surface soil will exceed the applicable soil cleanup objectives (SCOs). Where a soil cover is to be used it will be a minimum of one foot of soil placed over a demarcation layer,

with the upper six inches of soil of sufficient quality to maintain a vegetative layer. Soil cover material, including any fill material brought to the site, will meet the SCOs for cover material for the use of the site as set forth in 6 NYCRR Part 375-6.7(d). Substitution of other materials and components may be allowed where such components already exist or are a component of the tangible property to be placed as part of site redevelopment. Such components may include, but are not necessarily limited to: pavement, concrete, paved surface parking areas, sidewalks, building foundations and building slabs. This excludes approximately 200 cubic feet of PCB contaminated concrete that will be demolished, removed, and properly disposed as PCB contaminated waste.

5. Contaminated Sewer Cleaning and Grouting

Approximately 19,000 linear feet of contaminated on-site sewer lines will be cleaned using jetting or a similar, practical sewer cleaning technology. Liquid and solid spoils from the cleaning will be collected, sampled, and either treated on-site or transported and disposed of off-site as appropriate. Sewer cleaning will immediately be followed by the sealing of sewers with flowable fill, pumped, or tremied, as appropriate.

6. Surface Water Control

A series of new, clean catch basins and storm water collection systems will be constructed to connect to the existing Town of Tonawanda municipal separate storm sewer system (MS4). The new catch basins and collection system will drain ponded water from the Parking Lot area, the ponded area between AOC-1 (Fig. 1B) and Kenmore Avenue, along with other areas of ponding on-site. Detention of the storm water collected, if necessary, to meet peak flow criteria established by the Town of Tonawanda, will be achieved within the collection system. Samples will be collected prior to discharge and must meet city discharge limits.

7. Institutional Control

Imposition of an institutional control in the form of an environmental easement for the controlled property which will:

- require the remedial party or site owner to complete and submit to the Department a periodic certification of institutional and engineering controls in accordance with Part 375-1.8 (h)(3);
- allow the use and development of the controlled property for low occupancy, industrial use as defined by Part 375-1.8(g) and 40 CFR 761.3, although land use is subject to local zoning laws;
- restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH or County DOH; and
- require compliance with the Department approved Site Management Plan.

8. Site Management Plan

A Site Management Plan is required, which includes the following:

1. an Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:

   Institutional Controls: The Environmental Easement discussed in Paragraph 7 above.

   Engineering Controls: The soil cover discussed in Paragraph 4 and the Surface Water Control discussed in Paragraph 6 above.

   This plan includes, but may not be limited to:

   - an Excavation Plan which details the provisions for management of future excavations in areas of remaining contamination;
   - descriptions of the provisions of the environmental easement, including any land use, and groundwater;
   - a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including provision for implementing actions recommended to address exposures related to soil vapor intrusion;
   - a provision requiring a risk-based approval from the United States Environmental Protection Agency prior to any change of use to high occupancy, industrial use as defined by 40 CFR 761.3 and 40 CFR 761.61 (a)(4)(i)(B)(3)(v);
   - a provision that should a building foundation or building slab be removed in the future, a cover system consistent with that described in Paragraph 4 above will be placed in any areas where the upper one foot of exposed surface soil exceeds the applicable soil cleanup objectives (SCOs);
   - provisions for the management and inspection of the identified engineering controls;
   - maintaining site access controls and Department notification; and
   - the steps necessary for the periodic reviews and certification of the institutional and/or engineering controls.

2. a Monitoring Plan to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to:

   - a schedule of monitoring and frequency of submittals to the Department; and
   - monitoring for vapor intrusion for any buildings on the site, as may be required by the Institutional and Engineering Control Plan discussed above.

Exhibit A

Nature and Extent of Contamination

This section describes the findings of the Remedial Investigation for all environmental media that were evaluated. As described in Section 6.1, samples were collected from various environmental media to characterize the nature and extent of contamination.

For each medium for which contamination was identified, a table summarizes the findings of the investigation. The tables present the range of contamination found at the site in the media and compares the data with the applicable SCGs for the site. The contaminants are arranged into volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), and inorganics (metals and cyanide). For comparison purposes, the SCGs are provided for each medium that allows for unrestricted use. For soil, if applicable, the Restricted Use SCGs identified in Section 4 and Section 6.1.1 are also presented.

Waste/Source Areas

As described in the RI report, waste/source materials were identified at the site and are impacting groundwater, soil, sewer sediments, and surface water.

Wastes are defined in 6 NYCRR Part 375-1.2 (aw) and include solid, industrial and/or hazardous wastes. Source Areas are defined in 6 NYCRR Part 375 (au). Source areas are areas of concern at a site were substantial quantities of contaminants are found which can migrate and release significant levels of contaminants to another environmental medium. Wastes and Source areas were identified at the site include:

Waste/Source Areas – Asbestos

A total of 123 bulk samples for asbestos analysis were collected across the Site. As indicated on Figure 2, the majority of the Site has asbestos containing material (ACM) present at the surface. Along the southern edge of the property and the western edge of the asbestos survey area there is an approximate 100-foot wide area zone where no ACM was identified.

Waste/Source Areas – LNAPL

Seven light non-aqueous phase liquid (LNAPL) samples were collected from aboveground storage tanks (ASTs), manholes, and one monitoring well. A summary of the PCB detected results and properties of all LNAPL samples is shown on Figure 3.

VOCs were detected at low concentrations (less than 1.1 part per million (ppm)) in all but one LNAPL sample. Petroleum-related compounds (i.e., benzene, toluene, ethylbenzene, isopropylbenzene, and/or xylene) were found in two samples. Other VOCs detected in one or more of the LNAPL samples include 1,1-dichloeroethane, 1,1- dichloroethene, 1,2,4-trichlorobenzene, methyl acetate, and methylene chloride.

SVOCs bis(2-ethylhexyl)phthalate and caprolactam, along with several polycyclic aromatic hydrocarbons (PAHs), were detected in the standpipe, manhole, and one monitoring well sample.

PCBs were detected in the LNAPL samples collected from each of the four manholes sampled, and in the monitoring well AOC-14-MW-21I with a total PCB concentration of 270 ppm. Soil or waste containing PCB concentrations greater than 50 ppm is a hazardous waste in New York State.

Results for the identification of specific petroleum products in the LNAPL samples were inconclusive.

Waste/Source Areas – Surface Materials

Twenty-four concrete chip samples, fifteen brick chip samples, two asphalt samples, two bulk solids samples, and six wipe samples were collected for PCB analysis and compared to the Toxic Substances Control Act (TSCA) definition of PCB remediation waste (50 ppm).

Concrete chip samples: none of the results exceeded the 50 ppm for total PCBs.

Brick chip samples: PCBs were detected in 12 of the 15 samples. Brick chip sample results exceeded 50 ppm total PCBs at one location.

Bulk Solids Samples: PCBs were detected in both samples. Bulk solid sample results exceeded 50 ppm total PCBs at one location.

Asphalt Samples: No PCBs were detected in either of the two samples.

Wipe Samples: PCBs were detected in five of the six samples from various non-porous surfaces. Five of the samples had total concentrations greater than the SCG criterion of 10 micrograms per 100 square centimeters (μg/100 cm^2), or microgram per wipe (μg/wipe). Two of those wipe samples contained PCB concentrations greater than 100 μg/100 cm^2.

A summary of the detected results and properties of all surface material samples where results exceed PCB SCGs are shown on Figure 4.

Waste/Source Areas – Sewer Sediments

Forty-eight sediment samples were collected from 11 manholes, 34 catch basins, two ASTs, and one 8-inch diameter pipe connecting the two ASTs. Although there are no cleanup standards specific to sewer sediments, sediments are located at depth and could be encountered by a construction worker during future development. Therefore, analytical results, presented in Figure 5, are compared to Part 375 Industrial Use Soil Cleanup Objectives (SCOs). The manholes and catch basins are not connected to public owned treatment works sewers or outfalls.

Of the 48 samples, none exceeded the Industrial Use SCO for VOCs. However, 36 samples exceeded Industrial Use criteria for SVOCs, including PAHs.

PCBs exceeded Industrial Use criteria in ten catch basin and five manhole locations. Six catch basins and three manholes had a total PCB concentration between 50 and 500 ppm and require management as hazardous wastes. PCB concentrations in the western manholes/catch basins ranged from 32 to 380 ppm. The maximum total PCB concentration was 880 ppm.

Metals exceeding Industrial Use criteria include arsenic at eight locations and copper at one location.

Certain waste/source areas identified at the site were addressed by the IRM(s) described in Section 6.2. The remaining waste/source areas identified during the RI will be addressed in the remedy selection process.

Soil

Surface and subsurface soil samples were collected at the site during the RI. A total of 48 surface soil samples were collected from a depth of 0-2 inches to assess direct human exposure. In addition, 272 subsurface soil samples were collected from a depth of 2 - 30 feet to assess soil contamination impacts to groundwater. Figures 6A through 6X depict the surface and subsurface sample locations and concentrations, respectively. The results indicate that soils at the site exceed the unrestricted SCOs for volatile and semi-volatile organics, PCBs and metals. Several metals, PAHs, and PCBs were present above industrial SCOs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, arsenic, mercury, and PCBs.

Table 2 – Soil

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG (ppm)[b]	Frequency Exceeding Unrestricted SCG	Industrial SCG (ppm)[c]	Frequency Exceeding Industrial SCG	Protection of Groundwater (PGW) SCG (ppm)[d]	Frequency Exceeding PGW SCG
VOCs							
Acetone	0.00480-0.370	0.05	21/317	1,000	0/317	0.05	21/317
Benzene	0.000290-0.00500	0.06	0/319	89	0/319	0.06	0/319
Chlorobenzene	0.000890-0.000890	1.1	0/317	1,000	0/317	1.1	0/317
Chloroform	0.000350-0.000680	0.37	0/319	700	0/319	0.37	0/319
Ethylbenzene	0.000410-0.00220	1	0/315	780	0/315	1	0/315
Methyl Ethyl Ketone (2-Butanone)	0.00910-0.0540	0.12	0/319	1,000	0/319	0.12	0/319
Methylene Chloride	0.00250-0.0580	0.05	2/317	1,000	0/317	0.05	2/317

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG (ppm)[b]	Frequency Exceeding Unrestricted SCG	Industrial SCG (ppm)[c]	Frequency Exceeding Industrial SCG	Protection of Groundwater (PGW) SCG (ppm)[d]	Frequency Exceeding PGW SCG
Tetrachloroethylene (PCE)	0.00660-0.0260	1.3	0/317	300	0/317	1.3	0/317
Trichloroethene	0.07-0.07	0.47	0/319	400	0/319	0.47	0/319
Toluene	0.000450-0.00460	0.7	0/315	1,000	0/315	0.7	0/315
Xylenes, Total	0.000960-0.00850	0.26	0/315	1,000	0/315	1.6	0/315
SVOCs							
2-Methylphenol (O-Cresol)	0.00720-0.0300	0.33	0/320	1,000	0/320	0.33	0/318
4-Methylphenol (P-Cresol)	0.0150-4.70	0.33	3/320	1,000	0/320	0.33	3/320
Acenaphthene	0.00560-29.0	20	2/318	1,000	0/318	98	0/318
Acenaphthylene	0.00870-1.80	100	0/318	1,000	0/318	107	0/318
Anthracene	0.00600-61.0	100	0/318	1,000	0/318	1,000	0/318
Benzo(A) Anthracene	0.00740-190	1	42/318	11	8/318	1	42/318
Benzo(A) Pyrene	0.00880-170	1	43/318	1.1	38/318	22	4/318
Benzo(B) Fluoranthene	0.00630-240	1	57/318	11	11/318	1.7	42/318
Benzo(G,H,I) Perylene	0.00580-30.0	100	0/318	1,000	0/318	1,000	0/318
Benzo(K) Fluoranthene	0.00230-110	0.8	32/318	110	0/318	1.7	21/318
Chrysene	0.00680-200	1	48/318	110	1/318	1	48/161
Dibenz(A,H) Anthracene	0.00530-10.0	0.33	24/318	1.1	11/318	1,000	0/318
Dibenzofuran	0.00840-16.0	7	3/318	1,000	0/318	210	0/318
Fluoranthene	0.00760-490	100	1/318	1,000	0/318	1,000	0/318
Fluorene	0.0110-28.0	30	0/318	1,000	0/318	386	0/318
Indeno(1,2,3-C,D)Pyrene	0.00550-32.0	0.5	66/318	11	4/318	8.2	8/318
Naphthalene	0.0110-9.70	12	0/318	1,000	0/318	12	0/318
Phenanthrene	0.00610-290	100	1/318	1,000	0/318	1,000	0/318
Phenol	0.0450-16.0	0.33	1/318	1,000	0/318	0.33	1/318
Pyrene	0.00920-310	100	1/318	1,000	0/318	1,000	0/318
Metals							
Arsenic	0.560-93.2	13	23/318	16	17/318	16	17/318
Barium	2.50-557	350	4/320	400	0/320	820	0/320
Beryllium	0.0840-6.70	7.2	0/318	2700	0/318	47	0/318

Detected Constituents	Concentration Range Detected (ppm)[a]	Unrestricted SCG (ppm)[b]	Frequency Exceeding Unrestricted SCG	Industrial SCG (ppm)[c]	Frequency Exceeding Industrial SCG	Protection of Groundwater (PGW) SCG (ppm)[d]	Frequency Exceeding PGW SCG
Cadmium	0.0420-29.0	2.5	14/320	60	0/320	7.5	4/320
Chromium, Total	3.40-1,040	30	106/318	800	0/318	19	0/318
Copper	1.90-4,850	50	68/318	10,000	0/318	1,720	4/318
Lead	1.20-2,950	63	51/320	3900	0/320	450	3/320
Manganese	61.3-7,310	1,600	29/318	10,000	0/318	2,000	19/318
Mercury	0.00820-6.60	0.18	25/320	5.7	1/320	0.73	6/320
Nickel	3.40-340	30	117/318	10,000	0/318	130	15/318
Selenium	0.460-11.3	3.9	4/320	6,800	0/320	4	4/320
Silver	0.240-9.80	2	2/320	6,800	0/320	8.3	1/320
Zinc	11.5-4,000	109	75/318	10,000	0/318	2,480	2/318
Pesticides/PCBs							
Total PCBs	0.055-260	0.1	143/304	25	8/304	3.2	52/304
Endrin	0.000031-0.000031	0.014	0/2	410	0/2	0.06	0/2
gamma-BHC (Lindane)	0.001-0.001	0.1	0/2	23	0/2	0.1	0/2
Heptachlor	0.00008-0.00008	0.042	0/2	29	0/2	0.38	0/2

a - ppm: parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
b - SCG: Part 375-6.8(a), Unrestricted Soil Cleanup Objectives.
c - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Public Health for Industrial Use, unless otherwise noted.
d - SCG: Part 375-6.8(b), Restricted Use Soil Cleanup Objectives for the Protection of Groundwater.

Based on the findings of the Remedial Investigation, the past disposal of hazardous waste has resulted in the contamination of soil. The site contaminants identified in soil which are considered to be the primary contaminants of concern, to be addressed by the remedy selection process are: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, arsenic, mercury, and PCBs.

Surface Water

One surface water sample was collected from the drainage swale adjacent to Kenmore Avenue (AOC-1-LFSW-01) during the RI Phase I sampling event. Due to inadequate drainage, ponding occurs across the site. A second surface water sample was collected from such an area in the parking lot during the RI Phase II sampling event (Parking Lot Water). A summary of detected analytical results for the surface water samples compared to Class A surface water SCGs is presented in Table 3. Surface water results exceeding criteria are shown on Figure 7.

Neither sample contained VOCs or PCBs with concentrations above Class A surface water SCGs. Furthermore, the parking lot standing water sample did not exceed Class A surface water

SCGs for SVOCs and metals. However, SVOCs (i.e. PAHs) and metals (aluminum, iron, lead, and zinc) were detected above Class A surface water SCGs in the AOC-1-LFSW-01 sample.

Table 3 - Surface Water

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
VOCs			
Acetone	ND-4.9	50	0/2
Carbon disulfide	ND-0.44	60	0/2
SVOCs			
Anthracene	ND-0.54	3.8	0/2
Benzo(a)anthracene	ND-3.7	0.002	1/2
Benzo(a)pyrene	ND-5.6	0.0012	1/2
Benzo(b)fluoranthene	ND-11	0.002	1/2
Benzo(k)fluoranthene	ND-4.4	0.002	1/2
Chrysene	ND-6.8	0.002	1/2
Fluoranthene	ND-9.9	50	0/2
Indeno(1,2,3-cd)pyrene	ND-3.4	0.002	1/2
Phenanthrene	ND-3.3	5	0/2
Pyrene	ND-8.3	4.6	1/2
Inorganics			
Aluminum	ND-1,200	100	1/2
Barium	27-55	1,000	0/2
Chromium	ND-0.0036	50	0/2
Cobalt	ND-0.00097	5	0/2
Copper	6-11	14.6	0/2
Iron	300-24,600	300	1/2
Lead	ND-18	7	1/2
Magnesium	9,100-12,500	35,000	0/2
Manganese	36-290	300	0/2

Detected Constituents	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)	Frequency Exceeding SCG
Nickel	0.0048-7	84	0/2
Sodium	2,200-17,600	20,000	0/2
Vanadium	ND-0.0049	14	0/2
Zinc	5.5-220	134	1/2

a - ppb: parts per billion, which is equivalent to micrograms per liter, ug/L, in water.
b-SCG: Ambient Water Quality Standards and Guidance Values (TOGs 1.1.1) and 6 NYCRR Part 703: Surface Water and Groundwater Quality Standards.
ND: Non-detect

Based on the findings of the Remedial Investigation, the disposal of hazardous waste has resulted in the contamination of surface water. The site contaminants that are considered to be the primary contaminants of concern which will drive the remediation of surface water to be addressed by the remedy selection process are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, pyrene, aluminum, iron, lead, and zinc.

Exhibit B

Description of Remedial Alternatives

The following alternatives were considered based on the remedial action objectives (see Section 6.5) to address the contaminated media identified at the site as described in Exhibit A.

Alternative 1: No Further Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. This alternative leaves the site in its present condition and does not provide any additional protection to public health and the environment.

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

Alternative 2: No Further Action with Site Management

The No Further Action with Site Management Alternative recognizes the remediation of the site completed by the IRM(s) described in Section 6.2 and Site Management and Institutional Controls and Engineering Controls are necessary to confirm the effectiveness of the IRM. This alternative maintains engineering controls which were part of the IRM and includes institutional controls, in the form of and environmental easement and site management plan, necessary to protect public health and the environment from contamination remaining at the site after the IRMs.

Present Worth: *$175,000*
Capital Cost: *$0*
Annual Costs: *$11,400*

Alternative 3: Cover System, Contaminated Sewer Cleaning and Grouting, Surface Water Control, and Surface Soil Excavation with an Institutional Control and Site Management Plan

This alternative includes excavation and off-site disposal of surface contaminant source areas, including grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u); soil exceeding the 6 NYCRR Part 371 hazardous criteria for lead; concentrated solid or semi-solid hazardous substances per 6 NYCRR Part 375-1.2(au)(1); non-aqueous phase liquids (NAPL) encountered during excavation; soil with visual waste material or non-aqueous phase liquid; soil containing total SVOCs exceeding 500 ppm; and surface soils containing PCBs greater than 25 ppm.

Alternative 3 includes removal of sewer sediments (to the extent practicable) via jet cleaning an estimated 19,000 linear feet of sewer line (disposal of approximately 109,000 gallons of sludge), sealing of the sewers with flowable fill, and removal and disposal of surface soil (0-1 foot below

ground surface) with contamination above industrial use SCOs (roughly 1,500 cubic yards). Some areas where surface soil exceeds these criteria are primarily due to low levels of PAHs and metals would be addressed by placement of a 1-foot clean soil cover instead of excavation to reduce direct contact exposures over an area of roughly 46,200 square yards in the eastern portion of the site. Approximately 200 cubic feet of contaminated concrete would be demolished, removed, and disposed as PCB contaminated waste.

The management of surface water runoff (i.e. storm water) after construction is established by a series of new, clean catch basins and storm water pipes connected to the existing Municipal Separate Storm Sewer System (MS4) at several locations. The new catch basins and pipes will drain ponded water from the Parking Lot area, the ponded area between AOC-1 and Kenmore Avenue, and any other areas of ponding on-site. Detention of the storm water, if necessary, to meet peak flow criteria established by the Town, can be achieved within the collection system. Samples will be collected prior to discharge and a must meet city discharge limits.

The alternative also includes institutional controls in the form of an environmental easement restricting the use of the site to low occupancy, industrial use, Site Management Plan, groundwater use restriction, site use restriction, excavation plan and, if necessary, further evaluation of soil vapor intrusion.

Present Worth:.....*$5,965,000*
Capital Cost:.....*$5,780,000*
Annual Costs:.....*$11,400*

Alternative 4: Cover System, Contaminated Sewer Cleaning and Grouting, Surface Water Control, and Surface and Subsurface Soil Excavation with an Institutional Control and Site Management Plan

This alternative includes excavation and off-site disposal of surface and subsurface contaminant source areas, including grossly contaminated soil, as defined in 6 NYCRR Part 375-1.2(u); soil exceeding the 6 NYCRR Part 371 hazardous criteria for lead; concentrated solid or semi-solid hazardous substances per 6 NYCRR Part 375-1.2(au)(1); non-aqueous phase liquids (NAPL) encountered during excavation; soil with visual waste material or non-aqueous phase liquid; soil containing total SVOCs exceeding 500 ppm; and all soils containing PCBs greater than 25 ppm, except for subsurface soils in the landfill area at the eastern end of the site.

Alternative 4 includes removal of sewer sediments (to the extent practicable) via jet cleaning an estimated 19,000 linear feet of sewer line (disposal of approximately 109,000 gallons of sludge), sealing of the sewers with flowable fill, and removal and disposal of surface and subsurface soil (up to 5 feet below ground surface, with one limited area up to 10 feet below ground surface) with contamination above industrial use SCOs (roughly 2,400 cubic yards). Some areas where surface soil exceeds these criteria are primarily due to low levels of PAHs and metals would be addressed by placement of a 1-foot clean soil cover instead of excavation to reduce direct contact exposures over an area of roughly 46,200 square yards in the eastern portion of the site (see Fig.

8). Approximately 200 cubic feet of contaminated concrete would be demolished, removed, and disposed as PCB contaminated waste.

The management of surface water runoff (i.e. storm water) after construction is established by a series of new, clean catch basins and storm water pipes connected to the existing MS4 at several locations. The new catch basins and pipes will drain ponded water from the Parking Lot area, the ponded area between AOC-1 and Kenmore Avenue, and any other areas of ponding on-site. Detention of the storm water, if necessary, to meet peak flow criteria established by the Town, can be achieved within the collection system. Samples will be collected prior to discharge and a must meet city discharge limits.

The alternative also includes institutional controls described in Alternative 3.

Present Worth:.....*$7,174,000*
Capital Cost:.....*$7,003,000*
Annual Costs:.....*$11,400*

Alternative 5: Restoration to Unrestricted Conditions, Excavation of Entire Site

This alternative achieves all of the SCGs discussed in Section 6.1.1 and Exhibit A and soil meets the unrestricted soil cleanup objectives listed in Part 375-6.8 (a). This alternative would include: excavation and off-site disposal of all waste and soil contamination above the unrestricted soil cleanup objectives (i.e. sewer decontamination and sealing, demolition and disposal of former building floors, and excavation of contaminated soil). Excavation of contaminated soils (up to 10 feet below ground surface) and other concrete/floor material would produce approximately 427,500 cubic yards of material for disposal. The removal of all source material combined with natural attenuation of residual groundwater contamination will result in predisposal conditions. Therefore, the remedy will not rely on institutional or engineering controls to prevent future exposure. There is no Site Management, no restrictions, and no periodic review. This remedy will have no annual cost, only the capital cost.

Capital Cost:.....*$149,556,000*

Exhibit C

Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
1: No Further Action	$0	$0	$0
2: No Further Action with Site Management	$0	$11,400	$175,000
3: Cover System, Contaminated Sewer Cleaning and Grouting, Surface Water Control, and Surface Soil Excavation with an Institutional Control and Site Management Plan	$5,780,000	$11,400	$5,965,000
4: Cover System, Contaminated Sewer Cleaning and Grouting, Surface Water Control, and Surface and Subsurface Soil Excavation with an Institutional Control and Site Management Plan	$7,003,000	$11,400	$7,174,000
5: Restoration to Unrestricted Conditions, Excavation of Entire Site	$149,556,000	$0	$149,556,000

Exhibit D

SUMMARY OF THE SELECTED REMEDY

The Department has selected Alternative 4: Cover System, Contaminated Sewer Cleaning and Grouting, Surface Water Control, and Surface and Subsurface Soil Excavation with an Institutional Control and Site Management Plan as the remedy for this site. Alternative 4 will achieve the remediation goals for the site by decontaminating the sewers, excavating the bulk of the contaminated soils, providing a site cover and mitigating the surface water migration issue. The elements of this remedy are described in Section 7. The selected remedy is depicted in Figure 8.

Basis for Selection

The selected remedy is based on the results of the RI and the evaluation of alternatives. The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375. A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

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

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

The selected remedy, Alternative 4, would satisfy this criterion by removal of sewer sediments (to the extent practicable), sealing of the sewers with flowable fill, and removal of most surface and subsurface soil with contamination above the 6 NYCRR Part 375 industrial use SCOs and 40 CFR Part 761.61(a)(4)(B)(1) low occupancy area criteria. Contaminated concrete would be demolished, removed, and disposed off-site to eliminate potential exposure to PCBs absorbed into it. Alternative 4 addresses the source of the surface and subsurface soil contamination, and contaminated surface water migration, both of which are the most significant threat to public health and the environment. Neither Alternative 1 (No Further Action) nor Alternative 2 (No Further Action with Site Management) provide any protection to public health and the environment and will not be evaluated further. Alternative 4, by removing all soil contaminated above the industrial soil cleanup objectives and mitigating contaminated surface water migration, meets this threshold criterion. Alternative 3 also complies with this criterion; however, subsurface soil contamination would remain on-site. Alternative 5 meets the threshold criteria and would not require restrictions. Alternatives 3 and 4 rely on the Town of Tonawanda's restriction of private groundwater use at the site to protect human health. Remaining contamination in on-site groundwater will be addressed further in the future OU2 PRAP. The potential for soil vapor intrusion for Alternatives 3 and 4 is addressed by institutional controls and the Site Management Plan and will require further evaluation in the event of on-site construction or building re-development. Alternative 5 would remove all source material, therefore eliminating the potential for soil vapor intrusion in the soil. The potential for soil vapor intrusion through groundwater contamination will be addressed through natural attenuation of groundwater contaminants and through a vapor intrusion elevation in the event a new building is constructed or an existing structure is occupied on the site.

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

Alternative 4 complies with SCGs to the extent practicable. The alternative addresses source areas of contamination and complies with the industrial use soil cleanup objectives at the surface and subsurface through excavation and placement of clean backfill as part of a cover system. It also creates the conditions necessary to restore groundwater quality to the extent practicable through source removal and natural attenuation. Alternative 4 also prevents the migration of surface water to groundwater via infiltration. Alternatives 3 and 5 also comply with this criterion. As Alternatives 3, 4, and 5 satisfy the threshold criteria, the remaining criteria are particularly important in selecting a final remedy for the site.

The next six "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

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

Long-term effectiveness and permanence are directly related to the quantity of contaminants remaining on the site and, therefore, are best accomplished by those alternatives involving excavation of the contaminated overburden soils (Alternatives 4 and 5). Alternative 4 removes both surface and subsurface soil and is more effective long term than Alternative 3, which just addresses surface soil. For Alternatives 3 and 4, monitoring and institutional controls in the form of environmental easements and an SMP would be an effective means of managing residual contamination. Alternatives 3 and 4 require a groundwater use restriction and a soil vapor intrusion investigation for any current and future habitable structures. Alternative 5 would result in no remaining contamination.

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

Through the removal of 4,500 cubic yards of contaminated surface soil and concrete and sewer cleaning, Alternative 3 would reduce the mobility and volume of on-site waste by transferring the material to an approved off-site location. Alternative 4 requires the excavation of approximately 5,500 cubic yards of contaminated soil and concrete, which significantly reduces the volume and mobility by removing additional subsurface soil sources. Alternatives 3 and 4 both significantly reduce the mobility of contamination migration at the surface by redirecting surface water flow and, therefore, preventing further groundwater contamination through infiltration. Alternative 5, through the removal of 427,500 cubic yards of contaminated surface and subsurface material,

would reduce the most mobility and volume of contamination of all alternatives and does not require a surface water remedial component.

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

Alternatives 3 through 5 all have short-term impacts which could easily be controlled. Alternative 3 has the least intrusive activities during remediation, and therefore, would pose the smallest short-term risks. Alternatives 3 through 5 include excavation of soil to varying degrees and, therefore, require air and dust monitoring to protect residents which represents a short-term risk to local residents. As Alternative 5 has the greatest amount of excavation, it would present the greatest short-term impacts to the surrounding vicinity due to the total quantity excavated and duration of construction. Alternatives 3 and 4 could all be constructed in less than a year, but Alternative 5 would require 2 years to complete.

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

The technologies employed for Alternative 3, 4, and 5 are conventional and reliable technologies for remediation. However, Alternative 5 would be the most difficult alternative to implement due to the extensive subsurface structures present from the former plant operations, which would require demolition prior to excavation. The extensive excavation would be very disruptive to nearby residences and businesses, and the transportation of the great volume of waste would impact the community for a much longer duration.

7. Cost-Effectiveness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision.

The costs of the alternatives vary significantly. Alternative 3 has a low cost, but a significant amount of contaminated soil would not be addressed other than by institutional controls. With its large volume of soil to be handled, Alternative 5 (excavation and off-site disposal for unrestricted use) would have the highest present worth cost. Alternative 4 would address both surface and subsurface soil at an intermediate cost. Therefore, Alternative 4 has the best balance between cost and effectiveness.

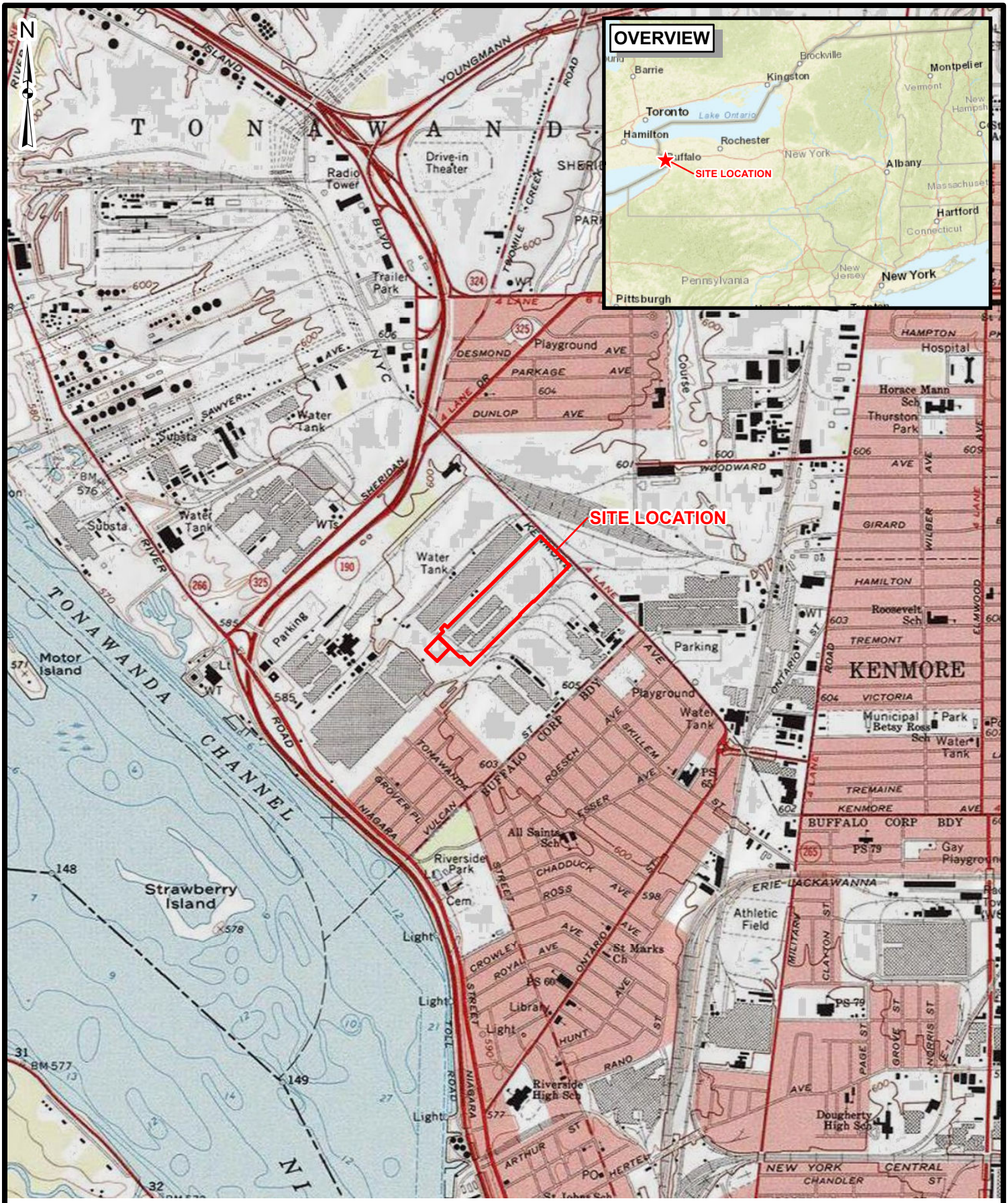
8. Land Use. When cleanup to pre-disposal conditions is determined to be infeasible, the Department may consider the current, intended, and reasonable anticipated future land use of the site and its surroundings in the selection of the soil remedy.

Alternative 5 would allow for unrestricted use of the site regardless of future zoning changes. Contamination remaining at the site under Alternatives 3 and 4 are consistent with current zoning and surrounding industrial land use and would be controlled with implementation of a Site Management Plan.

The final criterion, Community Acceptance, is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

9. Community Acceptance. Concerns of the community regarding the investigation, the evaluation of alternatives, and the PRAP are evaluated. A responsiveness summary has been prepared that describes public comments received and the manner in which the Department will address the concerns raised (Appendix A).

Alternative 4 has been selected because, as described above, these satisfy the threshold criteria and provides the best balance of the balancing criterion.



Sources: © 2013 National Geographic TOPO!
ESRI World Street Map

2,000 0 2,000 Feet

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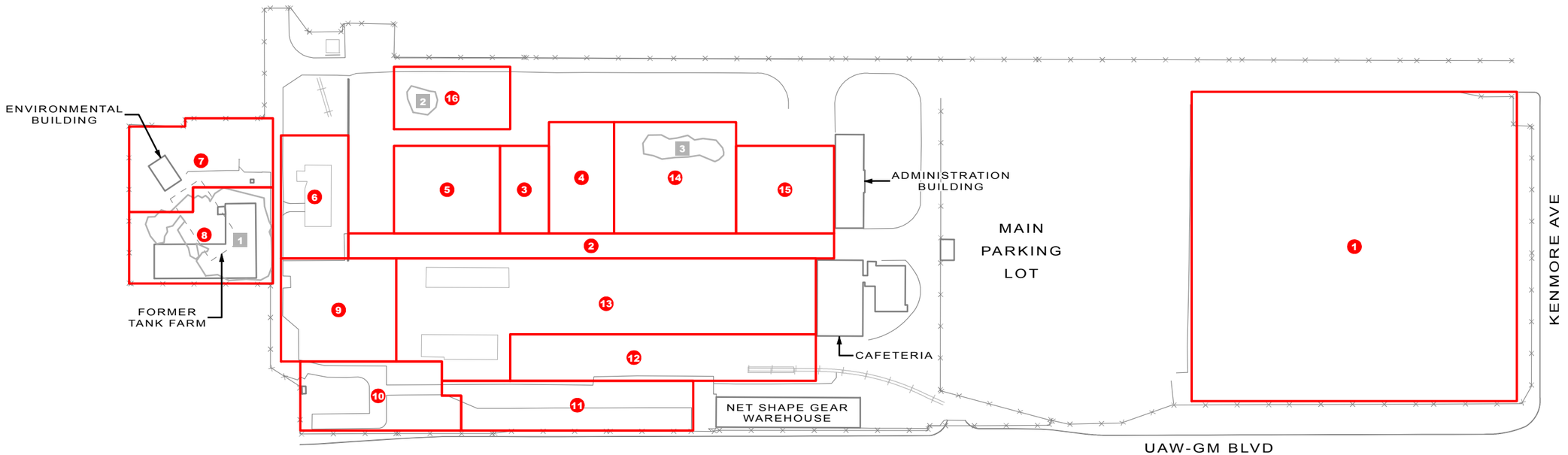
NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
SITE LOCATION

FIGURE 1A



Legend

- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

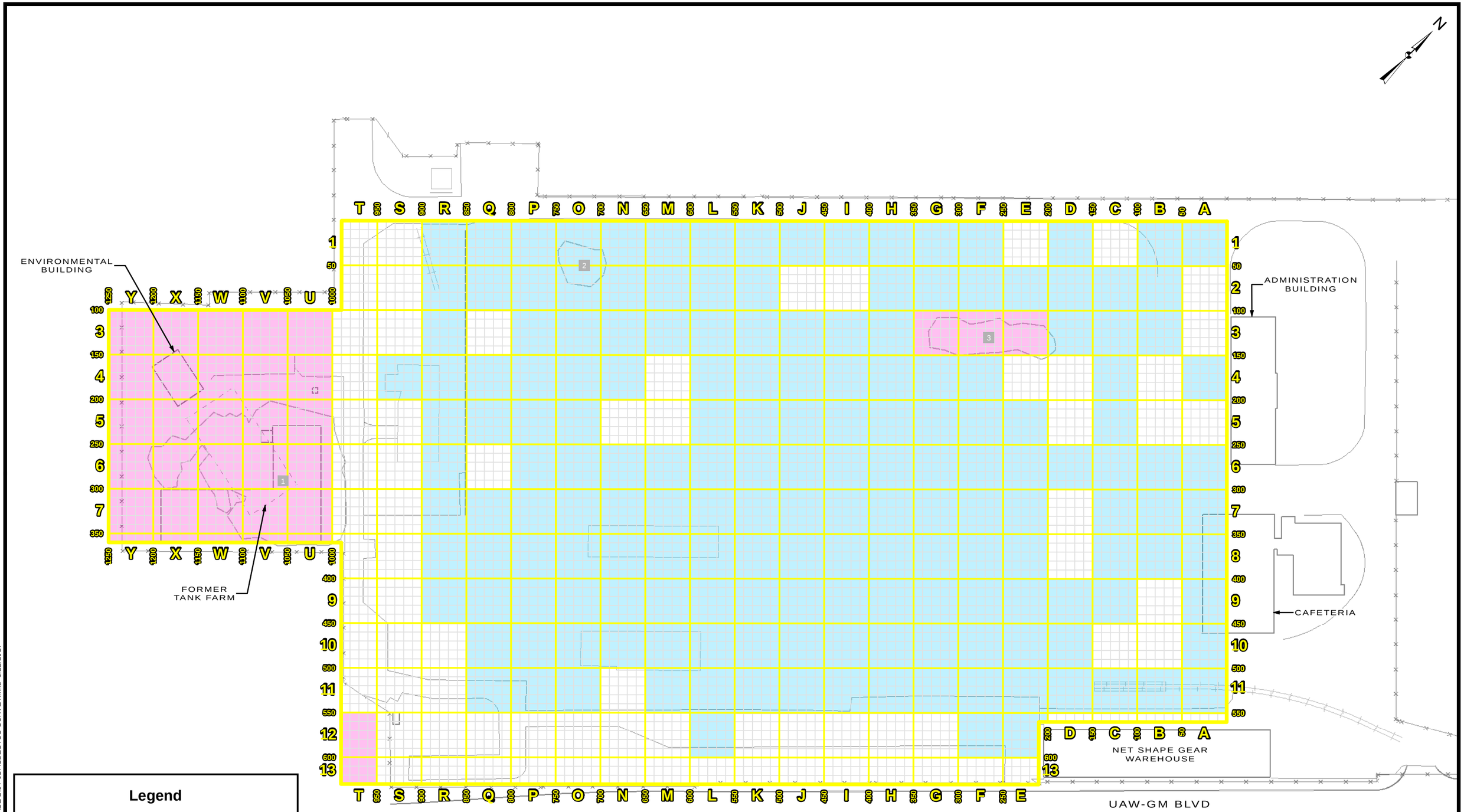
200 0 200 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AREAS OF CONCERN

URS

FIGURE1B

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\01-03 AREAS OF CONCERN.mxd 5/19/2017



Legend

- Asbestos Survey Sampling Grid
- Asbestos Containing Materials Found
- No Asbestos Containing Materials Found
- Not Part of Survey
- 1 Debris/Waste Pile (Removed Feb. 2016)

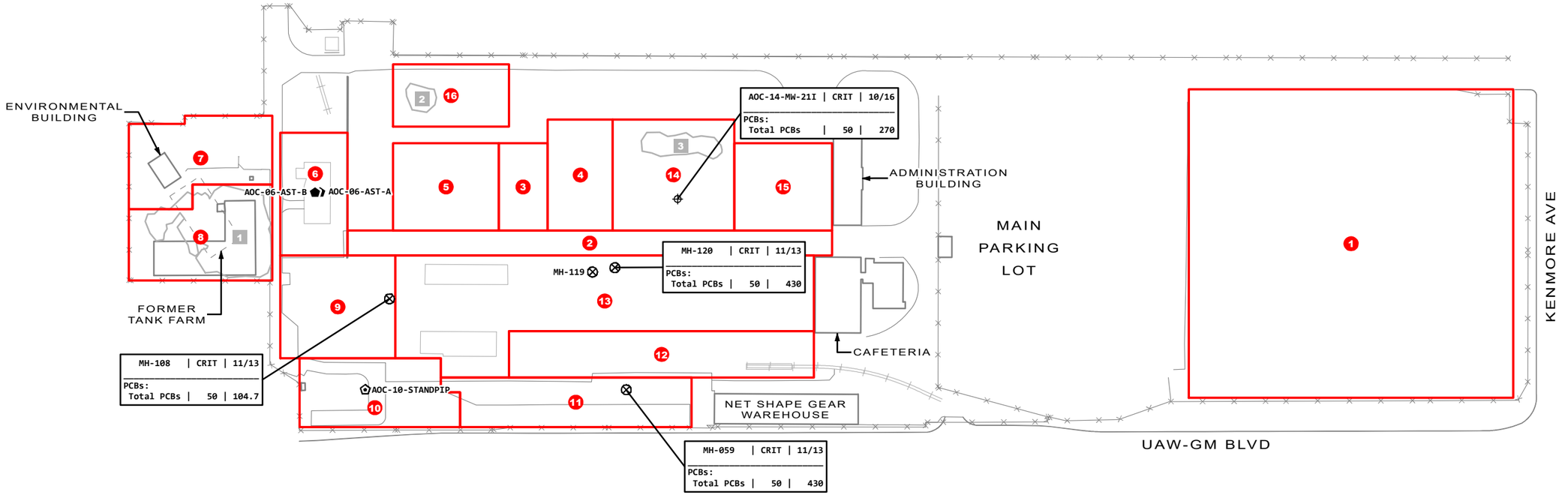
100 0 100 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
ASBESTOS SURVEY RESULTS

URS

FIGURE 2

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-01 ASBESTOS SURVEY.mxd 5/22/2017



Legend

- AST Sample
- Standpipe Sample
- Manhole
- Monitoring Well
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg; Locations shown without results indicate that no compounds exceeded criteria
Criteria: 40 CFR Part 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions, and 6 NYCRR Part 371.4 (e)

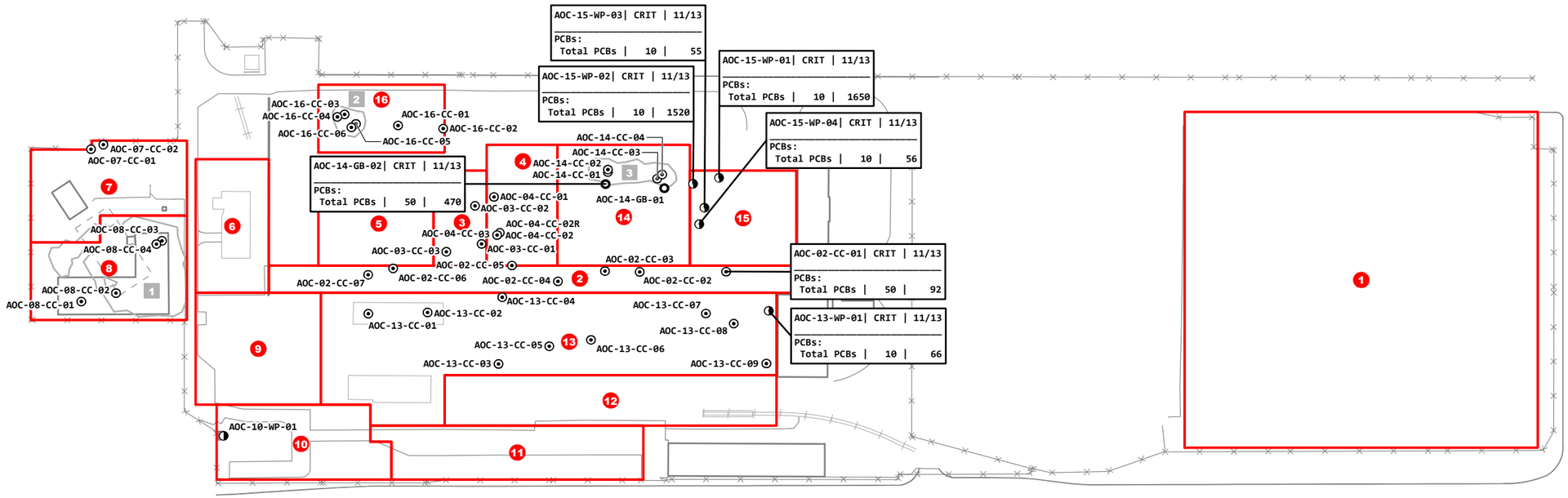
200 0 200 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
NON-AQUEOUS PHASE LIQUID ANALYTICAL RESULTS

URS

FIGURE 3

J:\Projects\11176989\GIS\MAPS\PRAP\NAPL ANALYTICAL.mxd 2/24/2020



Legend

- Chip Sample (Concrete, Brick, & Asphalt)
- Grab Sample (Bulk Solids)
- Wipe Sample
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg, except for Wipe Samples, which are in µg/wipe;
Locations shown without results indicate that no compounds exceeded criteria
Criteria: 40 CFR Part 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions, and 6 NYCRR Part 371.4 (e)

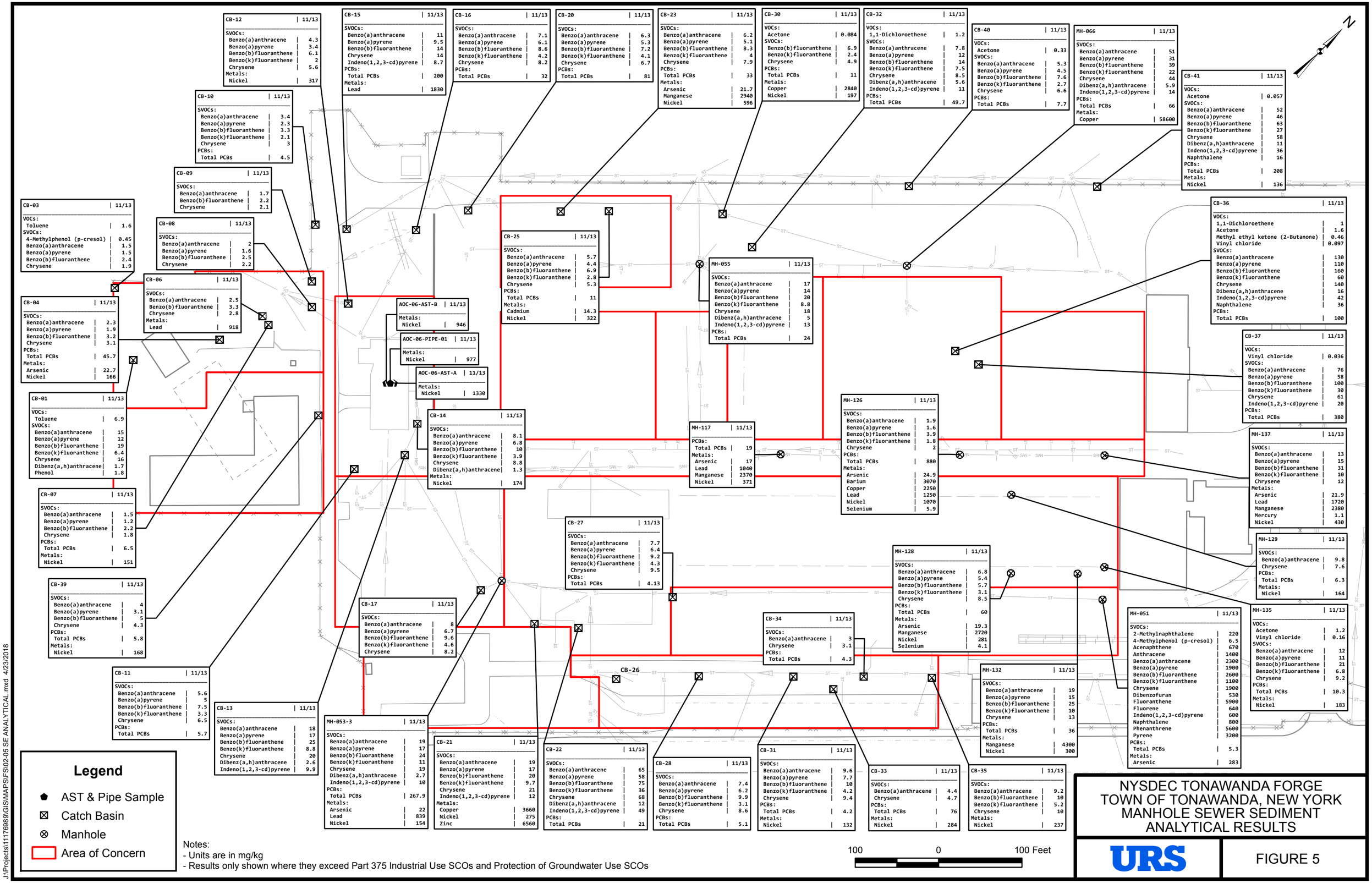
200 0 200 Feet

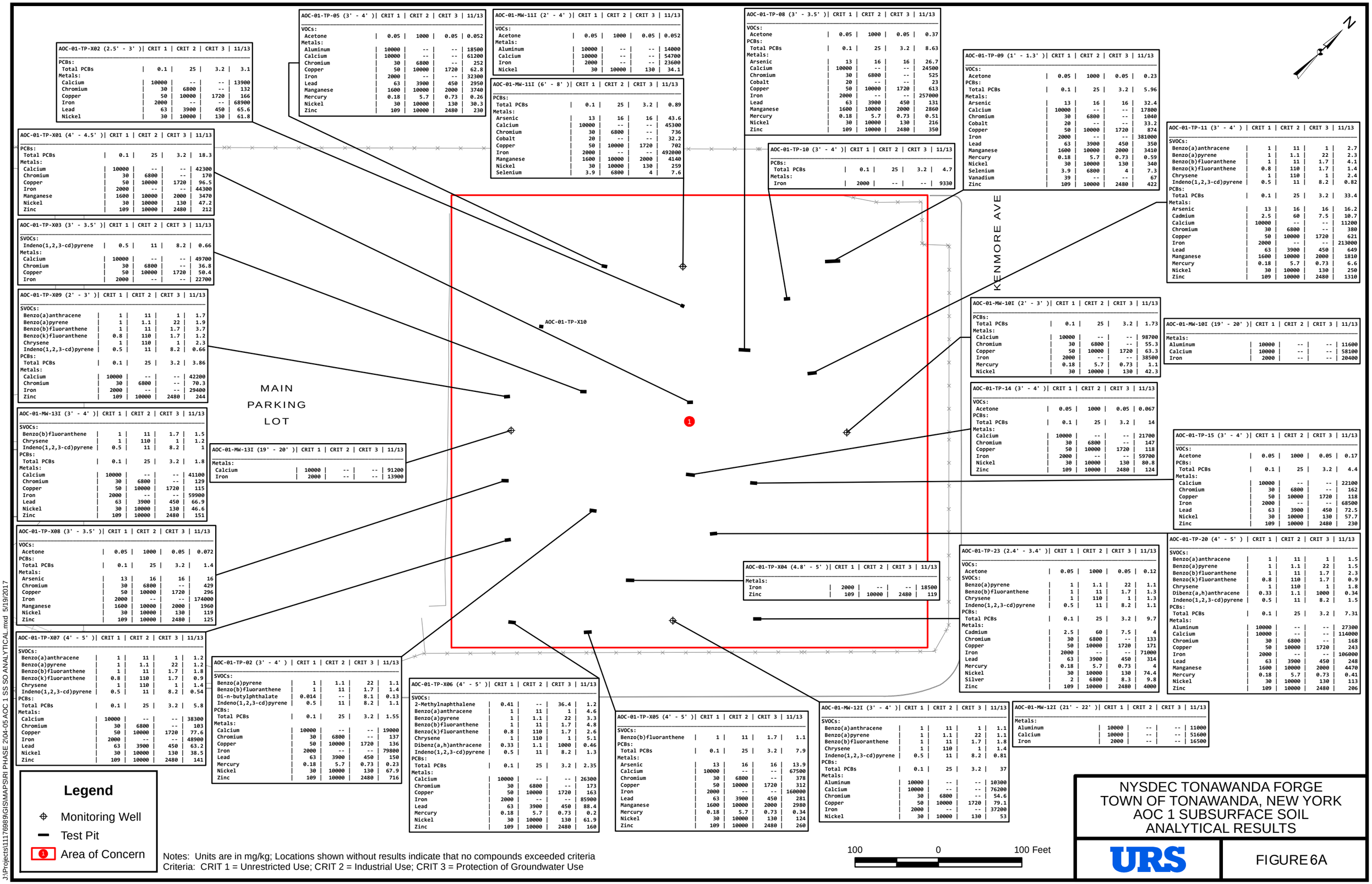
NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
CONCRETE AND ASPHALT CHIP, BRICK, BULK SOLIDS, & WIPE SAMPLES
PCB ANALYTICAL RESULTS

URS

FIGURE 4

J:\Projects\11176989\GIS\MAPS\PRAP\MISC ANALYTICAL.mxd 3/20/2020


CB-12 | 11/13
SVOCs:
Benzo(a)anthracene | 4.3
Benzo(a)pyrene | 3.4
Benzo(b)fluoranthene | 6.1
Benzo(k)fluoranthene | 2
Chrysene | 5.6
Metals:
Nickel | 317
CB-15 | 11/13
SVOCs:
Benzo(a)anthracene | 11
Benzo(a)pyrene | 9.5
Benzo(b)fluoranthene | 14
Chrysene | 14
Indeno(1,2,3-cd)pyrene | 8.7
PCBs:
Total PCBs | 200
Metals:
Lead | 1830
CB-16 | 11/13
SVOCs:
Benzo(a)anthracene | 7.1
Benzo(a)pyrene | 6.1
Benzo(b)fluoranthene | 8.6
Benzo(k)fluoranthene | 4.2
Chrysene | 8.2
PCBs:
Total PCBs | 32
CB-20 | 11/13
SVOCs:
Benzo(a)anthracene | 6.3
Benzo(a)pyrene | 5.3
Benzo(b)fluoranthene | 7.2
Benzo(k)fluoranthene | 4.1
Chrysene | 6.7
PCBs:
Total PCBs | 81
CB-23 | 11/13
SVOCs:
Benzo(a)anthracene | 6.2
Benzo(a)pyrene | 5.1
Benzo(b)fluoranthene | 8.3
Benzo(k)fluoranthene | 4
Chrysene | 7.9
PCBs:
Total PCBs | 33
Metals:
Arsenic | 21.7
Manganese | 2940
Nickel | 596
CB-30 | 11/13
VOCs:
Acetone | 0.084
SVOCs:
Benzo(b)fluoranthene | 6.9
Benzo(k)fluoranthene | 2.4
Chrysene | 4.9
PCBs:
Total PCBs | 11
Metals:
Copper | 2840
Nickel | 197
CB-32 | 11/13
VOCs:
1,1-Dichloroethene | 1.2
SVOCs:
Benzo(a)anthracene | 7.8
Benzo(a)pyrene | 12
Benzo(b)fluoranthene | 14
Benzo(k)fluoranthene | 7.5
Chrysene | 8.5
Dibenz(a,h)anthracene | 5.6
Indeno(1,2,3-cd)pyrene | 11
PCBs:
Total PCBs | 49.7
CB-40 | 11/13
VOCs:
Acetone | 0.33
SVOCs:
Benzo(a)anthracene | 5.3
Benzo(a)pyrene | 4.5
Benzo(b)fluoranthene | 7.6
Benzo(k)fluoranthene | 2.7
Chrysene | 6.6
PCBs:
Total PCBs | 7.7
MH-066 | 11/13
SVOCs:
Benzo(a)anthracene | 51
Benzo(a)pyrene | 31
Benzo(b)fluoranthene | 39
Benzo(k)fluoranthene | 22
Chrysene | 44
Dibenz(a,h)anthracene | 5.9
Indeno(1,2,3-cd)pyrene | 14
PCBs:
Total PCBs | 66
Metals:
Copper | 58600
CB-41 | 11/13
VOCs:
Acetone | 0.057
SVOCs:
Benzo(a)anthracene | 52
Benzo(a)pyrene | 46
Benzo(b)fluoranthene | 63
Benzo(k)fluoranthene | 27
Chrysene | 58
Dibenz(a,h)anthracene | 11
Indeno(1,2,3-cd)pyrene | 36
Naphthalene | 16
PCBs:
Total PCBs | 208
Metals:
Nickel | 136
CB-10 | 11/13
SVOCs:
Benzo(a)anthracene | 3.4
Benzo(a)pyrene | 2.3
Benzo(b)fluoranthene | 3.3
Benzo(k)fluoranthene | 2.1
Chrysene | 3
PCBs:
Total PCBs | 4.5
CB-09 | 11/13
SVOCs:
Benzo(a)anthracene | 1.7
Benzo(b)fluoranthene | 2.2
Chrysene | 2.1
CB-03 | 11/13
VOCs:
Toluene | 1.6
SVOCs:
4-Methylphenol (p-cresol) | 0.45
Benzo(a)anthracene | 1.5
Benzo(a)pyrene | 1.5
Benzo(b)fluoranthene | 2.4
Chrysene | 1.9
CB-08 | 11/13
SVOCs:
Benzo(a)anthracene | 2
Benzo(a)pyrene | 1.6
Benzo(b)fluoranthene | 2.5
Chrysene | 2.2
CB-06 | 11/13
SVOCs:
Benzo(a)anthracene | 2.5
Benzo(b)fluoranthene | 3.3
Chrysene | 2.8
Metals:
Lead | 918
CB-04 | 11/13
SVOCs:
Benzo(a)anthracene | 2.3
Benzo(a)pyrene | 1.9
Benzo(b)fluoranthene | 3.2
Chrysene | 3.1
PCBs:
Total PCBs | 45.7
Metals:
Arsenic | 22.7
Nickel | 166
CB-01 | 11/13
VOCs:
Toluene | 6.9
SVOCs:
Benzo(a)anthracene | 15
Benzo(a)pyrene | 12
Benzo(b)fluoranthene | 19
Benzo(k)fluoranthene | 6.4
Chrysene | 16
Dibenz(a,h)anthracene | 1.7
Phenol | 1.8
CB-07 | 11/13
SVOCs:
Benzo(a)anthracene | 1.5
Benzo(a)pyrene | 1.2
Benzo(b)fluoranthene | 2.2
Chrysene | 1.8
PCBs:
Total PCBs | 6.5
Metals:
Nickel | 151
CB-39 | 11/13
SVOCs:
Benzo(a)anthracene | 4
Benzo(a)pyrene | 3.1
Benzo(b)fluoranthene | 5
Chrysene | 4.3
PCBs:
Total PCBs | 5.8
Metals:
Nickel | 168
CB-11 | 11/13
SVOCs:
Benzo(a)anthracene | 5.6
Benzo(a)pyrene | 5
Benzo(b)fluoranthene | 7.5
Benzo(k)fluoranthene | 3.3
Chrysene | 6.5
PCBs:
Total PCBs | 5.7
CB-13 | 11/13
SVOCs:
Benzo(a)anthracene | 18
Benzo(a)pyrene | 17
Benzo(b)fluoranthene | 25
Benzo(k)fluoranthene | 8.8
Chrysene | 20
Dibenz(a,h)anthracene | 2.6
Indeno(1,2,3-cd)pyrene | 9.9
CB-25 | 11/13
SVOCs:
Benzo(a)anthracene | 5.7
Benzo(a)pyrene | 4.4
Benzo(b)fluoranthene | 6.9
Benzo(k)fluoranthene | 2.8
Chrysene | 5.3
PCBs:
Total PCBs | 11
Metals:
Cadmium | 14.3
Nickel | 322
AOC-06-AST-B | 11/13
Metals:
Nickel | 946
AOC-06-PIPE-01 | 11/13
Metals:
Nickel | 977
AOC-06-AST-A | 11/13
Metals:
Nickel | 1330
CB-14 | 11/13
SVOCs:
Benzo(a)anthracene | 8.1
Benzo(a)pyrene | 6.8
Benzo(b)fluoranthene | 10
Benzo(k)fluoranthene | 3.9
Chrysene | 8.8
Dibenz(a,h)anthracene | 1.3
Metals:
Nickel | 174
CB-17 | 11/13
SVOCs:
Benzo(a)anthracene | 8
Benzo(a)pyrene | 6.7
Benzo(b)fluoranthene | 9.6
Benzo(k)fluoranthene | 4.6
Chrysene | 8.2
MH-053-3 | 11/13
SVOCs:
Benzo(a)anthracene | 19
Benzo(a)pyrene | 17
Benzo(b)fluoranthene | 24
Benzo(k)fluoranthene | 11
Chrysene | 19
Dibenz(a,h)anthracene | 2.7
Indeno(1,2,3-cd)pyrene | 10
PCBs:
Total PCBs | 267.9
Metals:
Arsenic | 22
Lead | 839
Nickel | 154
CB-21 | 11/13
SVOCs:
Benzo(a)anthracene | 19
Benzo(a)pyrene | 17
Benzo(b)fluoranthene | 20
Benzo(k)fluoranthene | 9.7
Chrysene | 21
Indeno(1,2,3-cd)pyrene | 12
Metals:
Copper | 3660
Nickel | 275
Zinc | 6560
CB-22 | 11/13
SVOCs:
Benzo(a)anthracene | 65
Benzo(a)pyrene | 58
Benzo(b)fluoranthene | 75
Benzo(k)fluoranthene | 36
Chrysene | 68
Dibenz(a,h)anthracene | 12
Indeno(1,2,3-cd)pyrene | 49
PCBs:
Total PCBs | 21
CB-26
CB-27 | 11/13
SVOCs:
Benzo(a)anthracene | 7.7
Benzo(a)pyrene | 6.4
Benzo(b)fluoranthene | 9.2
Benzo(k)fluoranthene | 4.3
Chrysene | 9.5
PCBs:
Total PCBs | 4.13
CB-28 | 11/13
SVOCs:
Benzo(a)anthracene | 7.4
Benzo(a)pyrene | 6.2
Benzo(b)fluoranthene | 9.9
Benzo(k)fluoranthene | 3.1
Chrysene | 8.6
PCBs:
Total PCBs | 5.1
MH-055 | 11/13
SVOCs:
Benzo(a)anthracene | 17
Benzo(a)pyrene | 14
Benzo(b)fluoranthene | 20
Benzo(k)fluoranthene | 8.8
Chrysene | 18
Dibenz(a,h)anthracene | 5
Indeno(1,2,3-cd)pyrene | 13
PCBs:
Total PCBs | 24
MH-117 | 11/13
PCBs:
Total PCBs | 19
Metals:
Arsenic | 17
Lead | 1040
Manganese | 2370
Nickel | 371
MH-126 | 11/13
SVOCs:
Benzo(a)anthracene | 1.9
Benzo(a)pyrene | 1.6
Benzo(b)fluoranthene | 3.9
Benzo(k)fluoranthene | 1.8
Chrysene | 2
PCBs:
Total PCBs | 880
Metals:
Arsenic | 24.9
Barium | 3070
Copper | 2250
Lead | 1250
Nickel | 1070
Selenium | 5.9
MH-128 | 11/13
SVOCs:
Benzo(a)anthracene | 6.8
Benzo(a)pyrene | 5.4
Benzo(b)fluoranthene | 5.7
Benzo(k)fluoranthene | 3.1
Chrysene | 8.5
PCBs:
Total PCBs | 60
Metals:
Arsenic | 19.3
Manganese | 2720
Nickel | 281
Selenium | 4.1
CB-34 | 11/13
SVOCs:
Benzo(a)anthracene | 3
Chrysene | 3.1
PCBs:
Total PCBs | 4.3
CB-31 | 11/13
SVOCs:
Benzo(a)anthracene | 9.6
Benzo(a)pyrene | 7.7
Benzo(b)fluoranthene | 10
Benzo(k)fluoranthene | 4.2
Chrysene | 9.4
PCBs:
Total PCBs | 4.2
Metals:
Nickel | 132
CB-33 | 11/13
SVOCs:
Benzo(a)anthracene | 4.4
Chrysene | 4.7
PCBs:
Total PCBs | 76
Metals:
Nickel | 284
CB-35 | 11/13
SVOCs:
Benzo(a)anthracene | 9.2
Benzo(b)fluoranthene | 10
Benzo(k)fluoranthene | 5.2
Chrysene | 10
Metals:
Nickel | 237
MH-132 | 11/13
SVOCs:
Benzo(a)anthracene | 19
Benzo(a)pyrene | 15
Benzo(b)fluoranthene | 25
Benzo(k)fluoranthene | 10
Chrysene | 13
PCBs:
Total PCBs | 36
Metals:
Manganese | 4300
Nickel | 300
MH-051 | 11/13
SVOCs:
2-Methylnaphthalene | 220
4-Methylphenol (p-cresol) | 6.5
Acenaphthene | 670
Anthracene | 1400
Benzo(a)anthracene | 2300
Benzo(a)pyrene | 1900
Benzo(b)fluoranthene | 2600
Benzo(k)fluoranthene | 1100
Chrysene | 1900
Dibenzofuran | 530
Fluoranthene | 5900
Fluorene | 640
Indeno(1,2,3-cd)pyrene | 600
Naphthalene | 800
Phenanthrene | 5600
Pyrene | 3200
PCBs:
Total PCBs | 5.3
Metals:
Arsenic | 283
CB-36 | 11/13
VOCs:
1,1-Dichloroethene | 1
Acetone | 1.6
Methyl ethyl ketone (2-Butanone) | 0.46
Vinyl chloride | 0.097
SVOCs:
Benzo(a)anthracene | 130
Benzo(a)pyrene | 110
Benzo(b)fluoranthene | 160
Benzo(k)fluoranthene | 60
Chrysene | 140
Dibenz(a,h)anthracene | 16
Indeno(1,2,3-cd)pyrene | 42
Naphthalene | 36
PCBs:
Total PCBs | 100
CB-37 | 11/13
VOCs:
Vinyl chloride | 0.036
SVOCs:
Benzo(a)anthracene | 76
Benzo(a)pyrene | 58
Benzo(b)fluoranthene | 100
Benzo(k)fluoranthene | 30
Chrysene | 61
Indeno(1,2,3-cd)pyrene | 20
PCBs:
Total PCBs | 380
MH-137 | 11/13
SVOCs:
Benzo(a)anthracene | 13
Benzo(a)pyrene | 15
Benzo(b)fluoranthene | 31
Benzo(k)fluoranthene | 10
Chrysene | 12
Metals:
Arsenic | 21.9
Lead | 1720
Manganese | 2380
Mercury | 1.1
Nickel | 430
MH-129 | 11/13
SVOCs:
Benzo(a)anthracene | 9.8
Chrysene | 7.6
PCBs:
Total PCBs | 6.3
Metals:
Nickel | 164
MH-135 | 11/13
VOCs:
Acetone | 1.2
Vinyl chloride | 0.16
SVOCs:
Benzo(a)anthracene | 12
Benzo(a)pyrene | 11
Benzo(b)fluoranthene | 21
Benzo(k)fluoranthene | 6.8
Chrysene | 9.2
PCBs:
Total PCBs | 10.3
Metals:
Nickel | 183
N
Legend
AST & Pipe Sample
Catch Basin
Manhole
Area of Concern
Notes:
- Units are in mg/kg
- Results only shown where they exceed Part 375 Industrial Use SCOs and Protection of Groundwater Use SCOs
100 0 100 Feet
NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
MANHOLE SEWER SEDIMENT
ANALYTICAL RESULTS
URS
FIGURE 5
J:\Projects\11176989\GIS\MAPS\FS\02-05 SE ANALYTICAL.mxd 4/23/2018



AOC-01-TP-X02 (2.5' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.1
Metals:				
Calcium	10000	--	--	13900
Chromium	30	6800	--	132
Copper	50	10000	1720	166
Iron	2000	--	--	68900
Lead	63	3900	450	65.6
Nickel	30	10000	130	61.8

AOC-01-TP-X01 (4' - 4.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	18.3
Metals:				
Calcium	10000	--	--	42300
Chromium	30	6800	--	170
Copper	50	10000	1720	96.5
Iron	2000	--	--	44300
Manganese	1600	10000	2000	3470
Nickel	30	10000	130	47.2
Zinc	109	10000	2480	212

AOC-01-TP-X03 (3' - 3.5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.66
Metals:				
Calcium	10000	--	--	49700
Chromium	30	6800	--	36.8
Copper	50	10000	1720	50.4
Iron	2000	--	--	22700

AOC-01-TP-X09 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.7
Benzo(a)pyrene	1	1.1	22	1.9
Benzo(b)fluoranthene	1	11	1.7	3.7
Benzo(k)fluoranthene	0.8	110	1.7	1.2
Chrysene	1	110	1	2.3
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.66
PCBs:				
Total PCBs	0.1	25	3.2	3.86
Metals:				
Calcium	10000	--	--	42200
Chromium	30	6800	--	70.3
Iron	2000	--	--	29400
Zinc	109	10000	2480	244

AOC-01-MW-13I (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.5
Chrysene	1	110	1	1.2
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1
PCBs:				
Total PCBs	0.1	25	3.2	1.8
Metals:				
Calcium	10000	--	--	41100
Chromium	30	6800	--	129
Copper	50	10000	1720	115
Iron	2000	--	--	59900
Lead	63	3900	450	66.9
Nickel	30	10000	130	46.6
Zinc	109	10000	2480	151

AOC-01-TP-X08 (3' - 3.5')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.072
PCBs:				
Total PCBs	0.1	25	3.2	1.4
Metals:				
Arsenic	13	16	16	16
Chromium	30	6800	--	429
Copper	50	10000	1720	296
Iron	2000	--	--	174000
Manganese	1600	10000	2000	1960
Nickel	30	10000	130	119
Zinc	109	10000	2480	125

AOC-01-TP-X07 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.2
Benzo(a)pyrene	1	1.1	22	1.2
Benzo(b)fluoranthene	1	11	1.7	1.8
Benzo(k)fluoranthene	0.8	110	1.7	0.9
Chrysene	1	110	1	1.4
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.54
PCBs:				
Total PCBs	0.1	25	3.2	5.8
Metals:				
Calcium	10000	--	--	38300
Chromium	30	6800	--	103
Copper	50	10000	1720	77.6
Iron	2000	--	--	48900
Lead	63	3900	450	63.2
Nickel	30	10000	130	38.5
Zinc	109	10000	2480	141

AOC-01-TP-05 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.052
Metals:				
Aluminum	10000	--	--	18500
Calcium	10000	--	--	61200
Chromium	30	6800	--	252
Copper	50	10000	1720	62.8
Iron	2000	--	--	32300
Lead	63	3900	450	2950
Manganese	1600	10000	2000	3740
Mercury	0.18	5.7	0.73	0.26
Nickel	30	10000	130	30.3
Zinc	109	10000	2480	230

AOC-01-MW-13I (19' - 20')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Calcium	10000	--	--	91200
Iron	2000	--	--	13900

AOC-01-TP-02 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)pyrene	1	1.1	22	1.1
Benzo(b)fluoranthene	1	11	1.7	1.4
Di-n-butylphthalate	0.014	--	8.1	0.13
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.1
PCBs:				
Total PCBs	0.1	25	3.2	1.55
Metals:				
Calcium	10000	--	--	19000
Chromium	30	6800	--	137
Copper	50	10000	1720	136
Iron	2000	--	--	79800
Lead	63	3900	450	150
Mercury	0.18	5.7	0.73	0.23
Nickel	30	10000	130	67.9
Zinc	109	10000	2480	716

AOC-01-TP-X06 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	1.2
Benzo(a)anthracene	1	11	1	4.6
Benzo(a)pyrene	1	1.1	22	3.3
Benzo(b)fluoranthene	1	11	1.7	4.8
Benzo(k)fluoranthene	0.8	110	1.7	2.6
Chrysene	1	110	1	5.1
Dibenz(a,h)anthracene	0.33	1.1	1000	0.46
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.3
PCBs:				
Total PCBs	0.1	25	3.2	2.35
Metals:				
Calcium	10000	--	--	26300
Chromium	30	6800	--	173
Copper	50	10000	1720	163
Iron	2000	--	--	85900
Lead	63	3900	450	88.4
Mercury	0.18	5.7	0.73	0.2
Nickel	30	10000	130	61.9
Zinc	109	10000	2480	160

AOC-01-MW-11I (2' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.052
Metals:				
Aluminum	10000	--	--	14000
Calcium	10000	--	--	54700
Iron	2000	--	--	23600
Nickel	30	10000	130	34.1

AOC-01-MW-11I (6' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.89
Metals:				
Arsenic	13	16	16	43.6
Calcium	10000	--	--	45300
Chromium	30	6800	--	736
Cobalt	20	--	--	32.2
Copper	50	10000	1720	702
Iron	2000	--	--	492000
Manganese	1600	10000	2000	4140
Nickel	30	10000	130	259
Selenium	3.9	6800	4	7.6

AOC-01-TP-X04 (4.8' - 5')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Iron	2000	--	--	18500
Zinc	109	10000	2480	119

AOC-01-TP-X05 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.1
PCBs:				
Total PCBs	0.1	25	3.2	7.9
Metals:				
Arsenic	13	16	16	13.9
Calcium	10000	--	--	67500
Chromium	30	6800	--	378
Copper	50	10000	1720	312
Iron	2000	--	--	160000
Lead	63	3900	450	281
Manganese	1600	10000	2000	2980
Mercury	0.18	5.7	0.73	0.34
Nickel	30	10000	130	124
Zinc	109	10000	2480	260

AOC-01-TP-08 (3' - 3.5')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.37
PCBs:				
Total PCBs	0.1	25	3.2	8.63
Metals:				
Arsenic	13	16	16	26.7
Calcium	10000	--	--	24500
Chromium	30	6800	--	525
Cobalt	20	--	--	23
Copper	50	10000	1720	613
Iron	2000	--	--	257000
Lead	63	3900	450	131
Manganese	1600	10000	2000	2860
Mercury	0.18	5.7	0.73	0.51
Nickel	30	10000	130	216
Zinc	109	10000	2480	350

AOC-01-TP-10 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	4.7
Metals:				
Iron	2000	--	--	9330

AOC-01-MW-12I (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.1
Benzo(a)pyrene	1	1.1	22	1.1
Benzo(b)fluoranthene	1	11	1.7	1.8
Chrysene	1	110	1	1.4
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.81
PCBs:				
Total PCBs	0.1	25	3.2	37
Metals:				
Aluminum	10000	--	--	10300
Calcium	10000	--	--	76200
Chromium	30	6800	--	54.6
Copper	50	10000	1720	79.1
Iron	2000	--	--	37200
Nickel	30	10000	130	53

AOC-01-TP-09 (1' - 1.3')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.23
PCBs:				
Total PCBs	0.1	25	3.2	5.96
Metals:				
Arsenic	13	16	16	32.4
Calcium	10000	--	--	17800
Chromium	30	6800	--	1040
Cobalt	20	--	--	33.2
Copper	50	10000	1720	874
Iron	2000	--	--	381000
Lead	63	3900	450	350
Manganese	1600	10000	2000	3410
Mercury	0.18	5.7	0.73	0.59
Nickel	30	10000	130	340
Selenium	3.9	6800	4	7.3
Vanadium	39	--	--	67
Zinc	109	10000	2480	422

AOC-01-TP-23 (2.4' - 3.4')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.12
SVOCs:				
Benzo(a)pyrene	1	1.1	22	1.1
Benzo(b)fluoranthene	1	11	1.7	1.3
Chrysene	1	110	1	1.3
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.1
PCBs:				
Total PCBs	0.1	25	3.2	9.7
Metals:				
Cadmium	2.5	60	7.5	4
Chromium	30	6800	--	133
Copper	50	10000	1720	171
Iron	2000	--	--	71000
Lead	63	3900	450	314
Mercury	0.18	5.7	0.73	4
Nickel	30	10000	130	74.4
Silver	2	6800	8.3	9.8
Zinc	109	10000	2480	4000

AOC-01-TP-11 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	2.7
Benzo(a)pyrene	1	1.1	22	2.3
Benzo(b)fluoranthene	1	11	1.7	4.1
Benzo(k)fluoranthene	0.8	110	1.7	1.4
Chrysene	1	110	1	2.4
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.82
PCBs:				
Total PCBs	0.1	25	3.2	33.4
Metals:				
Arsenic	13	16	16	16.2
Cadmium	2.5	60	7.5	10.7
Calcium	10000	--	--	11200
Chromium	30	6800	--	380
Copper	50	10000	1720	621
Iron	2000	--	--	213000
Lead	63	3900	450	649
Manganese	1600	10000	2000	1810
Mercury	0.18	5.7	0.73	6.6
Nickel	30	10000	130	250
Zinc	109	10000	2480	1310

AOC-01-MW-10I (2' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	1.73
Metals:				
Calcium	10000	--	--	98700
Chromium	30	6800	--	55.3
Copper	50	10000	1720	63.3
Iron	2000	--	--	38500
Mercury	0.18	5.7	0.73	1.1
Nickel	30	10000	130	42.3

AOC-01-MW-10I (19' - 20')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11600
Calcium	10000	--	--	58100
Iron	2000	--	--	20400

AOC-01-TP-14 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.067
PCBs:				
Total PCBs	0.1	25	3.2	14
Metals:				
Calcium	10000	--	--	21700
Chromium	30	6800	--	147
Copper	50	10000	1720	118
Iron	2000	--	--	59700
Nickel	30	10000	130	80.8
Zinc	109	10000	2480	124

AOC-01-TP-15 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.17
PCBs:				
Total PCBs	0.1	25	3.2	4.4
Metals:				
Calcium	10000	--	--	22100
Chromium	30	6800	--	162
Copper	50	10000	1720	118
Iron	2000	--	--	68500
Lead	63	3900	450	72.5
Nickel	30	10000	130	57.7
Zinc	109	10000	2480	230

AOC-01-TP-20 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.5
Benzo(a)pyrene	1	1.1	22	1.5
Benzo(b)fluoranthene	1	11	1.7	2.3
Benzo(k)fluoranthene	0.8	110	1.7	0.9
Chrysene	1	110	1	1.8
Dibenz(a,h)anthracene	0.33	1.1	1000	0.34
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.5
PCBs:				
Total PCBs	0.1	25	3.2	7.31
Metals:				
Aluminum	10000	--	--	27300
Calcium	10000	--	--	114000
Chromium	30	6800	--	168
Copper	50	10000	1720	243
Iron	2000	--	--	106000
Lead	63	3900	450	248
Manganese	1600	10000	2000	4470
Mercury	0.18	5.7	0.73	0.41
Nickel	30	10000	130	113
Zinc	109	10000	2480	206

AOC-01-MW-12I (21' - 22')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11000
Calcium	10000	--	--	51600
Iron	2000	--	--	16500

Legend

- Monitoring Well
- Test Pit
- Area of Concern

Notes: Units are in mg/kg; Locations shown without results indicate that no compounds exceeded criteria
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

100 0 100 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 1 SUBSURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6A

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-05 AOC 1 SS SO ANALYTICAL.mxd 5/19/2017

AOC-02-GP-01 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
VOCs:				
Acetone	0.05	1000	0.05	0.12
PCBs:				
Total PCBs	0.1	25	3.2	0.15
Metals:				
Calcium	10000	--	--	42700
Iron	2000	--	--	11700

AOC-02-GP-01 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	12200
Calcium	10000	--	--	53500
Iron	2000	--	--	22300

AOC-02-MW-03I (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.64
Metals:				
Calcium	10000	--	--	94900
Iron	2000	--	--	11900

AOC-02-MW-03I (5' - 6')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	12000
Calcium	10000	--	--	50100
Iron	2000	--	--	19900

AOC-02-MW-01I (1.3' - 2.3')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11700
Calcium	10000	--	--	88100
Chromium	30	6800	--	43.9
Iron	2000	--	--	14700

AOC-02-MW-01I (17' - 18')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	10400
Calcium	10000	--	--	48800
Iron	2000	--	--	16300

ADMINISTRATION BUILDING

CAFETERIA

Legend

- Monitoring Well
- Geoprobe
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

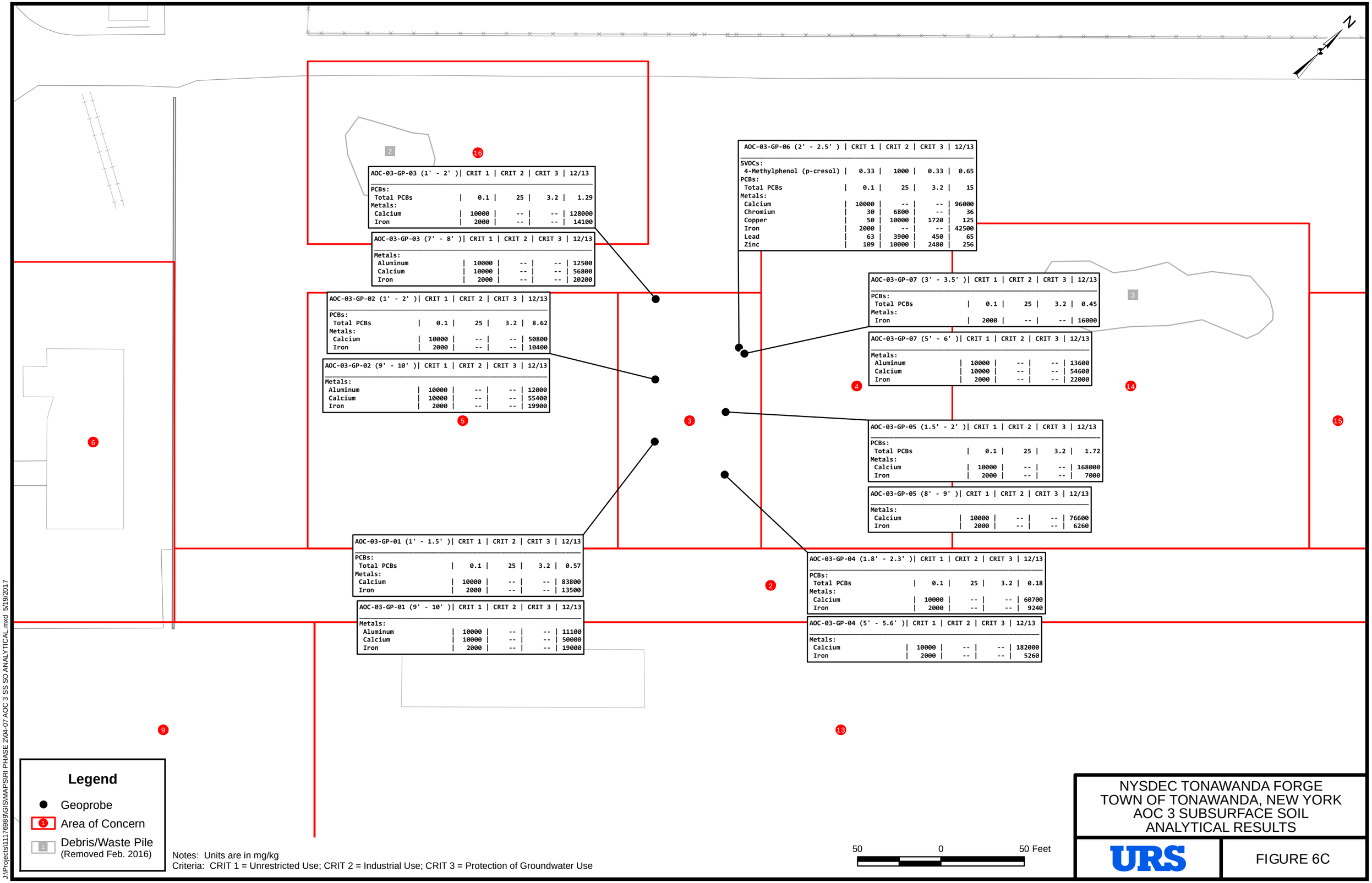
60 0 60 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 2 SUBSURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6B

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-06 AOC 2 SS SO ANALYTICAL.mxd 5/19/2017


N
2
16
AOC-03-GP-03 (1' - 2')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
PCBs:
Total PCBs | 0.1 | 25 | 3.2 | 1.29
Metals:
Calcium | 10000 | -- | -- | 128000
Iron | 2000 | -- | -- | 14100
AOC-03-GP-03 (7' - 8')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
Metals:
Aluminum | 10000 | -- | -- | 12500
Calcium | 10000 | -- | -- | 56800
Iron | 2000 | -- | -- | 20200
AOC-03-GP-02 (1' - 2')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
PCBs:
Total PCBs | 0.1 | 25 | 3.2 | 8.62
Metals:
Calcium | 10000 | -- | -- | 50800
Iron | 2000 | -- | -- | 10400
AOC-03-GP-02 (9' - 10')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
Metals:
Aluminum | 10000 | -- | -- | 12000
Calcium | 10000 | -- | -- | 55400
Iron | 2000 | -- | -- | 19900
5
6
AOC-03-GP-06 (2' - 2.5') | CRIT 1 | CRIT 2 | CRIT 3 | 12/13
SVOCs:
4-Methylphenol (p-cresol) | 0.33 | 1000 | 0.33 | 0.65
PCBs:
Total PCBs | 0.1 | 25 | 3.2 | 15
Metals:
Calcium | 10000 | -- | -- | 96000
Chromium | 30 | 6800 | -- | 36
Copper | 50 | 10000 | 1720 | 125
Iron | 2000 | -- | -- | 42500
Lead | 63 | 3900 | 450 | 65
Zinc | 109 | 10000 | 2480 | 256
AOC-03-GP-07 (3' - 3.5')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
PCBs:
Total PCBs | 0.1 | 25 | 3.2 | 0.45
Metals:
Iron | 2000 | -- | -- | 16000
AOC-03-GP-07 (5' - 6')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
Metals:
Aluminum | 10000 | -- | -- | 13600
Calcium | 10000 | -- | -- | 54600
Iron | 2000 | -- | -- | 22000
3
4
14
15
AOC-03-GP-05 (1.5' - 2')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
PCBs:
Total PCBs | 0.1 | 25 | 3.2 | 1.72
Metals:
Calcium | 10000 | -- | -- | 168000
Iron | 2000 | -- | -- | 7000
AOC-03-GP-05 (8' - 9')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
Metals:
Calcium | 10000 | -- | -- | 76600
Iron | 2000 | -- | -- | 6260
AOC-03-GP-01 (1' - 1.5')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
PCBs:
Total PCBs | 0.1 | 25 | 3.2 | 0.57
Metals:
Calcium | 10000 | -- | -- | 83800
Iron | 2000 | -- | -- | 13500
AOC-03-GP-01 (9' - 10')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
Metals:
Aluminum | 10000 | -- | -- | 11100
Calcium | 10000 | -- | -- | 50000
Iron | 2000 | -- | -- | 19000
AOC-03-GP-04 (1.8' - 2.3')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
PCBs:
Total PCBs | 0.1 | 25 | 3.2 | 0.18
Metals:
Calcium | 10000 | -- | -- | 60700
Iron | 2000 | -- | -- | 9240
AOC-03-GP-04 (5' - 5.6')| CRIT 1 | CRIT 2 | CRIT 3 | 12/13
Metals:
Calcium | 10000 | -- | -- | 182000
Iron | 2000 | -- | -- | 5260
2
9
13
Legend
Geoprobe
1 Area of Concern
1 Debris/Waste Pile
(Removed Feb. 2016)
Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use
50 0 50 Feet
NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 3 SUBSURFACE SOIL
ANALYTICAL RESULTS
URS
FIGURE 6C
J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-07 AOC 3 SS SO ANALYTICAL.mxd 5/19/2017

AOC-04-GP-03 (1.5' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	82400
Iron	2000	--	--	7620

AOC-04-GP-04 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Di-n-butylphthalate	0.014	--	8.1	0.099
Metals:				
Aluminum	10000	--	--	21300
Calcium	10000	--	--	172000
Iron	2000	--	--	7210
Manganese	1600	10000	2000	3380

AOC-04-GP-04 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	13700
Calcium	10000	--	--	52900
Iron	2000	--	--	23900
Nickel	30	10000	130	32

AOC-04-GP-02 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	93400
Iron	2000	--	--	7780

AOC-04-GP-02 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	13500
Calcium	10000	--	--	53800
Iron	2000	--	--	23600

AOC-04-GP-01 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	20400
Calcium	10000	--	--	38400
Iron	2000	--	--	24600
Nickel	30	10000	130	34.8

Legend

- Geoprobe
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 4 SUBSURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6D

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AOC-05-GP-03 (4' - 4.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	53600
Iron	2000	--	--	5770

AOC-05-SB-02 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	14100
Arsenic	13	16	16	71.4
Calcium	10000	--	--	26700
Chromium	30	6800	--	31.9
Iron	2000	--	--	18200
Nickel	30	10000	130	30.8
Vanadium	39	--	--	74.6

AOC-05-MW-04I (2' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Calcium	10000	--	--	212000
Iron	2000	--	--	4900

AOC-05-SB-02 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	13500
Arsenic	13	16	16	57.8
Calcium	10000	--	--	28300
Iron	2000	--	--	13100
Vanadium	39	--	--	72.6

AOC-05-MW-04I (5' - 6')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	12700
Barium	350	10000	820	355
Calcium	10000	--	--	79100
Iron	2000	--	--	19500

AOC-05-SB-04 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	19200
Arsenic	13	16	16	92.3
Calcium	10000	--	--	37700
Chromium	30	6800	--	48.9
Iron	2000	--	--	27100
Nickel	30	10000	130	38.4
Vanadium	39	--	--	113

AOC-05-SB-01 (1.5' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	0.28
Metals:				
Calcium	10000	--	--	143000
Iron	2000	--	--	5190

AOC-05-SB-04 (10' - 10.7')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	19100
Arsenic	13	16	16	74.3
Calcium	10000	--	--	41700
Chromium	30	6800	--	43.9
Iron	2000	--	--	25100
Nickel	30	10000	130	39.6
Vanadium	39	--	--	105

AOC-05-SB-01 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	15800
Calcium	10000	--	--	53100
Iron	2000	--	--	21200
Nickel	30	10000	130	30.6

AOC-05-SB-04 (12' - 14')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	12200
Calcium	10000	--	--	55200
Chromium	30	6800	--	32.4
Iron	2000	--	--	21600

AOC-05-GP-02 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	19700
Arsenic	13	16	16	83.7
Calcium	10000	--	--	40300
Chromium	30	6800	--	44.6
Iron	2000	--	--	24200
Mercury	0.18	5.7	0.73	0.2
Nickel	30	10000	130	38.7
Vanadium	39	--	--	107

AOC-05-SB-03 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	19700
Arsenic	13	16	16	93.2
Calcium	10000	--	--	39100
Chromium	30	6800	--	41.5
Iron	2000	--	--	16800
Nickel	30	10000	130	40.3
Vanadium	39	--	--	107

AOC-05-GP-02 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	18900
Arsenic	13	16	16	78.8
Calcium	10000	--	--	41600
Chromium	30	6800	--	43.1
Iron	2000	--	--	20900
Nickel	30	10000	130	35.9
Vanadium	39	--	--	107

AOC-05-GP-01 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Calcium	10000	--	--	77200
Iron	2000	--	--	8150

AOC-05-GP-04 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	28600
Iron	2000	--	--	15700

FORMER TANK FARM

Legend

- Monitoring Well
- Geoprobe
- Soil Boring
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 5 SUBSURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6E

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AOC-06-MW-06I (1' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	17700
Iron	2000	--	--	33200

AOC-06-MW-06I (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	26500
Barium	350	10000	820	354
Calcium	10000	--	--	11300
Chromium	30	6800	--	34.6
Iron	2000	--	--	36900
Nickel	30	10000	130	49.2
Vanadium	39	--	--	45.4

AOC-06-MW-06I (10' - 12')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	17300
Calcium	10000	--	--	85400
Iron	2000	--	--	33400
Nickel	30	10000	130	37.5

AOC-06-GP-02 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.16
Metals:				
Calcium	10000	--	--	219000

AOC-06-GP-02 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11100
Calcium	10000	--	--	52300
Iron	2000	--	--	16000

AOC-06-GP-03 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	17600
Calcium	10000	--	--	47600
Iron	2000	--	--	20900
Nickel	30	10000	130	31.4

AOC-06-GP-03 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11100
Calcium	10000	--	--	51600
Iron	2000	--	--	18500

AOC-06-GP-01 (1.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.2
Metals:				
Aluminum	10000	--	--	10700
Calcium	10000	--	--	75000
Iron	2000	--	--	8730

AOC-06-GP-01 (3' - 3.5')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.21
Metals:				
Aluminum	10000	--	--	16100
Iron	2000	--	--	27400

AOC-06-GP-04 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	17100
Calcium	10000	--	--	10900
Cobalt	20	--	--	20.6
Iron	2000	--	--	24300
Nickel	30	10000	130	33.2

AOC-06-GP-04 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11500
Calcium	10000	--	--	51000
Iron	2000	--	--	18100

ENVIRONMENTAL BUILDING

FORMER TANK FARM

Legend

- Monitoring Well
- Geoprobe
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

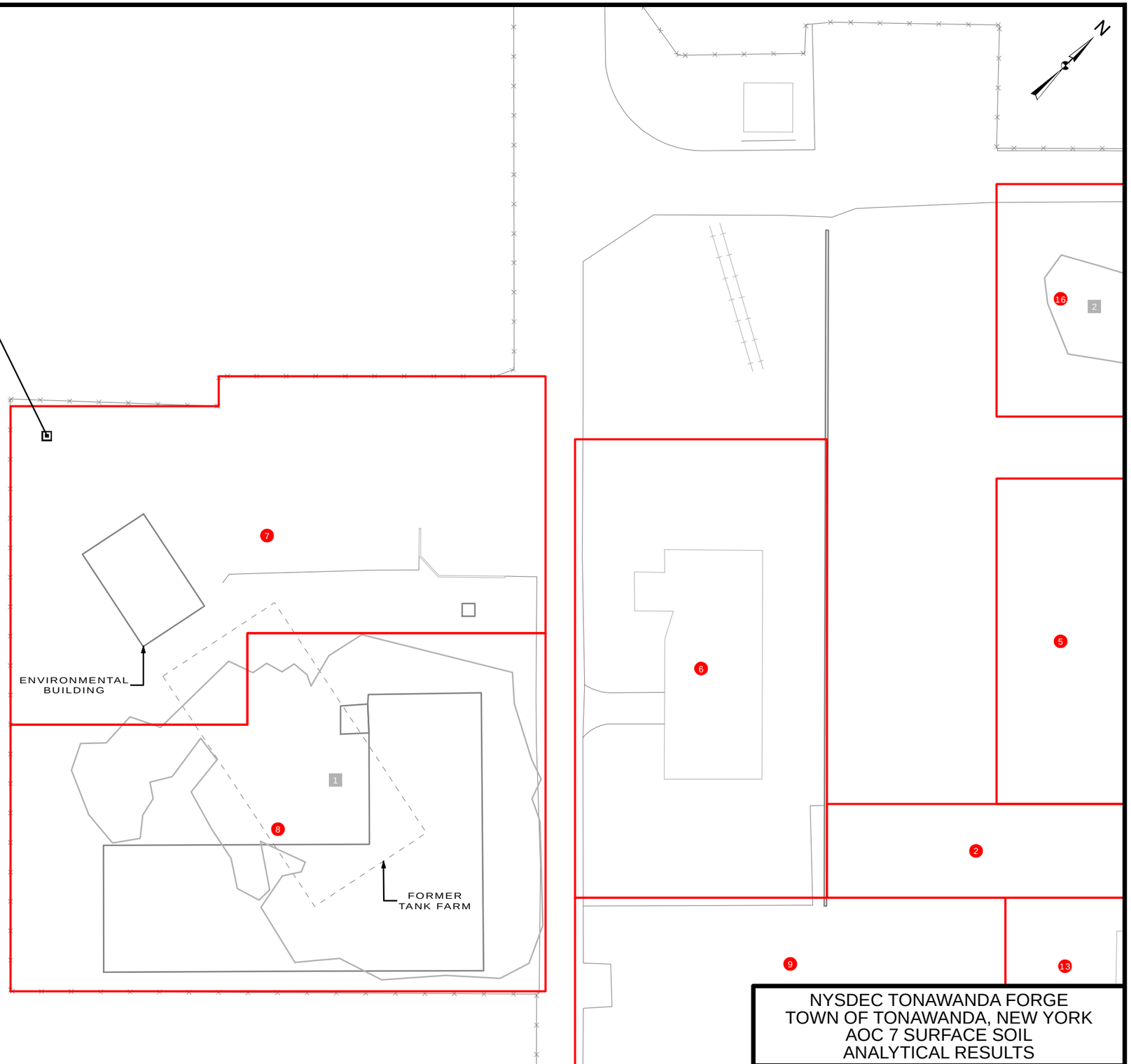
NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 6 SUBSURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6F

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-10 AOC 6 SS SO ANALYTICAL.mxd 5/19/2017

AOC-07-SS-14 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.7
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	2.6
PCBs:				
Total PCBs	0.1	25	3.2	1.17
Metals:				
Aluminum	10000	--	--	10200
Calcium	10000	--	--	81500
Chromium	30	6800	--	177
Copper	50	10000	1720	129
Iron	2000	--	--	42400
Lead	63	3900	450	158
Nickel	30	10000	130	113
Vanadium	39	--	--	41.9
Zinc	109	10000	2480	1400



Legend

- Surface Soil Sample
- 1 Area of Concern
- 1 Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 7 SURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6G

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AOC-07-GP-01 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	12300
Calcium	10000	--	--	58500
Iron	2000	--	--	18700

AOC-07-GP-01 (5' - 6')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	12300
Calcium	10000	--	--	46200
Iron	2000	--	--	19300

AOC-07-GP-02 (0.5' - 1')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.7
Metals:				
Calcium	10000	--	--	65800
Iron	2000	--	--	14000

AOC-07-GP-02 (8' - 8.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.26
Metals:				
Calcium	10000	--	--	142000
Iron	2000	--	--	9950

AOC-07-GP-03 (0' - 0.5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.5
Benzo(a)pyrene	1	1.1	22	1.3
Benzo(b)fluoranthene	1	11	1.7	1.8
Chrysene	1	110	1	1.6
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.52
PCBs:				
Total PCBs	0.1	25	3.2	0.12
Metals:				
Calcium	10000	--	--	162000
Iron	2000	--	--	11200
Zinc	109	10000	2480	169

AOC-07-GP-03 (6' - 6.5')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	16700
Iron	2000	--	--	7180

AOC-07-GP-04 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.49
Metals:				
Aluminum	10000	--	--	14100
Calcium	10000	--	--	16700
Iron	2000	--	--	16600

AOC-07-GP-04 (5.5' - 6')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	13800
Calcium	10000	--	--	48500
Iron	2000	--	--	20300

AOC-07-GP-05 (1' - 1.8')	CRIT 1	CRIT 2	CRIT 3	10/16
SVOCs:				
Benzo(a)anthracene	1	11	1	4.3
Benzo(a)pyrene	1	1.1	22	3
Benzo(b)fluoranthene	1	11	1.7	4.6
Benzo(k)fluoranthene	0.8	110	1.7	1.9
Chrysene	1	110	1	4.3
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.6
PCBs:				
Total PCBs	0.1	25	3.2	3.6
Metals:				
Aluminum	10000	--	--	14800
Calcium	10000	--	--	112000
Iron	2000	--	--	19800

ENVIRONMENTAL BUILDING

FORMER TANK FARM

Legend

- Geoprobe
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

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NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 7 SUBSURFACE SOIL
ANALYTICAL RESULTS

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FIGURE 6H

AOC-08-N-TT-11 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	10/16
SVOCs:				
Benzo(a)anthracene	1	11	1	1.3
Benzo(a)pyrene	1	1.1	22	1.5
Benzo(b)fluoranthene	1	11	1.7	2.8
Benzo(k)fluoranthene	0.8	110	1.7	1
Chrysene	1	110	1	1.8
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.1
PCBs:				
Total PCBs	0.1	25	3.2	1.42
Metals:				
Aluminum	10000	--	--	18600
Calcium	10000	--	--	82000
Chromium	30	6800	--	91.6
Copper	50	10000	1720	60.1
Iron	2000	--	--	39900
Mercury	0.18	5.7	0.73	0.23
Nickel	30	10000	130	36.7

AOC-08-N-TT-47 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	17300
Calcium	10000	--	--	57200
Iron	2000	--	--	22300

AOC-08-S-TT-18 (4' - 4.5')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	17
Metals:				
Calcium	10000	--	--	194000
Iron	2000	--	--	10400

AOC-08-MW-18I (12' - 14')	CRIT 1	CRIT 2	CRIT 3	09/16
Metals:				
Aluminum	10000	--	--	15600
Calcium	10000	--	--	47700
Iron	2000	--	--	21100

AOC-08-S-TT-60 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	10/16
SVOCs:				
Benzo(a)anthracene	1	11	1	5.8
Benzo(a)pyrene	1	1.1	22	4.5
Benzo(b)fluoranthene	1	11	1.7	5.9
Benzo(k)fluoranthene	0.8	110	1.7	3.2
Chrysene	1	110	1	5.6
Dibenz(a,h)anthracene	0.33	1.1	1000	0.85
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	2.6
PCBs:				
Total PCBs	0.1	25	3.2	1.02
Metals:				
Aluminum	10000	--	--	17200
Calcium	10000	--	--	52400
Chromium	30	6800	--	33.2
Iron	2000	--	--	22100
Nickel	30	10000	130	30.6

AOC-08-SB-14 (3' - 3.6')	CRIT 1	CRIT 2	CRIT 3	09/16
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.1
PCBs:				
Total PCBs	0.1	25	3.2	0.27
Metals:				
Aluminum	10000	--	--	16900
Calcium	10000	--	--	150000
Iron	2000	--	--	12300

AOC-08-MW-07I (15' - 17')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	13200
Iron	2000	--	--	30000

AOC-08-MW-07I (19' - 21')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	10600
Calcium	10000	--	--	51300
Iron	2000	--	--	15900

AOC-08-MW-07S (8' - 10')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	1.5
Metals:				
Aluminum	10000	--	--	10600
Calcium	10000	--	--	87100
Iron	2000	--	--	15400

AOC-08-GP-01 (0.5' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.43
Metals:				
Aluminum	10000	--	--	11400
Calcium	10000	--	--	76700
Chromium	30	6800	--	33.4
Iron	2000	--	--	21300
Zinc	109	10000	2480	127

AOC-08-GP-01 (3' - 3.5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.3
Benzo(a)pyrene	1	1.1	22	1.5
Benzo(b)fluoranthene	1	11	1.7	2.4
Benzo(k)fluoranthene	0.8	110	1.7	1
Chrysene	1	110	1	1.8
PCBs:				
Total PCBs	0.1	25	3.2	0.49
Metals:				
Aluminum	10000	--	--	12600
Calcium	10000	--	--	81600
Chromium	30	6800	--	42.2
Iron	2000	--	--	21800

AOC-08-SB-16 (2.8' - 4')	CRIT 1	CRIT 2	CRIT 3	09/16
Metals:				
Aluminum	10000	--	--	21000
Arsenic	13	16	16	20
Calcium	10000	--	--	112000
Iron	2000	--	--	12100

AOC-08-SB-16 (6' - 8')	CRIT 1	CRIT 2	CRIT 3	09/16
Metals:				
Aluminum	10000	--	--	16300
Calcium	10000	--	--	57800
Iron	2000	--	--	21300

AOC-08-N-TT-80 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	0.22
Metals:				
Aluminum	10000	--	--	17600
Calcium	10000	--	--	52300
Iron	2000	--	--	22500

AOC-08-SB-15 (0.8' - 1.7')	CRIT 1	CRIT 2	CRIT 3	09/16
Metals:				
Calcium	10000	--	--	199000
Iron	2000	--	--	7310

AOC-08-SB-15 (2' - 4')	CRIT 1	CRIT 2	CRIT 3	09/16
PCBs:				
Total PCBs	0.1	25	3.2	0.19
Metals:				
Aluminum	10000	--	--	25900
Calcium	10000	--	--	47300
Chromium	30	6800	--	31.2
Iron	2000	--	--	28100
Nickel	30	10000	130	32.4
Vanadium	39	--	--	46

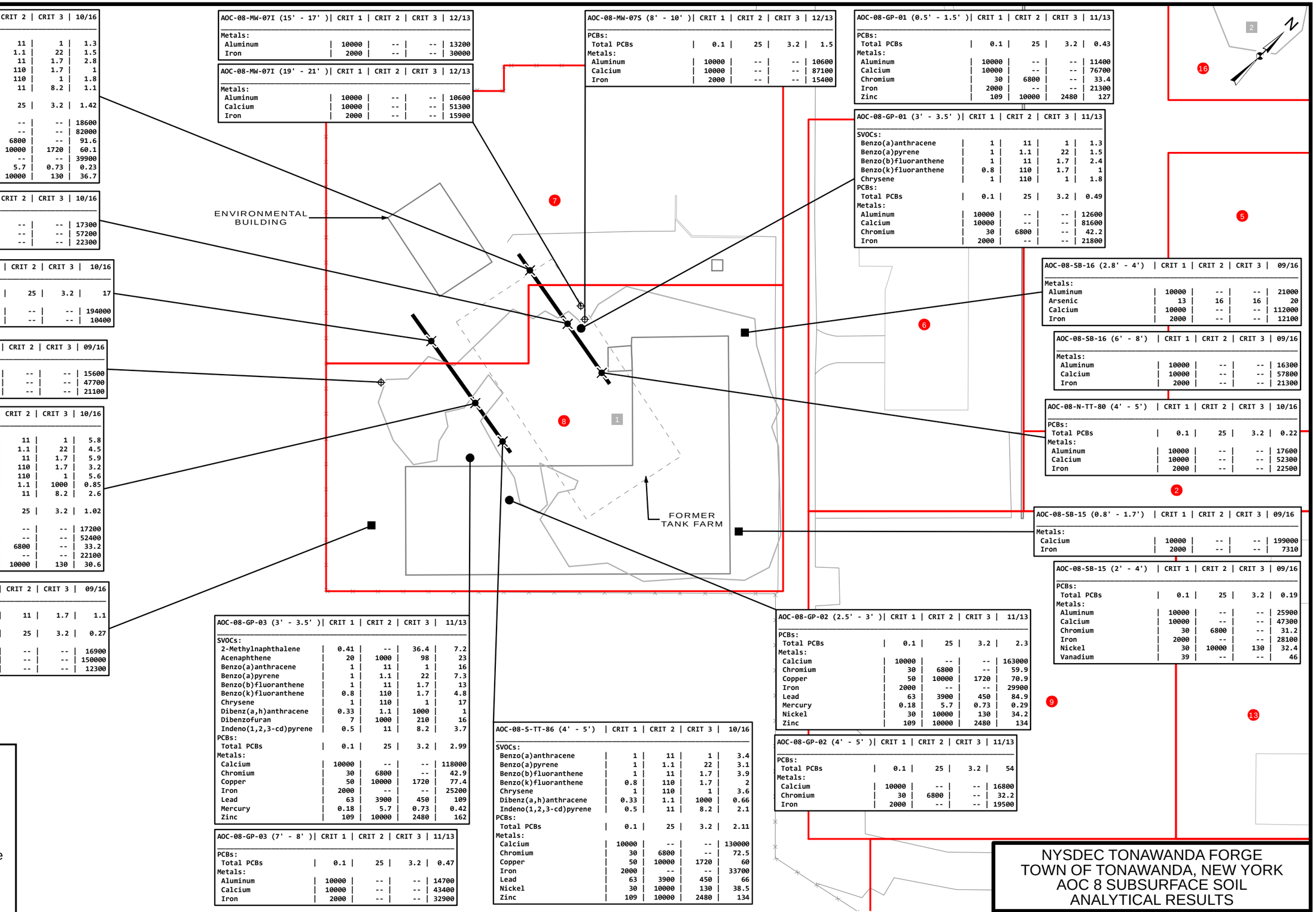
AOC-08-GP-03 (3' - 3.5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	7.2
Acenaphthene	20	1000	98	23
Benzo(a)anthracene	1	11	1	16
Benzo(a)pyrene	1	1.1	22	7.3
Benzo(b)fluoranthene	1	11	1.7	13
Benzo(k)fluoranthene	0.8	110	1.7	4.8
Chrysene	1	110	1	17
Dibenz(a,h)anthracene	0.33	1.1	1000	1
Dibenzofuran	7	1000	210	16
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	3.7
PCBs:				
Total PCBs	0.1	25	3.2	2.99
Metals:				
Calcium	10000	--	--	118000
Chromium	30	6800	--	42.9
Copper	50	10000	1720	77.4
Iron	2000	--	--	25200
Lead	63	3900	450	109
Mercury	0.18	5.7	0.73	0.42
Zinc	109	10000	2480	162

AOC-08-GP-03 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.47
Metals:				
Aluminum	10000	--	--	14700
Calcium	10000	--	--	43400
Iron	2000	--	--	32900

AOC-08-S-TT-86 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	10/16
SVOCs:				
Benzo(a)anthracene	1	11	1	3.4
Benzo(a)pyrene	1	1.1	22	3.1
Benzo(b)fluoranthene	1	11	1.7	3.9
Benzo(k)fluoranthene	0.8	110	1.7	2
Chrysene	1	110	1	3.6
Dibenz(a,h)anthracene	0.33	1.1	1000	0.66
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	2.1
PCBs:				
Total PCBs	0.1	25	3.2	2.11
Metals:				
Calcium	10000	--	--	130000
Chromium	30	6800	--	72.5
Copper	50	10000	1720	60
Iron	2000	--	--	33700
Lead	63	3900	450	66
Nickel	30	10000	130	38.5
Zinc	109	10000	2480	134

AOC-08-GP-02 (2.5' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	2.3
Metals:				
Calcium	10000	--	--	163000
Chromium	30	6800	--	59.9
Copper	50	10000	1720	70.9
Iron	2000	--	--	29900
Lead	63	3900	450	84.9
Mercury	0.18	5.7	0.73	0.29
Nickel	30	10000	130	34.2
Zinc	109	10000	2480	134

AOC-08-GP-02 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	54
Metals:				
Calcium	10000	--	--	16800
Chromium	30	6800	--	32.2
Iron	2000	--	--	19500



Legend

- Monitoring Well
- Geoprobe
- Soil Boring
- Test Trench Sample
- Test Pit
- 1 Area of Concern
- 1 Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 8 SUBSURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6I

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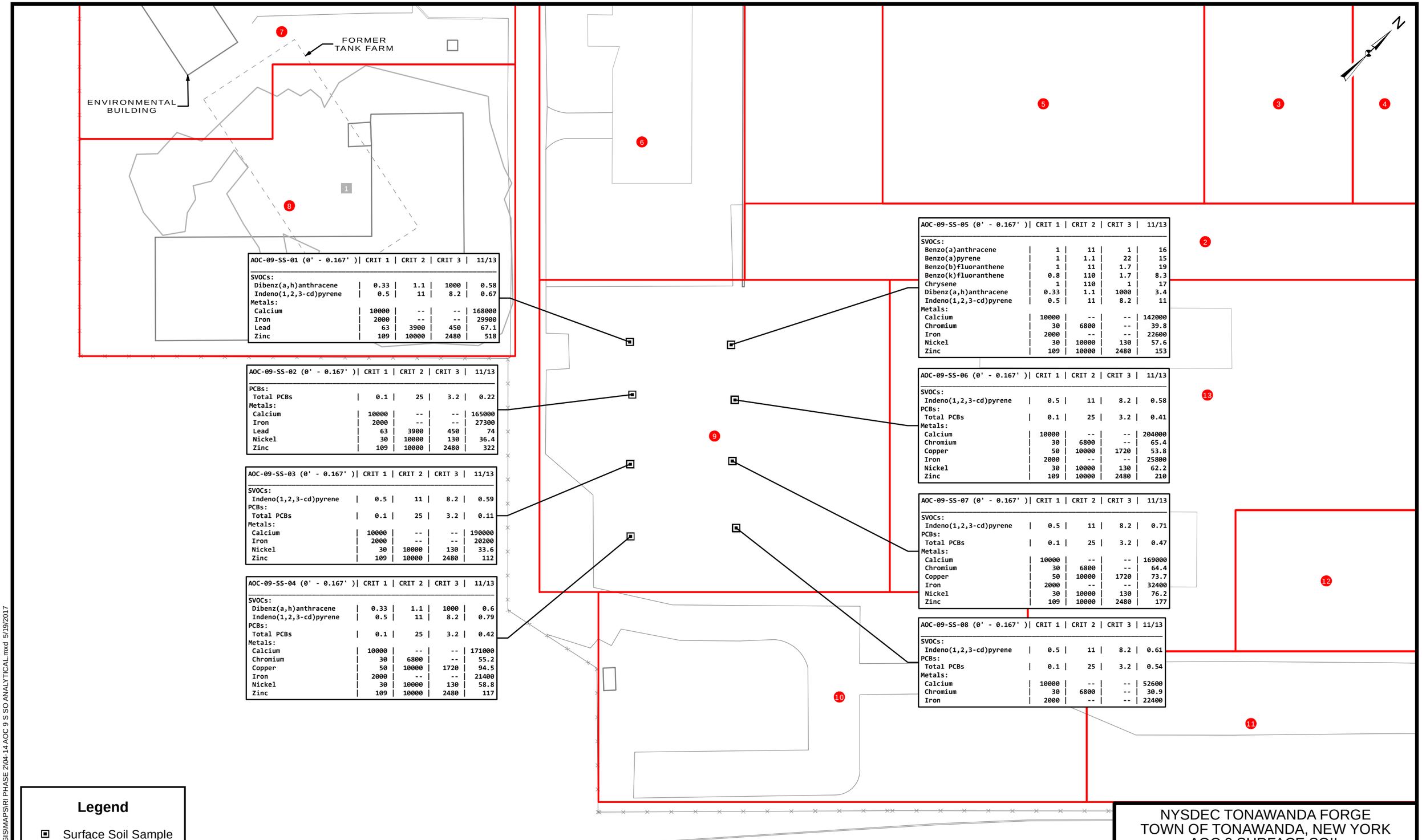

AOC-09-SS-01 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Dibenz(a,h)anthracene	0.33	1.1	1000	0.58
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.67
Metals:				
Calcium	10000	--	--	168000
Iron	2000	--	--	29900
Lead	63	3900	450	67.1
Zinc	109	10000	2480	518

AOC-09-SS-02 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.22
Metals:				
Calcium	10000	--	--	165000
Iron	2000	--	--	27300
Lead	63	3900	450	74
Nickel	30	10000	130	36.4
Zinc	109	10000	2480	322

AOC-09-SS-03 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.59
PCBs:				
Total PCBs	0.1	25	3.2	0.11
Metals:				
Calcium	10000	--	--	190000
Iron	2000	--	--	20200
Nickel	30	10000	130	33.6
Zinc	109	10000	2480	112

AOC-09-SS-04 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Dibenz(a,h)anthracene	0.33	1.1	1000	0.6
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.79
PCBs:				
Total PCBs	0.1	25	3.2	0.42
Metals:				
Calcium	10000	--	--	171000
Chromium	30	6800	--	55.2
Copper	50	10000	1720	94.5
Iron	2000	--	--	21400
Nickel	30	10000	130	58.8
Zinc	109	10000	2480	117

AOC-09-SS-05 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	16
Benzo(a)pyrene	1	1.1	22	15
Benzo(b)fluoranthene	1	11	1.7	19
Benzo(k)fluoranthene	0.8	110	1.7	8.3
Chrysene	1	110	1	17
Dibenz(a,h)anthracene	0.33	1.1	1000	3.4
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	11
Metals:				
Calcium	10000	--	--	142000
Chromium	30	6800	--	39.8
Iron	2000	--	--	22600
Nickel	30	10000	130	57.6
Zinc	109	10000	2480	153

AOC-09-SS-06 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.58
PCBs:				
Total PCBs	0.1	25	3.2	0.41
Metals:				
Calcium	10000	--	--	204000
Chromium	30	6800	--	65.4
Copper	50	10000	1720	53.8
Iron	2000	--	--	25800
Nickel	30	10000	130	62.2
Zinc	109	10000	2480	210

AOC-09-SS-07 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.71
PCBs:				
Total PCBs	0.1	25	3.2	0.47
Metals:				
Calcium	10000	--	--	169000
Chromium	30	6800	--	64.4
Copper	50	10000	1720	73.7
Iron	2000	--	--	32400
Nickel	30	10000	130	76.2
Zinc	109	10000	2480	177

AOC-09-SS-08 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.61
PCBs:				
Total PCBs	0.1	25	3.2	0.54
Metals:				
Calcium	10000	--	--	52600
Chromium	30	6800	--	30.9
Iron	2000	--	--	22400

Legend

- Surface Soil Sample
- 1 Area of Concern
- 1 Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 9 SURFACE SOIL
ANALYTICAL RESULTS

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FIGURE 6J

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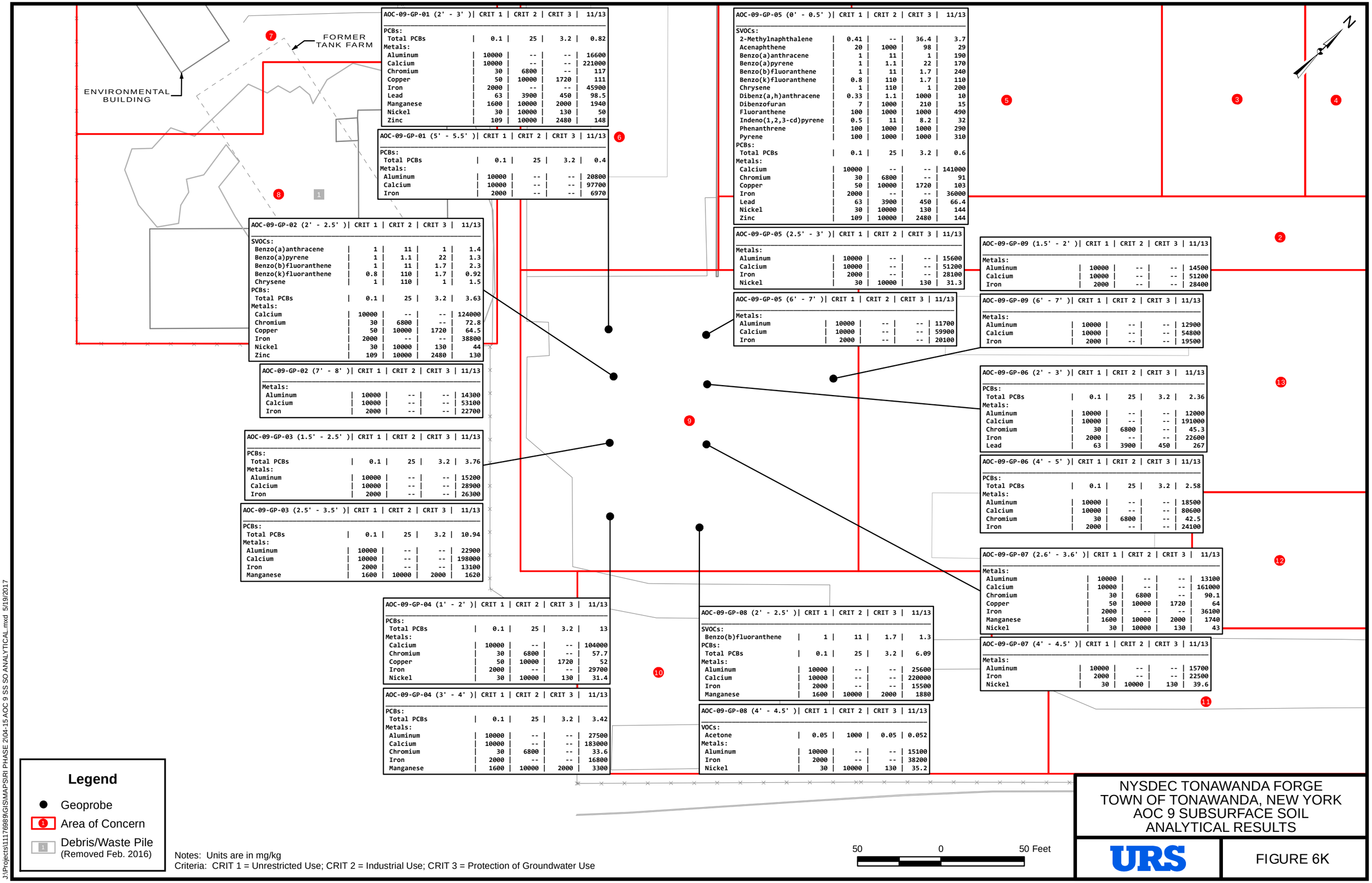

AOC-09-GP-01 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.82
Metals:				
Aluminum	10000	--	--	16600
Calcium	10000	--	--	221000
Chromium	30	6800	--	117
Copper	50	10000	1720	111
Iron	2000	--	--	45900
Lead	63	3900	450	98.5
Manganese	1600	10000	2000	1940
Nickel	30	10000	130	50
Zinc	109	10000	2480	148

AOC-09-GP-01 (5' - 5.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.4
Metals:				
Aluminum	10000	--	--	20800
Calcium	10000	--	--	97700
Iron	2000	--	--	6970

AOC-09-GP-02 (2' - 2.5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.4
Benzo(a)pyrene	1	1.1	22	1.3
Benzo(b)fluoranthene	1	11	1.7	2.3
Benzo(k)fluoranthene	0.8	110	1.7	0.92
Chrysene	1	110	1	1.5
PCBs:				
Total PCBs	0.1	25	3.2	3.63
Metals:				
Calcium	10000	--	--	124000
Chromium	30	6800	--	72.8
Copper	50	10000	1720	64.5
Iron	2000	--	--	38800
Nickel	30	10000	130	44
Zinc	109	10000	2480	130

AOC-09-GP-02 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	14300
Calcium	10000	--	--	53100
Iron	2000	--	--	22700

AOC-09-GP-03 (1.5' - 2.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.76
Metals:				
Aluminum	10000	--	--	15200
Calcium	10000	--	--	28900
Iron	2000	--	--	26300

AOC-09-GP-03 (2.5' - 3.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	10.94
Metals:				
Aluminum	10000	--	--	22900
Calcium	10000	--	--	198000
Iron	2000	--	--	13100
Manganese	1600	10000	2000	1620

AOC-09-GP-04 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	13
Metals:				
Calcium	10000	--	--	104000
Chromium	30	6800	--	57.7
Copper	50	10000	1720	52
Iron	2000	--	--	29700
Nickel	30	10000	130	31.4

AOC-09-GP-04 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.42
Metals:				
Aluminum	10000	--	--	27500
Calcium	10000	--	--	183000
Chromium	30	6800	--	33.6
Iron	2000	--	--	16800
Manganese	1600	10000	2000	3300

AOC-09-GP-05 (0' - 0.5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	3.7
Acenaphthene	20	1000	98	29
Benzo(a)anthracene	1	11	1	190
Benzo(a)pyrene	1	1.1	22	170
Benzo(b)fluoranthene	1	11	1.7	240
Benzo(k)fluoranthene	0.8	110	1.7	110
Chrysene	1	110	1	200
Dibenz(a,h)anthracene	0.33	1.1	1000	10
Dibenzofuran	7	1000	210	15
Fluoranthene	100	1000	1000	490
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	32
Phenanthrene	100	1000	1000	290
Pyrene	100	1000	1000	310
PCBs:				
Total PCBs	0.1	25	3.2	0.6
Metals:				
Calcium	10000	--	--	141000
Chromium	30	6800	--	91
Copper	50	10000	1720	103
Iron	2000	--	--	36000
Lead	63	3900	450	66.4
Nickel	30	10000	130	144
Zinc	109	10000	2480	144

AOC-09-GP-05 (2.5' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	15600
Calcium	10000	--	--	51200
Iron	2000	--	--	28100
Nickel	30	10000	130	31.3

AOC-09-GP-05 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11700
Calcium	10000	--	--	59900
Iron	2000	--	--	20100

AOC-09-GP-08 (2' - 2.5')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.3
PCBs:				
Total PCBs	0.1	25	3.2	6.09
Metals:				
Aluminum	10000	--	--	25600
Calcium	10000	--	--	220000
Iron	2000	--	--	15500
Manganese	1600	10000	2000	1880

AOC-09-GP-08 (4' - 4.5')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.052
Metals:				
Aluminum	10000	--	--	15100
Iron	2000	--	--	38200
Nickel	30	10000	130	35.2

AOC-09-GP-09 (1.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	14500
Calcium	10000	--	--	51200
Iron	2000	--	--	28400

AOC-09-GP-09 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	12900
Calcium	10000	--	--	54800
Iron	2000	--	--	19500

AOC-09-GP-06 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	2.36
Metals:				
Aluminum	10000	--	--	12000
Calcium	10000	--	--	191000
Chromium	30	6800	--	45.3
Iron	2000	--	--	22600
Lead	63	3900	450	267

AOC-09-GP-06 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	2.58
Metals:				
Aluminum	10000	--	--	18500
Calcium	10000	--	--	80600
Chromium	30	6800	--	42.5
Iron	2000	--	--	24100

AOC-09-GP-07 (2.6' - 3.6')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	13100
Calcium	10000	--	--	161000
Chromium	30	6800	--	90.1
Copper	50	10000	1720	64
Iron	2000	--	--	36100
Manganese	1600	10000	2000	1740
Nickel	30	10000	130	43

AOC-09-GP-07 (4' - 4.5')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	15700
Iron	2000	--	--	22500
Nickel	30	10000	130	39.6

Legend

- Geoprobe
- 1 Area of Concern
- 1 Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
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AOC 9 SUBSURFACE SOIL ANALYTICAL RESULTS

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FIGURE 6K

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-15 AOC 9 SS SO ANALYTICAL.mxd 5/19/2017

AOC-10-SS-01 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Dibenz(a,h)anthracene	0.33	1.1	1000	0.65
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.86
PCBs:				
Total PCBs	0.1	25	3.2	1.4
Metals:				
Aluminum	10000	--	--	10900
Calcium	10000	--	--	150000
Chromium	30	6800	--	56.1
Copper	50	10000	1720	103
Iron	2000	--	--	27500
Nickel	30	10000	130	45.3
Zinc	109	10000	2480	460

AOC-10-SS-03 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Dibenz(a,h)anthracene	0.33	1.1	1000	0.56
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.51
PCBs:				
Total PCBs	0.1	25	3.2	1
Metals:				
Calcium	10000	--	--	177000
Chromium	30	6800	--	34
Iron	2000	--	--	19500
Nickel	30	10000	130	54.7
Zinc	109	10000	2480	570

AOC-10-SS-02 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.6
PCBs:				
Total PCBs	0.1	25	3.2	1.6
Metals:				
Calcium	10000	--	--	176000
Iron	2000	--	--	15400
Nickel	30	10000	130	42.2
Zinc	109	10000	2480	129

UAW-GM BLVD

Legend

- Surface Soil Sample
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 10 SURFACE SOIL
ANALYTICAL RESULTS

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FIGURE 6L

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-16 AOC 10 S SO ANALYTICAL.mxd 5/19/2017

AOC-10-SB-08 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.2
Benzo(b)fluoranthene	1	11	1.7	1.3
Chrysene	1	110	1	1.3
PCBs:				
Total PCBs	0.1	25	3.2	0.23
Metals:				
Calcium	10000	--	--	135000
Iron	2000	--	--	12000

AOC-10-SB-08 (5' - 6')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.3
Benzo(a)pyrene	1	1.1	22	1.1
Benzo(b)fluoranthene	1	11	1.7	1.8
Benzo(k)fluoranthene	0.8	110	1.7	0.81
Chrysene	1	110	1	1.5
Metals:				
Calcium	10000	--	--	142000
Iron	2000	--	--	10100

AOC-10-SB-09 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	164000
Chromium	30	6800	--	35.8
Copper	50	10000	1720	52.1
Iron	2000	--	--	17200
Nickel	30	10000	130	41.2
Zinc	109	10000	2480	130

AOC-10-SB-11 (10' - 12')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	12200
Calcium	10000	--	--	56900
Iron	2000	--	--	21300

AOC-10-SB-10 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	0.37
Metals:				
Calcium	10000	--	--	173000
Iron	2000	--	--	6980
Zinc	109	10000	2480	313

AOC-10-SB-12 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
VOCs:				
Acetone	0.05	1000	0.05	0.17
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	1
Metals:				
Arsenic	13	16	16	14.2
Calcium	10000	--	--	10600
Chromium	30	6800	--	55.8
Copper	50	10000	1720	88.2
Iron	2000	--	--	40200
Nickel	30	10000	130	34.8

AOC-10-SB-01 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	48
Metals:				
Calcium	10000	--	--	121000
Chromium	30	6800	--	32
Iron	2000	--	--	16700

AOC-10-SB-01 (2' - 2.5')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.2
Metals:				
Aluminum	10000	--	--	18200
Iron	2000	--	--	30200

AOC-10-SB-02 (0.5' - 1')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.4
Chrysene	1	110	1	1.1
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.67
PCBs:				
Total PCBs	0.1	25	3.2	9.6
Metals:				
Calcium	10000	--	--	152000
Chromium	30	6800	--	36.5
Iron	2000	--	--	18900
Zinc	109	10000	2480	119

AOC-10-SB-02 (2.5' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
VOCs:				
Acetone	0.05	1000	0.05	0.06
Metals:				
Aluminum	10000	--	--	11300
Iron	2000	--	--	20500

AOC-10-GP-02 (2.5' - 3.1')	CRIT 1	CRIT 2	CRIT 3	10/16
VOCs:				
Acetone	0.05	1000	0.05	0.2
Metals:				
Aluminum	10000	--	--	26200
Iron	2000	--	--	23500
Vanadium	39	--	--	44.4

AOC-10-MW-08I (3' - 4')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	2.3
Benzo(a)pyrene	1	1.1	22	1.5
Benzo(b)fluoranthene	1	11	1.7	2.5
Benzo(k)fluoranthene	0.8	110	1.7	1.4
Chrysene	1	110	1	2.5
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.7
PCBs:				
Total PCBs	0.1	25	3.2	0.21
Metals:				
Calcium	10000	--	--	169000
Iron	2000	--	--	9020

AOC-10-MW-08I (5' - 6')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	12600
Calcium	10000	--	--	72000
Iron	2000	--	--	19100

AOC-10-GP-01 (2.4' - 3.4')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	203000
Iron	2000	--	--	7380

AOC-10-SB-03 (1.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	6.21
Metals:				
Calcium	10000	--	--	180000
Chromium	30	6800	--	40.3
Iron	2000	--	--	17900
Nickel	30	10000	130	38.7

AOC-10-SB-03 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	13300
Calcium	10000	--	--	46400
Iron	2000	--	--	21200

AOC-10-SB-05 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	2.5
Metals:				
Aluminum	10000	--	--	18600
Iron	2000	--	--	39200
Nickel	30	10000	130	37.8

AOC-10-SB-07 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	15000
Calcium	10000	--	--	53500
Iron	2000	--	--	20600

AOC-10-SB-04 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Benzo(a)pyrene	1	1.1	22	1.3
Benzo(b)fluoranthene	1	11	1.7	2
Chrysene	1	110	1	1.1
Dibenz(a,h)anthracene	0.33	1.1	1000	0.38
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.4
PCBs:				
Total PCBs	0.1	25	3.2	3.1
Metals:				
Aluminum	10000	--	--	32200
Calcium	10000	--	--	166000
Chromium	30	6800	--	55.4
Iron	2000	--	--	42100
Manganese	1600	10000	2000	2990

AOC-10-SB-04 (8' - 10')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	12700
Calcium	10000	--	--	65800
Iron	2000	--	--	25200

AOC-10-SB-06 (2' - 4')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	0.82
Metals:				
Aluminum	10000	--	--	19400
Calcium	10000	--	--	20000
Iron	2000	--	--	21500
Nickel	30	10000	130	36.1
Zinc	109	10000	2480	219

AOC-10-SB-14 (4' - 6')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	1
Metals:				
Calcium	10000	--	--	145000
Iron	2000	--	--	9190
Nickel	30	10000	130	38.3

AOC-10-SB-14 (8' - 10')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	0.18
Metals:				
Aluminum	10000	--	--	13600
Calcium	10000	--	--	56500
Iron	2000	--	--	20900

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AOC-10-SB-13 (2' - 4')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.2
Chrysene	1	110	1	1.2
PCBs:				
Total PCBs	0.1	25	3.2	0.28
Metals:				
Calcium	10000	--	--	125000
Iron	2000	--	--	13000
Lead	63	3900	450	65.6

AOC-10-SB-13 (10' - 11')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	12400
Calcium	10000	--	--	56000
Iron	2000	--	--	20300

AOC-10-SB-15 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Benzo(a)anthracene	1	11	1	5.4
Benzo(a)pyrene	1	1.1	22	4.9
Benzo(b)fluoranthene	1	11	1.7	7.9
Benzo(k)fluoranthene	0.8	110	1.7	4.1
Chrysene	1	110	1	5.7
Dibenz(a,h)anthracene	0.33	1.1	1000	0.52
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.6
PCBs:				
Total PCBs	0.1	25	3.2	11
Metals:				
Calcium	10000	--	--	133000
Iron	2000	--	--	10500

Legend

- Geoprobe
- Monitoring Well
- Soil Boring
- 1 Area of Concern
- 1 Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 10 SUBSURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6M

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AOC-11-SS-05 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Dibenz(a,h)anthracene	0.33	1.1	1000	0.56
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.64
PCBs:				
Total PCBs	0.1	25	3.2	0.26
Metals:				
Calcium	10000	--	--	200000
Chromium	30	6800	--	30.3
Iron	2000	--	--	17400
Nickel	30	10000	130	44.9

AOC-11-SS-07 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.57
Metals:				
Calcium	10000	--	--	196000
Chromium	30	6800	--	44.5
Iron	2000	--	--	25900
Nickel	30	10000	130	46.7

AOC-11-SS-03 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.49
Metals:				
Calcium	10000	--	--	249000
Iron	2000	--	--	16800
Nickel	30	10000	130	61

AOC-11-SS-01 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.31
Metals:				
Calcium	10000	--	--	146000
Iron	2000	--	--	11600
Nickel	30	10000	130	48.6

AOC-11-SS-08 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.62
Metals:				
Calcium	10000	--	--	178000
Chromium	30	6800	--	31.9
Copper	50	10000	1720	50.6
Iron	2000	--	--	23200
Nickel	30	10000	130	50.4

AOC-11-SS-06 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Dibenz(a,h)anthracene	0.33	1.1	1000	0.58
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.67
PCBs:				
Total PCBs	0.1	25	3.2	0.35
Metals:				
Calcium	10000	--	--	147000
Chromium	30	6800	--	44.4
Copper	50	10000	1720	57.5
Iron	2000	--	--	32200
Nickel	30	10000	130	98.8
Zinc	109	10000	2480	184

AOC-11-SS-04 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.5
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.76
PCBs:				
Total PCBs	0.1	25	3.2	5.5
Metals:				
Cadmium	2.5	60	7.5	9.3
Calcium	10000	--	--	276000
Chromium	30	6800	--	36.2
Copper	50	10000	1720	61.1
Iron	2000	--	--	28600
Nickel	30	10000	130	73.2
Zinc	109	10000	2480	1600

AOC-11-SS-02 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Cadmium	2.5	60	7.5	15.3
Calcium	10000	--	--	174000
Chromium	30	6800	--	37.8
Copper	50	10000	1720	53.7
Iron	2000	--	--	33100
Nickel	30	10000	130	314
Zinc	109	10000	2480	3640

NET SHAPE GEAR WAREHOUSE

UAW-GM BLVD

Legend

- Surface Soil Sample
- Area of Concern

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 11 SURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6N

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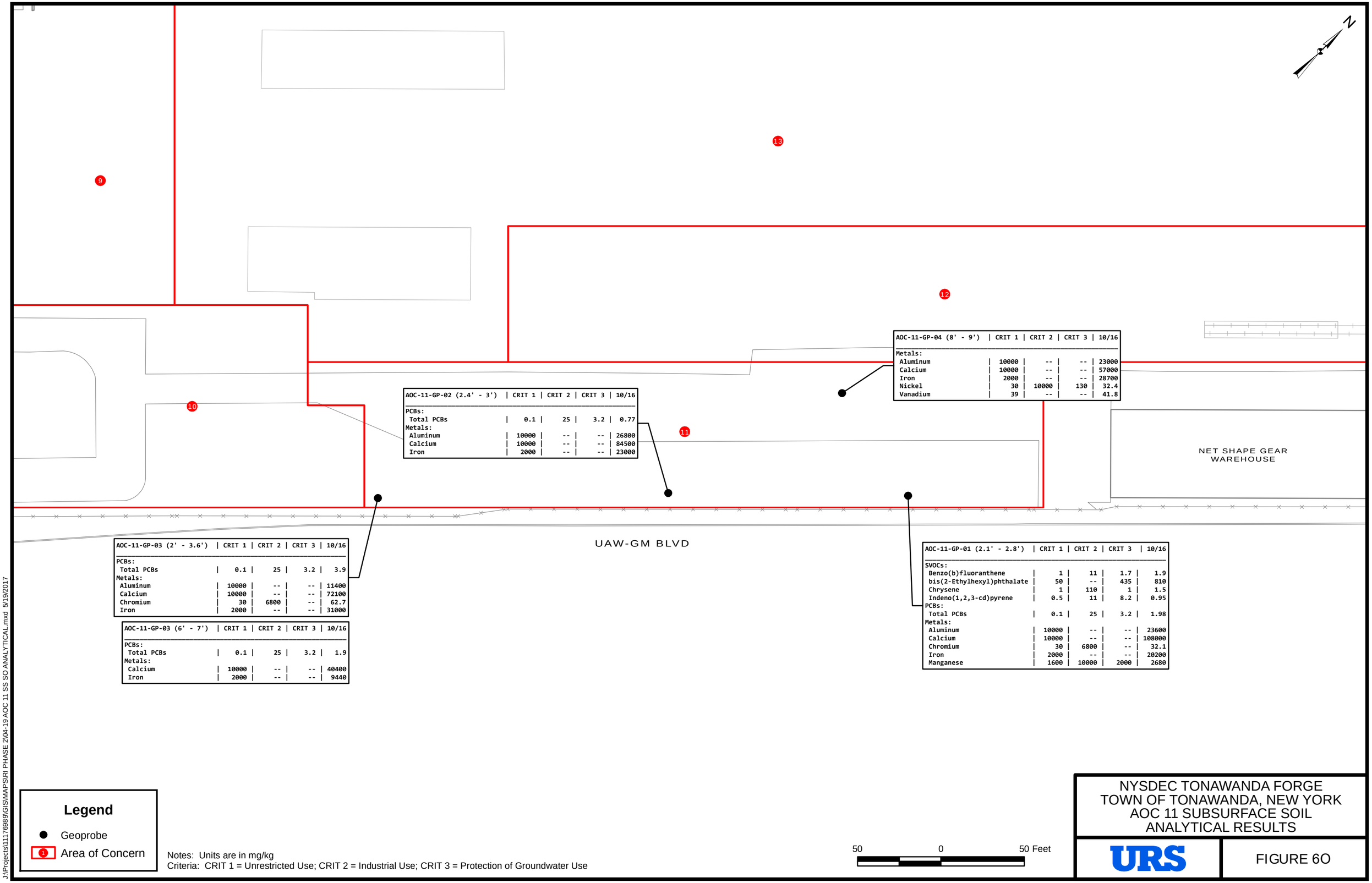

AOC-11-GP-02 (2.4' - 3')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	0.77
Metals:				
Aluminum	10000	--	--	26800
Calcium	10000	--	--	84500
Iron	2000	--	--	23000

AOC-11-GP-04 (8' - 9')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	23000
Calcium	10000	--	--	57000
Iron	2000	--	--	28700
Nickel	30	10000	130	32.4
Vanadium	39	--	--	41.8

AOC-11-GP-03 (2' - 3.6')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	3.9
Metals:				
Aluminum	10000	--	--	11400
Calcium	10000	--	--	72100
Chromium	30	6800	--	62.7
Iron	2000	--	--	31000

AOC-11-GP-03 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	1.9
Metals:				
Calcium	10000	--	--	40400
Iron	2000	--	--	9440

AOC-11-GP-01 (2.1' - 2.8')	CRIT 1	CRIT 2	CRIT 3	10/16
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.9
bis(2-Ethylhexyl)phthalate	50	--	435	810
Chrysene	1	110	1	1.5
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.95
PCBs:				
Total PCBs	0.1	25	3.2	1.98
Metals:				
Aluminum	10000	--	--	23600
Calcium	10000	--	--	108000
Chromium	30	6800	--	32.1
Iron	2000	--	--	20200
Manganese	1600	10000	2000	2680

Legend

- Geoprobe
- 1 Area of Concern

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 11 SUBSURFACE SOIL ANALYTICAL RESULTS

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FIGURE 6O

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5 3 4 14 15 2 13 12 11 10

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AOC-12-SS-07 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	0.88
Benzo(a)anthracene	1	11	1	9.6
Benzo(a)pyrene	1	1.1	22	7.8
Benzo(b)fluoranthene	1	11	1.7	9.9
Benzo(k)fluoranthene	0.8	110	1.7	4.2
Chrysene	1	110	1	9.3
Dibenz(a,h)anthracene	0.33	1.1	1000	1.9
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	6.7
PCBs:				
Total PCBs	0.1	25	3.2	13.4
Metals:				
Arsenic	13	16	16	27
Calcium	10000	--	--	50000
Chromium	30	6800	--	76.6
Copper	50	10000	1720	133
Iron	2000	--	--	48800
Lead	63	3900	450	145
Nickel	30	10000	130	169
Selenium	3.9	6800	4	11.3
Thallium	5	--	--	8.8
Zinc	109	10000	2480	273

AOC-12-SS-05 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	2.4
Benzo(a)anthracene	1	11	1	42
Benzo(a)pyrene	1	1.1	22	28
Benzo(b)fluoranthene	1	11	1.7	47
Benzo(k)fluoranthene	0.8	110	1.7	15
Chrysene	1	110	1	44
Dibenz(a,h)anthracene	0.33	1.1	1000	7.1
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	27
PCBs:				
Total PCBs	0.1	25	3.2	167
Metals:				
Cadmium	2.5	60	7.5	2.7
Calcium	10000	--	--	93900
Chromium	30	6800	--	200
Copper	50	10000	1720	513
Iron	2000	--	--	109000
Lead	63	3900	450	324
Nickel	30	10000	130	257
Zinc	109	10000	2480	549

AOC-12-SS-03 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	0.54
Benzo(a)anthracene	1	11	1	9.2
Benzo(a)pyrene	1	1.1	22	7.9
Benzo(b)fluoranthene	1	11	1.7	11
Benzo(k)fluoranthene	0.8	110	1.7	4
Chrysene	1	110	1	8.9
Dibenz(a,h)anthracene	0.33	1.1	1000	1.8
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	6.8
PCBs:				
Total PCBs	0.1	25	3.2	4.17
Metals:				
Calcium	10000	--	--	127000
Chromium	30	6800	--	105
Copper	50	10000	1720	419
Iron	2000	--	--	55000
Lead	63	3900	450	115
Nickel	30	10000	130	196
Zinc	109	10000	2480	310

AOC-12-SS-01 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	1.1
Benzo(a)anthracene	1	11	1	16
Benzo(a)pyrene	1	1.1	22	13
Benzo(b)fluoranthene	1	11	1.7	16
Benzo(k)fluoranthene	0.8	110	1.7	7.9
Chrysene	1	110	1	15
Dibenz(a,h)anthracene	0.33	1.1	1000	2.9
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	11
PCBs:				
Total PCBs	0.1	25	3.2	6.42
Metals:				
Calcium	10000	--	--	141000
Chromium	30	6800	--	74.5
Copper	50	10000	1720	1150
Iron	2000	--	--	36600
Lead	63	3900	450	214
Nickel	30	10000	130	103
Zinc	109	10000	2480	534

AOC-12-SS-08 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	9.5
Benzo(a)pyrene	1	1.1	22	9.5
Benzo(b)fluoranthene	1	11	1.7	15
Benzo(k)fluoranthene	0.8	110	1.7	5
Chrysene	1	110	1	9.6
Dibenz(a,h)anthracene	0.33	1.1	1000	2.4
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	9.3
PCBs:				
Total PCBs	0.1	25	3.2	7.97
Metals:				
Aluminum	10000	--	--	27300
Calcium	10000	--	--	192000
Chromium	30	6800	--	50.7
Copper	50	10000	1720	223
Iron	2000	--	--	32900
Lead	63	3900	450	159
Manganese	1600	10000	2000	1790
Nickel	30	10000	130	69.7
Selenium	3.9	6800	4	5.2
Silver	2	6800	8.3	2.5
Zinc	109	10000	2480	165

AOC-12-SS-02 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	1.9
Benzo(a)anthracene	1	11	1	25
Benzo(a)pyrene	1	1.1	22	20
Benzo(b)fluoranthene	1	11	1.7	26
Benzo(k)fluoranthene	0.8	110	1.7	11
Chrysene	1	110	1	26
Dibenz(a,h)anthracene	0.33	1.1	1000	5.2
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	19
PCBs:				
Total PCBs	0.1	25	3.2	2.19
Metals:				
Aluminum	10000	--	--	11100
Calcium	10000	--	--	232000
Chromium	30	6800	--	66.1
Copper	50	10000	1720	1780
Iron	2000	--	--	24500
Lead	63	3900	450	316
Nickel	30	10000	130	58.9
Zinc	109	10000	2480	227

AOC-12-SS-06 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	6.3
Benzo(a)pyrene	1	1.1	22	6.6
Benzo(b)fluoranthene	1	11	1.7	9.7
Benzo(k)fluoranthene	0.8	110	1.7	3.6
Chrysene	1	110	1	7.2
Dibenz(a,h)anthracene	0.33	1.1	1000	1.8
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	7.3
PCBs:				
Total PCBs	0.1	25	3.2	18.1
Metals:				
Aluminum	10000	--	--	20300
Calcium	10000	--	--	142000
Chromium	30	6800	--	97.1
Copper	50	10000	1720	4560
Iron	2000	--	--	57000
Lead	63	3900	450	731
Mercury	0.18	5.7	0.73	0.21
Nickel	30	10000	130	120
Zinc	109	10000	2480	409

AOC-12-SS-04 (0' - 0.167')	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
Benzo(a)anthracene	1	11	1	1.5
Benzo(a)pyrene	1	1.1	22	1.4
Benzo(b)fluoranthene	1	11	1.7	1.9
Benzo(k)fluoranthene	0.8	110	1.7	0.83
Chrysene	1	110	1	1.6
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.3
PCBs:				
Total PCBs	0.1	25	3.2	4.64
Metals:				
Cadmium	2.5	60	7.5	29
Calcium	10000	--	--	137000
Chromium	30	6800	--	65
Copper	50	10000	1720	2610
Iron	2000	--	--	29900
Lead	63	3900	450	366
Nickel	30	10000	130	82.3
Zinc	109	10000	2480	265

Legend

- Surface Soil Sample
- 1 Area of Concern

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 12 SURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6P

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5 | 3 | 4 | 14 | 15

2 | 13 | 12 | 11 | 10

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NET SHAPE GEAR WAREHOUSE

UAW-GM BLVD

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AOC-12-GP-04 (1' - 2')

	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.89
Metals:				
Calcium	10000	--	--	95600
Iron	2000	--	--	8560

AOC-12-GP-04 (6' - 6.5')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	13300
Calcium	10000	--	--	53000
Iron	2000	--	--	23400

AOC-12-MW-09I (2' - 3')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Calcium	10000	--	--	79800
Iron	2000	--	--	7640

AOC-12-MW-09I (4' - 5')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	14000
Calcium	10000	--	--	43700
Iron	2000	--	--	22000

AOC-12-GP-12 (4' - 5')

	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	146000
Iron	2000	--	--	5720

AOC-12-GP-07 (0.5' - 1')

	CRIT 1	CRIT 2	CRIT 3	11/13
SVOCs:				
2-Methylnaphthalene	0.41	--	36.4	2.5
Benzo(a)anthracene	1	11	1	30
Benzo(a)pyrene	1	1.1	22	23
Benzo(b)fluoranthene	1	11	1.7	35
Benzo(k)fluoranthene	0.8	110	1.7	14
Chrysene	1	110	1	29
Dibenz(a,h)anthracene	0.33	1.1	1000	2.2
Dibenzofuran	7	1000	210	7.6
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	7.2
PCBs:				
Total PCBs	0.1	25	3.2	150
Metals:				
Calcium	10000	--	--	111000
Chromium	30	6800	--	39.5
Copper	50	10000	1720	96.3
Iron	2000	--	--	26400
Lead	63	3900	450	310
Nickel	30	10000	130	59.7
Zinc	109	10000	2480	145

AOC-12-GP-11 (0' - 1.6')

	CRIT 1	CRIT 2	CRIT 3	10/16
SVOCs:				
Benzo(a)anthracene	1	11	1	7.8
Benzo(a)pyrene	1	1.1	22	6.3
Benzo(b)fluoranthene	1	11	1.7	8.4
Benzo(k)fluoranthene	0.8	110	1.7	3.9
Chrysene	1	110	1	7.5
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	3.6
PCBs:				
Total PCBs	0.1	25	3.2	7.7
Metals:				
Aluminum	10000	--	--	18500
Arsenic	13	16	16	14
Calcium	10000	--	--	102000
Chromium	30	6800	--	710
Copper	50	10000	1720	561
Iron	2000	--	--	131000
Lead	63	3900	450	182
Manganese	1600	10000	2000	3500
Mercury	0.18	5.7	0.73	0.24
Nickel	30	10000	130	157
Vanadium	39	--	--	63.3
Zinc	109	10000	2480	287

AOC-12-GP-01 (0.5' - 1')

	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	3.9
Metals:				
Calcium	10000	--	--	133000
Iron	2000	--	--	10700

AOC-12-GP-08 (1' - 1.5')

	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.39
Metals:				
Calcium	10000	--	--	83200
Iron	2000	--	--	9250

AOC-12-GP-08 (7' - 8')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	13900
Calcium	10000	--	--	63200
Iron	2000	--	--	25000

AOC-12-GP-02 (0.5' - 1')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Calcium	10000	--	--	170000
Iron	2000	--	--	6450

AOC-12-GP-02 (6' - 7')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	11400
Calcium	10000	--	--	46000
Iron	2000	--	--	20400

AOC-12-GP-03 (1' - 2')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Calcium	10000	--	--	122000
Iron	2000	--	--	6520

AOC-12-GP-09 (1' - 1.5')

	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	1.1
Metals:				
Calcium	10000	--	--	163000
Iron	2000	--	--	5480

AOC-12-GP-10 (1.8' - 2.4')

	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	169000
Iron	2000	--	--	11000

AOC-12-GP-09 (7' - 8')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	13800
Calcium	10000	--	--	55400
Iron	2000	--	--	21500

AOC-12-GP-06 (1' - 1.5')

	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.63
Metals:				
Calcium	10000	--	--	114000
Iron	2000	--	--	8250

AOC-12-GP-06 (7' - 8')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	14300
Calcium	10000	--	--	56400
Iron	2000	--	--	24600

AOC-12-GP-05 (1.5' - 2')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Calcium	10000	--	--	132000
Iron	2000	--	--	8380

AOC-12-GP-05 (7' - 8')

	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	14500
Calcium	10000	--	--	61800
Iron	2000	--	--	23700

Legend

- Monitoring Well
- Geoprobe
- 1 Area of Concern

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 12 SUBSURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6Q

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-21 AOC 12 SS SO ANALYTICAL.mxd 5/19/2017

AOC-13-GP-01 (1.1' - 1.7')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	114000
Iron	2000	--	--	8860

AOC-13-GP-02 (6' - 7.5')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	1.2
Metals:				
Calcium	10000	--	--	50300
Iron	2000	--	--	8090

AOC-13-MW-19I (2' - 3')	CRIT 1	CRIT 2	CRIT 3	09/16
SVOCs:				
4-Methylphenol (p-cresol)	0.33	1000	0.33	4.7
Phenol	0.33	1000	0.33	16
PCBs:				
Total PCBs	0.1	25	3.2	54
Metals:				
Calcium	10000	--	--	77300
Iron	2000	--	--	7850

AOC-13-SB-02 (1.7' - 2.2')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
4-Methylphenol (p-cresol)	0.33	1000	0.33	0.72
Metals:				
Calcium	10000	--	--	76400
Iron	2000	--	--	8180

AOC-13-SB-01 (4' - 4.5')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	0.5
Metals:				
Calcium	10000	--	--	140000
Iron	2000	--	--	8460

AOC-13-SB-01 (5' - 6')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	14200
Calcium	10000	--	--	55900
Iron	2000	--	--	24900
Nickel	30	10000	130	30.5

AOC-13-SB-04 (2.3' - 2.9')	CRIT 1	CRIT 2	CRIT 3	12/13
VOCs:				
Acetone	0.05	1000	0.05	0.063
PCBs:				
Total PCBs	0.1	25	3.2	0.72
Metals:				
Calcium	10000	--	--	28100
Copper	50	10000	1720	64.6
Iron	2000	--	--	47200
Nickel	30	10000	130	41.6
Zinc	109	10000	2480	145

AOC-13-MW-02D (26.5' - 27.1')	CRIT 1	CRIT 2	CRIT 3	09/16
VOCs:				
Acetone	0.05	1000	0.05	0.2
Methylene chloride	0.05	1000	0.05	0.051
Metals:				
Aluminum	10000	--	--	16500
Calcium	10000	--	--	53900
Iron	2000	--	--	21600

AOC-13-MW-02I (1.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/13
PCBs:				
Total PCBs	0.1	25	3.2	0.85
Metals:				
Calcium	10000	--	--	140000
Iron	2000	--	--	6040

AOC-13-MW-02I (7' - 8')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	10800
Barium	350	10000	820	557
Calcium	10000	--	--	52600
Iron	2000	--	--	17100

AOC-13-SB-06 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	19400
Calcium	10000	--	--	72300
Cobalt	20	--	--	20.9
Iron	2000	--	--	29900
Nickel	30	10000	130	35.6

AOC-13-SB-03 (1.3' - 1.6')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	0.29
Metals:				
Calcium	10000	--	--	72600
Iron	2000	--	--	5380

AOC-13-GP-03 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	108000
Iron	2000	--	--	6710

AOC-13-SB-05 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	135000
Iron	2000	--	--	6770

AOC-13-SB-05 (8.5' - 9.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	14000
Calcium	10000	--	--	62400
Iron	2000	--	--	21200

AOC-13-SB-08 (8' - 9')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	12700
Calcium	10000	--	--	62500
Iron	2000	--	--	20800

AOC-13-MW-20I (6' - 6.4')	CRIT 1	CRIT 2	CRIT 3	09/16
SVOCs:				
Benzo(a)anthracene	1	11	1	4.8
Benzo(a)pyrene	1	1.1	22	4.1
Benzo(b)fluoranthene	1	11	1.7	5.2
Benzo(k)fluoranthene	0.8	110	1.7	2.3
Chrysene	1	110	1	4.4
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	2.5
PCBs:				
Total PCBs	0.1	25	3.2	0.12
Metals:				
Aluminum	10000	--	--	12700
Calcium	10000	--	--	83800
Chromium	30	6800	--	39.2
Iron	2000	--	--	21600

AOC-13-GP-04 (6.4' - 7.4')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	99800
Iron	2000	--	--	6570

AOC-13-SB-07 (5' - 5.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	72600
Iron	2000	--	--	6060

AOC-13-SB-07 (8' - 9')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	12600
Calcium	10000	--	--	70400
Iron	2000	--	--	22700

1 2 3 4 5 10 11 12 13 14 15

CAFETERIA

NET SHAPE GEAR WAREHOUSE

UAW-GM BLVD

Legend

- Monitoring Well
- Soil Boring
- 1 Area of Concern

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 13 SUBSURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6R

J:\Projects\11176989\GIS\MAP\SRI PHASE 2\04-22 AOC 13 SS SO ANALYTICAL.mxd 5/19/2017

AOC-14-GP-03 (2' - 2.9')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	21800
Calcium	10000	--	--	59100
Iron	2000	--	--	21700
Nickel	30	10000	130	30.1

AOC-14-GP-02 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	25100
Calcium	10000	--	--	32900
Iron	2000	--	--	21200

AOC-14-GP-01 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	18900
Calcium	10000	--	--	48200
Iron	2000	--	--	22600
Nickel	30	10000	130	31.6

AOC-14-GP-05 (1.1' - 2')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	86400
Iron	2000	--	--	6140

AOC-14-GP-05 (7.8' - 8.2')	CRIT 1	CRIT 2	CRIT 3	10/16
VOCs:				
Acetone	0.05	1000	0.05	0.077
PCBs:				
Total PCBs	0.1	25	3.2	0.16
Metals:				
Calcium	10000	--	--	221000
Iron	2000	--	--	2670

AOC-14-GP-05 (10.5' - 11')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	0.2
Metals:				
Aluminum	10000	--	--	18200
Calcium	10000	--	--	49000
Iron	2000	--	--	21300
Nickel	30	10000	130	31.7

AOC-14-GP-04 (0.8' - 1.8')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	20800
Calcium	10000	--	--	104000
Iron	2000	--	--	20100

AOC-14-MW-21I (1.5' - 3')	CRIT 1	CRIT 2	CRIT 3	09/16
Metals:				
Calcium	10000	--	--	140000
Iron	2000	--	--	8890

AOC-14-MW-21I (8.2' - 8.4')	CRIT 1	CRIT 2	CRIT 3	09/16
PCBs:				
Total PCBs	0.1	25	3.2	0.29
Metals:				
Calcium	10000	--	--	79500
Iron	2000	--	--	11500

AOC-14-MW-21I (9' - 10')	CRIT 1	CRIT 2	CRIT 3	09/16
PCBs:				
Total PCBs	0.1	25	3.2	0.56
Metals:				
Aluminum	10000	--	--	18800
Calcium	10000	--	--	44700
Iron	2000	--	--	21300

AOC-14-GP-06 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	19200
Calcium	10000	--	--	79900
Iron	2000	--	--	12500

AOC-14-GP-08 (3' - 4')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	23800
Calcium	10000	--	--	66100
Iron	2000	--	--	17000

AOC-14-GP-07 (2.2' - 3.2')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	43800
Barium	350	10000	820	416
Calcium	10000	--	--	144000
Iron	2000	--	--	6420
Manganese	1600	10000	2000	3800

AOC-14-GP-07 (7' - 8')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	0.23
Metals:				
Aluminum	10000	--	--	20100
Calcium	10000	--	--	43700
Iron	2000	--	--	23800
Nickel	30	10000	130	31.2

ADMINISTRATION BUILDING

Legend

- Soil Boring
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 14 SUBSURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6S

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-23 AOC 14 SS SO ANALYTICAL.mxd 5/19/2017

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AOC-15-GP-03 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	260
Metals:				
Calcium	10000	--	--	112000
Iron	2000	--	--	6170

AOC-15-GP-04 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	81400
Iron	2000	--	--	7350

AOC-15-GP-04 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	13200
Calcium	10000	--	--	61500
Iron	2000	--	--	21200

AOC-15-GP-01 (3' - 3.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	18400
Arsenic	13	16	16	15.7
Calcium	10000	--	--	55200
Iron	2000	--	--	29100
Nickel	30	10000	130	41

AOC-15-GP-01 (4' - 5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	14900
Calcium	10000	--	--	67700
Cobalt	20	--	--	21
Iron	2000	--	--	24100
Nickel	30	10000	130	36.3

AOC-15-GP-02 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Calcium	10000	--	--	165000
Iron	2000	--	--	10500

AOC-15-GP-06 (2' - 2.5')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	90500
Iron	2000	--	--	7450

ADMINISTRATION BUILDING

MAIN PARKING LOT

CAFETERIA

Legend

- Geoprobe
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 15 SUBSURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6T

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-24 AOC 15 SS SO ANALYTICAL.mxd 5/19/2017

AOC-16-GP-07 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	10/16
PCBs:				
Total PCBs	0.1	25	3.2	0.13
Metals:				
Calcium	10000	--	--	54500
Iron	2000	--	--	11500

AOC-16-MW-05I (2' - 3')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	14100
Calcium	10000	--	--	63200
Iron	2000	--	--	20800

AOC-16-MW-05I (5' - 6')	CRIT 1	CRIT 2	CRIT 3	11/13
Metals:				
Aluminum	10000	--	--	16700
Calcium	10000	--	--	38300
Iron	2000	--	--	22300

AOC-16-GP-06 (1' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	18800
Calcium	10000	--	--	167000
Iron	2000	--	--	7560

AOC-16-GP-06 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	11700
Calcium	10000	--	--	55900
Iron	2000	--	--	16400

AOC-16-GP-04 (8' - 9')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	1.4
Metals:				
Aluminum	10000	--	--	15800
Calcium	10000	--	--	54700
Iron	2000	--	--	24800

AOC-16-GP-01 (1.2' - 1.9')	CRIT 1	CRIT 2	CRIT 3	12/13
VOCs:				
Acetone	0.05	1000	0.05	0.19
Metals:				
Calcium	10000	--	--	27500
Iron	2000	--	--	13300

AOC-16-GP-01 (12' - 12.5')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	10400
Calcium	10000	--	--	12200
Iron	2000	--	--	24900

AOC-16-GP-05 (2' - 3')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Di-n-butylphthalate	0.014	--	8.1	3.3
Metals:				
Calcium	10000	--	--	47800
Iron	2000	--	--	14700

AOC-16-GP-05 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	14300
Calcium	10000	--	--	52200
Iron	2000	--	--	23600

AOC-16-GP-02 (1' - 1.5')	CRIT 1	CRIT 2	CRIT 3	12/13
SVOCs:				
Di-n-butylphthalate	0.014	--	8.1	2.6
PCBs:				
Total PCBs	0.1	25	3.2	17
Metals:				
Calcium	10000	--	--	76600
Iron	2000	--	--	18100

AOC-16-GP-02 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	15700
Calcium	10000	--	--	55000
Cobalt	20	--	--	22.8
Iron	2000	--	--	20600
Nickel	30	10000	130	38.4

AOC-16-GP-03 (1.5' - 2')	CRIT 1	CRIT 2	CRIT 3	12/13
PCBs:				
Total PCBs	0.1	25	3.2	1.2
Metals:				
Aluminum	10000	--	--	13500
Calcium	10000	--	--	44300
Iron	2000	--	--	21200

AOC-16-GP-03 (6' - 7')	CRIT 1	CRIT 2	CRIT 3	12/13
Metals:				
Aluminum	10000	--	--	14900
Calcium	10000	--	--	65000
Iron	2000	--	--	20400

Legend

- Geoprobe
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
AOC 16 SUBSURFACE SOIL
ANALYTICAL RESULTS

URS

FIGURE 6U

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-25 AOC 16 SS SO ANALYTICAL.mxd 5/19/2017

North SB-02 (1.2' - 2')	CRIT 1	CRIT 2	CRIT 3	10/16
VOCs:				
Acetone	0.05	1000	0.05	0.13
Metals:				
Aluminum	10000	--	--	23400
Iron	2000	--	--	17700

North SB-01 (0.8' - 1.4')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Calcium	10000	--	--	185000
Iron	2000	--	--	5330

North SB-03 (1.8' - 2.8')	CRIT 1	CRIT 2	CRIT 3	10/16
Metals:				
Aluminum	10000	--	--	22200
Calcium	10000	--	--	48600
Iron	2000	--	--	25900
Nickel	30	10000	130	32.6
Vanadium	39	--	--	40.8

N

ADMINISTRATION BUILDING

16 5 3 4 3 14 15 2

Legend

- Soil Boring
- 1 Area of Concern
- 1 Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

50 0 50 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
NORTH OF AOC 14 SUBSURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6V

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-26 NORTH OF AOC 14 SS SO ANALYTICAL.mxd 5/22/2017

SS-13 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
PCBs:				
Total PCBs	0.1	25	3.2	0.13
Metals:				
Calcium	10000	--	--	112000
Chromium	30	6800	--	33.9
Iron	2000	--	--	19700
Nickel	30	10000	130	51.8
Zinc	109	10000	2480	243

SS-12 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(a)anthracene	1	11	1	6.3
Benzo(a)pyrene	1	1.1	22	6.1
Benzo(b)fluoranthene	1	11	1.7	12
Chrysene	1	110	1	6.7
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	6.5
PCBs:				
Total PCBs	0.1	25	3.2	6.8
Metals:				
Cadmium	2.5	60	7.5	2.7
Calcium	10000	--	--	45900
Chromium	30	6800	--	145
Copper	50	10000	1720	126
Iron	2000	--	--	49100
Lead	63	3900	450	260
Nickel	30	10000	130	63
Zinc	109	10000	2480	451

SS-11 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(a)anthracene	1	11	1	2.3
Benzo(a)pyrene	1	1.1	22	2.6
Benzo(b)fluoranthene	1	11	1.7	3.7
Benzo(k)fluoranthene	0.8	110	1.7	1.7
Chrysene	1	110	1	2.8
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	3.2
PCBs:				
Total PCBs	0.1	25	3.2	1
Metals:				
Aluminum	10000	--	--	12700
Cadmium	2.5	60	7.5	3.2
Calcium	10000	--	--	36000
Chromium	30	6800	--	99.7
Copper	50	10000	1720	87.3
Iron	2000	--	--	38800
Lead	63	3900	450	376
Nickel	30	10000	130	44.8
Zinc	109	10000	2480	1070

SS-10 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(a)anthracene	1	11	1	7.5
Benzo(a)pyrene	1	11	22	7.8
Benzo(b)fluoranthene	1	11	1.7	16
Chrysene	1	110	1	9.2
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	8.6
PCBs:				
Total PCBs	0.1	25	3.2	3.02
Metals:				
Cadmium	2.5	60	7.5	3
Calcium	10000	--	--	70100
Chromium	30	6800	--	151
Copper	50	10000	1720	175
Iron	2000	--	--	50400
Lead	63	3900	450	342
Nickel	30	10000	130	65.7
Zinc	109	10000	2480	486

SS-09 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.3
PCBs:				
Total PCBs	0.1	25	3.2	0.13
Metals:				
Aluminum	10000	--	--	10800
Calcium	10000	--	--	58200
Iron	2000	--	--	14000

SS-08 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.1
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.9
PCBs:				
Total PCBs	0.1	25	3.2	2.58
Metals:				
Aluminum	10000	--	--	17500
Arsenic	13	16	16	14.4
Calcium	10000	--	--	39900
Chromium	30	6800	--	210
Copper	50	10000	1720	264
Iron	2000	--	--	116000
Lead	63	3900	450	131
Mercury	0.18	5.7	0.73	0.23
Nickel	30	10000	130	82.5
Zinc	109	10000	2480	200

SS-07 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
Metals:				
Aluminum	10000	--	--	12500
Calcium	10000	--	--	10800
Iron	2000	--	--	13500

SS-01 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
Metals:				
Aluminum	10000	--	--	10900
Iron	2000	--	--	13500

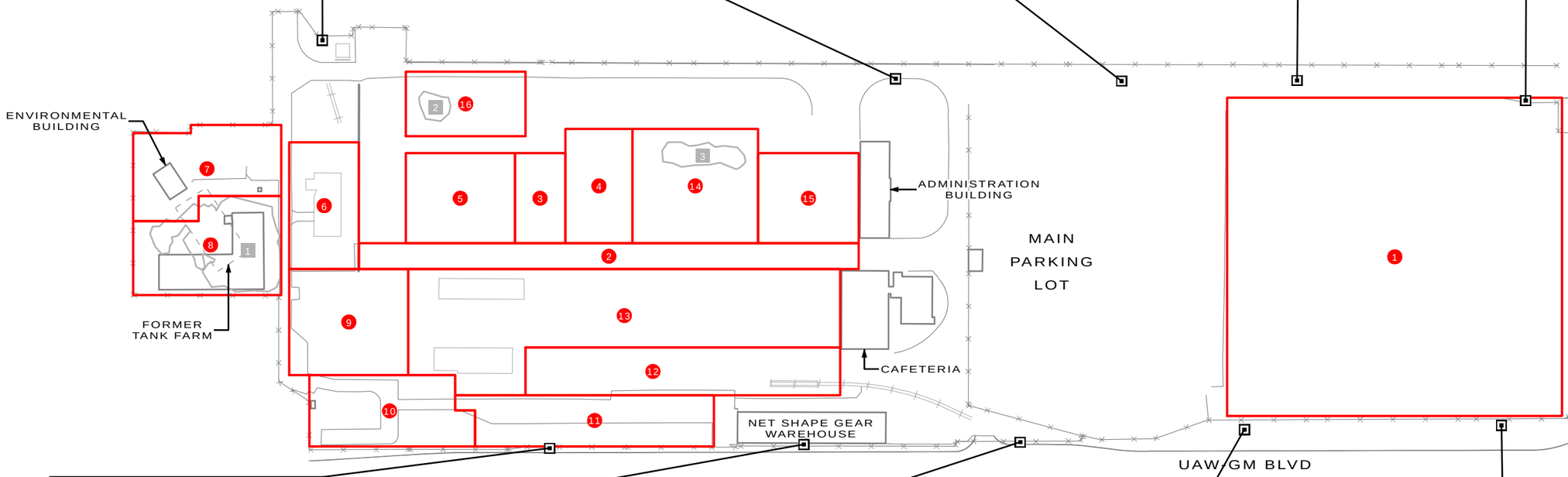
SS-02 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
Metals:				
Aluminum	10000	--	--	12300
Iron	2000	--	--	16400

SS-03 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
PCBs:				
Total PCBs	0.1	25	3.2	0.11
Metals:				
Aluminum	10000	--	--	11700
Iron	2000	--	--	14700
Lead	63	3900	450	79.4
Zinc	109	10000	2480	120

SS-04 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(a)anthracene	1	11	1	2.2
Benzo(a)pyrene	1	1.1	22	2.3
Benzo(b)fluoranthene	1	11	1.7	3.6
Benzo(k)fluoranthene	0.8	110	1.7	1.9
Chrysene	1	110	1	2.8
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	2.4
PCBs:				
Total PCBs	0.1	25	3.2	6.36
Metals:				
Calcium	10000	--	--	53200
Chromium	30	6800	--	222
Copper	50	10000	1720	136
Iron	2000	--	--	123000
Lead	63	3900	450	94.5
Mercury	0.18	5.7	0.73	0.32
Nickel	30	10000	130	72.7
Zinc	109	10000	2480	150

SS-05 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
PCBs:				
Total PCBs	0.1	25	3.2	6.53
Metals:				
Aluminum	10000	--	--	13000
Arsenic	13	16	16	16.7
Cadmium	2.5	60	7.5	4.5
Calcium	10000	--	--	27400
Chromium	30	6800	--	252
Copper	50	10000	1720	151
Iron	2000	--	--	82900
Lead	63	3900	450	294
Manganese	1600	10000	2000	2170
Mercury	0.18	5.7	0.73	1.2
Nickel	30	10000	130	93.4
Zinc	109	10000	2480	569

SS-06 (0' - 0.16')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.74
Metals:				
Aluminum	10000	--	--	12900
Iron	2000	--	--	13700



Legend

- Surface Soil Sample
- 1 Area of Concern
- 1 Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

200 0 200 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
SITE PERIMETER SURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6W

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-27 SITE PERIMETER S SO ANALYTICAL.mxd 5/22/2017

SS-13 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
Metals:				
Aluminum	10000	--	--	23300
Chromium	30	6800	--	33.5
Iron	2000	--	--	25300
Vanadium	39	--	--	42.1

SS-12 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
PCBs:				
Total PCBs	0.1	25	3.2	10
Metals:				
Aluminum	10000	--	--	19200
Calcium	10000	--	--	28300
Chromium	30	6800	--	112
Iron	2000	--	--	28500
Manganese	1600	10000	2000	1710
Nickel	30	10000	130	31.3

SS-11 (0.5' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(b)fluoranthene	1	11	1.7	1.3
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	1.5
PCBs:				
Total PCBs	0.1	25	3.2	2.77
Metals:				
Aluminum	10000	--	--	10900
Cadmium	2.5	60	7.5	3
Calcium	10000	--	--	34900
Chromium	30	6800	--	131
Copper	50	10000	1720	62.2
Iron	2000	--	--	32900
Lead	63	3900	450	417
Manganese	1600	10000	2000	1890
Nickel	30	10000	130	31.5
Zinc	109	10000	2480	478

SS-10 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
PCBs:				
Total PCBs	0.1	25	3.2	0.91
Metals:				
Aluminum	10000	--	--	25600
Calcium	10000	--	--	72000
Chromium	30	6800	--	343
Iron	2000	--	--	26500
Manganese	1600	10000	2000	6550
Vanadium	39	--	--	51.8

MW-23I (0' - 2')	CRIT 1	CRIT 2	CRIT 3	10/16
SVOCs:				
Benzo(a)anthracene	1	11	1	6.8
Benzo(a)pyrene	1	1.1	22	6.2
Benzo(b)fluoranthene	1	11	1.7	8.1
Benzo(k)fluoranthene	0.8	110	1.7	3.5
Chrysene	1	110	1	6.1
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	3.5
Metals:				
Calcium	10000	--	--	132000
Iron	2000	--	--	10700
Lead	63	3900	450	70.3

SS-09 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(a)anthracene	1	11	1	1.8
Benzo(a)pyrene	1	1.1	22	1.7
Benzo(b)fluoranthene	1	11	1.7	3.3
Chrysene	1	110	1	2
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	2
PCBs:				
Total PCBs	0.1	25	3.2	0.21
Metals:				
Aluminum	10000	--	--	12600
Calcium	10000	--	--	20500
Iron	2000	--	--	15600
Zinc	109	10000	2480	125

SS-08 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
Metals:				
Aluminum	10000	--	--	28300
Chromium	30	6800	--	33.3
Iron	2000	--	--	27100
Vanadium	39	--	--	51.5
Zinc	109	10000	2480	115

SS-07 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
PCBs:				
Total PCBs	0.1	25	3.2	2.71
Metals:				
Arsenic	13	16	16	19
Cadmium	2.5	60	7.5	3.7
Calcium	10000	--	--	20000
Chromium	30	6800	--	362
Cobalt	20	--	--	20.3
Copper	50	10000	1720	478
Iron	2000	--	--	171000
Lead	63	3900	450	249
Manganese	1600	10000	2000	1730
Mercury	0.18	5.7	0.73	0.2
Nickel	30	10000	130	152
Zinc	109	10000	2480	475

SS-06 (0.5' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/16
PCBs:				
Total PCBs	0.1	25	3.2	0.14
Metals:				
Aluminum	10000	--	--	17500
Calcium	10000	--	--	52100
Iron	2000	--	--	23300
Mercury	0.18	5.7	0.73	0.29

SS-05 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.93
PCBs:				
Total PCBs	0.1	25	3.2	15.49
Metals:				
Aluminum	10000	--	--	18700
Cadmium	2.5	60	7.5	3.9
Calcium	10000	--	--	95000
Chromium	30	6800	--	307
Copper	50	10000	1720	124
Iron	2000	--	--	46200
Lead	63	3900	450	170
Manganese	1600	10000	2000	7310
Mercury	0.18	5.7	0.73	2
Nickel	30	10000	130	38.2
Zinc	109	10000	2480	391

SS-04 (0.5' - 1.5')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Benzo(a)anthracene	1	11	1	1.5
Benzo(a)pyrene	1	1.1	22	1.7
Benzo(b)fluoranthene	1	11	1.7	2.4
Chrysene	1	110	1	2
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	2
PCBs:				
Total PCBs	0.1	25	3.2	12.1
Metals:				
Calcium	10000	--	--	16800
Chromium	30	6800	--	390
Copper	50	10000	1720	4850
Iron	2000	--	--	184000
Lead	63	3900	450	352
Manganese	1600	10000	2000	1910
Nickel	30	10000	130	130
Zinc	109	10000	2480	285

SS-03 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
SVOCs:				
Indeno(1,2,3-cd)pyrene	0.5	11	8.2	0.82
PCBs:				
Total PCBs	0.1	25	3.2	0.4
Metals:				
Aluminum	10000	--	--	11300
Calcium	10000	--	--	59300
Chromium	30	6800	--	40.9
Copper	50	10000	1720	95.2
Iron	2000	--	--	23300
Lead	63	3900	450	75.4
Zinc	109	10000	2480	121

SS-02 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
Metals:				
Aluminum	10000	--	--	23600
Iron	2000	--	--	26900
Nickel	30	10000	130	32.1
Vanadium	39	--	--	42.5

SS-01 (0.5' - 2')	CRIT 1	CRIT 2	CRIT 3	11/16
Metals:				
Calcium	10000	--	--	101000
Iron	2000	--	--	10100

MW-22I (0.5' - 2.5')	CRIT 1	CRIT 2	CRIT 3	09/16
VOCs:				
Methylene chloride	0.05	1000	0.05	0.058
Metals:				
Calcium	10000	--	--	105000
Chromium	30	6800	--	51.5
Iron	2000	--	--	9230
Nickel	30	10000	130	37.5

MW-17I (13.5' - 14')	CRIT 1	CRIT 2	CRIT 3	09/16
Metals:				
Aluminum	10000	--	--	15700
Calcium	10000	--	--	47700
Iron	2000	--	--	21600

ENVIRONMENTAL BUILDING

FORMER TANK FARM

ADMINISTRATION BUILDING

CAFETERIA

NET SHAPE GEAR WAREHOUSE

UAW-GM BLVD

Legend

- Surface Soil Sample
- Monitoring Well
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in mg/kg
Criteria: CRIT 1 = Unrestricted Use; CRIT 2 = Industrial Use; CRIT 3 = Protection of Groundwater Use

200 0 200 Feet

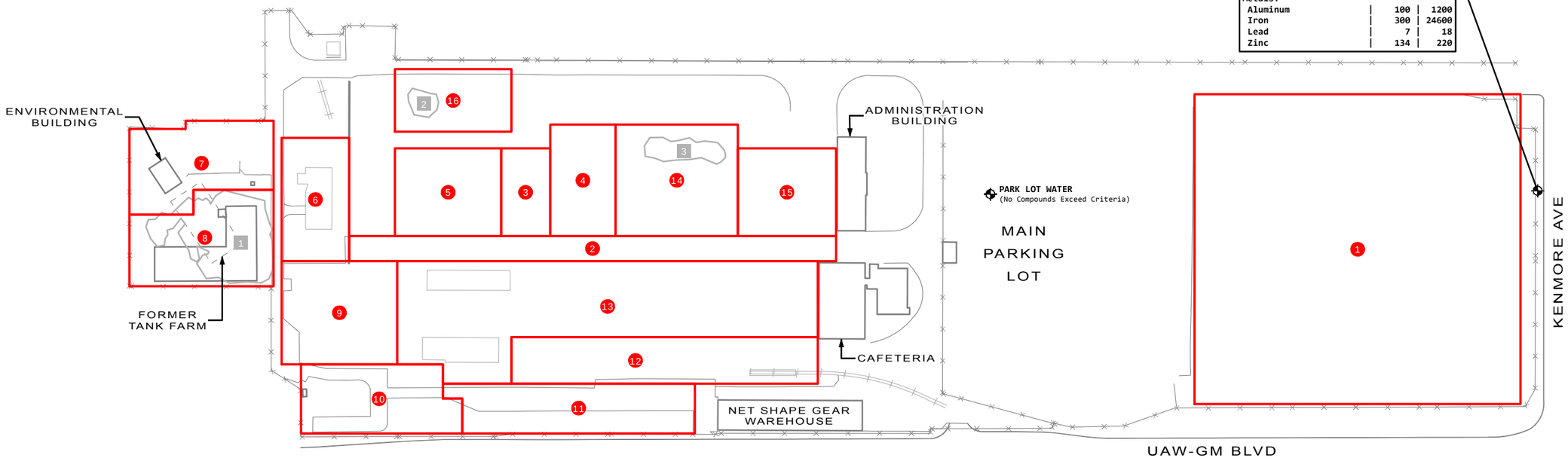
NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
SITE PERIMETER SUBSURFACE SOIL ANALYTICAL RESULTS

URS

FIGURE 6X

J:\Projects\11176989\GIS\MAPS\RI PHASE 2\04-28 SITE PERIMETER SS SO ANALYTICAL.mxd 5/22/2017

AOC-01-LF-SW-01	CRIT	11/13
SVOCs:		
Indeno(1,2,3-cd)pyrene	0.002	3.4
Pyrene	4.6	8.3
Benzo(a)anthracene	0.002	3.7
Benzo(a)pyrene	0.0012	5.6
Benzo(b)fluoranthene	0.002	11
Benzo(k)fluoranthene	0.002	4.4
Chrysene	0.002	6.8
Metals:		
Aluminum	100	1200
Iron	300	24600
Lead	7	18
Zinc	134	220



Legend

- Surface Water Sample
- Area of Concern
- Debris/Waste Pile (Removed Feb. 2016)

Notes: Units are in µg/L; Locations shown without results indicate that no compounds exceeded criteria
Criteria: NYSDEC TOGS 1.1.1 Ambient Water Quality Standards, Class A

200 0 200 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
SURFACE WATER ANALYTICAL RESULTS

URS

FIGURE 7

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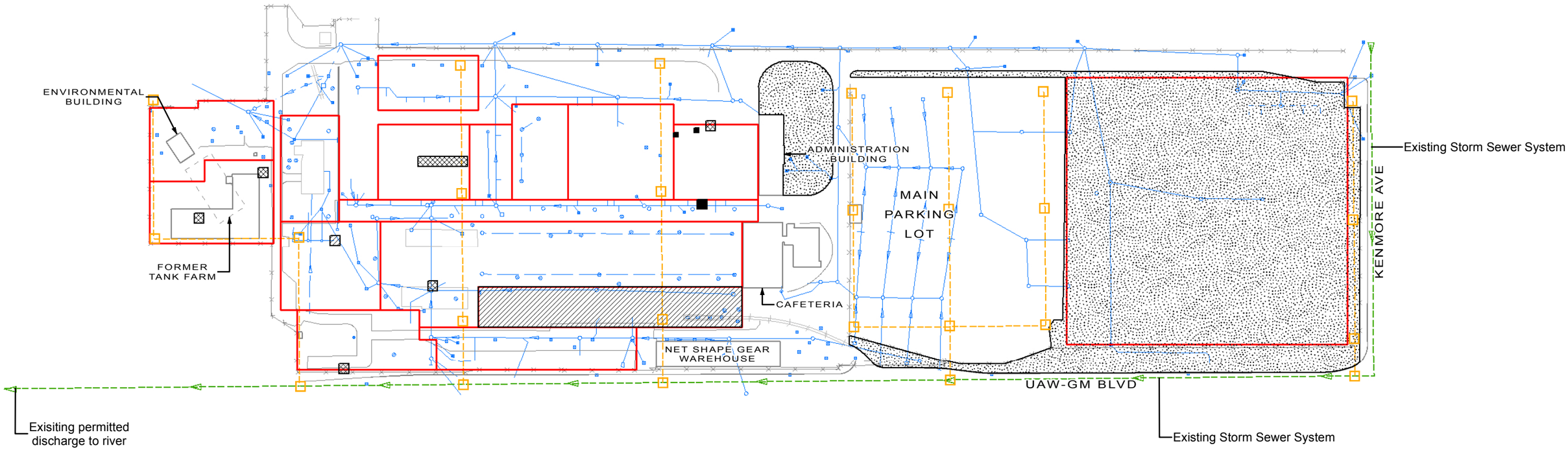

Legend

- Existing Storm Sewer System
- Proposed Onsite Sewer System
- Sewer to be cleaned and sealed
- Areas of Concern
- One-foot Surface Cover
- Surface Soil Excavation
- Subsurface Soil Excavation
- Concrete or Brick Removal

200 0 200 Feet

NYSDEC TONAWANDA FORGE
TOWN OF TONAWANDA, NEW YORK
ALTERNATIVE 4

URS

FIGURE 8

J:\Projects\11176989\GIS\MAPS\FS\04-02 ALTERNATIVE 4.mxd 9/17/2019

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Tonawanda Forge Site
Operable Unit No. 01: Soil Contamination
State Superfund Project
Town of Tonawanda, Erie County, New York
Site No. 915274

The Proposed Remedial Action Plan (PRAP) for the Tonawanda Forge site was prepared by the New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 5, 2020. The PRAP outlined the remedial measure proposed for the contaminated soil, sewer sediment, and surface water at the Tonawanda Forge site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on February 26, 2020, which included a presentation of the remedial investigation/feasibility study (RI/FS) for the Tonawanda Forge Site as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on March 9, 2020.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the Department's responses:

Site-Related Questions

COMMENT 1: What is the NYSDEC classification for this site? Why is this a State Superfund Site?

RESPONSE 1: Tonawanda Forge is currently a State Superfund (SSF) Class 2 site. A Class 2 site is a site where the presence of hazardous waste poses a significant threat to the public health or environment and action is required.

COMMENT 2: Is this site a candidate for a State Superfund (SSF) site? Could this be a candidate for the Brownfield Cleanup Program (BCP)?

RESPONSE 2: This site is currently a SSF site and has been listed on the Registry of Inactive Hazardous Waste Disposal Sites due to disposal of hazardous waste on the site. Because this site is a Class 2 site where a viable potentially responsible party (PRP) has been identified, the site is not eligible for the BCP.

COMMENT 3: As far as the [BCP] application for this site, how was that presented to the public?

RESPONSE 3: This is not a Brownfield Cleanup site. There is not a BCP application.

COMMENT 4: So, this is a superfund site and this [PRAP meeting] is or will be a public hearing? Are you saying there is no public hearing required for BCP sites?

RESPONSE 4: To clarify, a PRAP public meeting is an informational meeting to present the Department's proposed remedial action plan for the site and to answer any questions the public may have regarding the proposal. New York State law requires a public meeting as part of the PRAP process. The PRAP meeting is not a public hearing, which is a quasi-judicial proceeding involving an administrative law judge. Public hearings are not required under the SSF and BCP programs.

COMMENT 5: Who's paying for this [remedy]?

RESPONSE 5: The Department has requested that PRPs associated with the site implement the remedy. If an agreement cannot be reached with the PRPs, the Department will implement the remedy using the State's hazardous waste remedial fund, and will seek cost recovery from the PRPs.

COMMENT 6: The proposed remedy cost $7.2 million. How much money in the NYS Superfund pool is allocated for remediation? How much money currently available for Superfund?

RESPONSE 6: The amount of money made available under the State Superfund Program to complete remedial construction varies year to year. Once a remedial design is completed, and the project is approved for construction, the funding necessary to complete the construction (including change orders) will be allocated.

COMMENT 7: Is there currently a buyer for this site? Or a current owner?

RESPONSE 7: The property is currently owned by Lewis Brothers, LLC.

COMMENT 8: What was disposed of in the landfill?

RESPONSE 8: Subsurface investigations found manufacturing byproducts (e.g., slag), railyard materials, and construction debris (e.g., concrete, steel, sections of piping).

COMMENT 9: You mentioned "community acceptance" of the remedy during your presentation. How exactly do you gauge that? What metrical standards do you use to gauge acceptance? For example, what if you receive 25

comments opposing the proposed plan and only 1 in favor of it - would you then adjust your remedy?

RESPONSE 9: A responsiveness summary is prepared to address the public comments and questions submitted to the Department. The Department evaluates these comments, and any new information received, when finalizing the remedy to ensure the selected remedy remains protective of public health and the environment and provides the best balance of the balancing criteria, as detailed in Exhibit D: Basis for Selection. The Department values community input, as community members often provide valuable local information and considerations that aid the Department in selecting the final remedy.

COMMENT 10: How do you change your remedy based on public comments received? Do you go back to the community with discussion or changes if there is not public agreement with the proposed remedy? Is that an internal decision to change the plan or is it done publicly?

RESPONSE 10: The Department evaluated public comments for new information or considerations before selecting a final remedy. If the selected remedy differs significantly from the proposed remedy, the ROD and responsiveness summary will describe the differences and reasons for the changes.

Remedy Questions

COMMENT 11: What will the cover system consist of (i.e., will it be impermeable clay)? Will there be a leachate collection system included?

RESPONSE 11: The cover will consist of a minimum of one foot of clean soil placed over a demarcation layer. The upper six inches of soil will be of sufficient quality to maintain a vegetative layer. A leachate collection system is not included in the remedy.

COMMENT 12: After remediation is completed, how will the soil vapor intrusion system be factored into controls in place for future site use? How will the agencies involved enforce/ensure that the systems put into place continue to operate during future site use?

RESPONSE 12: A provision for the evaluation of soil vapor intrusion potential for any occupied on-site structure will be included within the Site Management Plan. This evaluation may consist of additional sampling or an analysis of contamination in other media. If an additional engineering control – such as a subslab depressurization system to mitigate soil vapor intrusion – is warranted, the Department and NYSDOH will review design plan and performance data for the system, and an annual certification submitted to the Department will be required to confirm the control(s) remain in-place and are effective.

COMMENT 13: When you have the remedy in place with the new stormwater piping system, will there be a barrier to ensure that there is no mixing of stormwater with groundwater? Will the piping system have walls to ensure the pipes are watertight? What steps wills you take to prevent any infiltration?

RESPONSE 13: Details of the stormwater system will be finalized during the design phase. The system will be designed to prevent infiltration and inflow of groundwater into the stormwater system.

COMMENT 14: What is the flow direction of the stormwater on the site?

RESPONSE 14: The stormwater drain direction runs southeast along Kenmore Avenue and then to the south-southwest, along UAW-GM Boulevard.

COMMENT 15: Is there any kind of sampling for runoff during cleanup to ensure that groundwater is not mixing with stormwater runoff before it runs off the site and discharges to the sewer system? How will you ensure that contaminated runoff doesn't get into the sewer system?

RESPONSE 15: The project team will work with the DEC's Division of Water to ensure compliance with the technical requirements of a State Pollutant Discharge Elimination System (SPDES) permit for stormwater discharge. Before discharge, stormwater samples will be collected and analyzed to confirm limits are met. These discharge limits will be determined during the design.

COMMENT 16: What is happening to the current stormwater runoff and the water accumulating now? Will additional samples be collected? What about the water you mentioned in your presentation that runs off to Kenmore? Will you be testing that before the remedy occurs and how will you be addressing that before the remedy occurs?

RESPONSE 16: Current stormwater runoff ponds across the site and periodically evaporates. Additional sampling will be collected to ensure stormwater discharge meets applicable limits for discharge.

COMMENT 17: What is the status of the buildings? Will they be demolished as part of the cleanup plan?

RESPONSE 17: No buildings will be demolished as part of the remedy.

<u>Remedial Construction Questions</u>

COMMENT 18: How are dust and exposures mitigated during cleanup and what factors are used in the process? Where will the air monitors you mentioned be placed during cleanup? Have you accounted for wind direction or changes? Will there be oversight to monitor changing conditions at the site and how that impacts dust and exposures? What processes and methods will you use to ensure that there is not off-site movement and that workers are also protected?

RESPONSE 18: All nuisances – dust, odor, noise, vibration, etc. – are monitored during construction activities and will be addressed in the construction contract specifications. For example, mobile air monitoring stations will be set up around the work areas in accordance with the community air monitoring plan (CAMP). The CAMP requires air monitoring up and downwind of the site (locations will be modified as needed based on wind direction). All nuisance data will be continually monitored during construction activities. Any visible fugitive dust will require the corrective action (e.g., wetting of disturbed materials). If exceedances occur, all work related to the nuisance will be halted until the nuisance is properly addressed. Workers are also protected through the Health and Safety Plan (HASP), which provides guidelines and requirements to establish safe working conditions and practices associated with various field activities.

COMMENT 19: I'm curious about the amount of activity (truck movement, traffic, etc.) that cleanup at this site will create? What can we expect to see?

RESPONSE 19: Approximately 2,400 cubic yards of soil will be removed from the site. The exact quantity of soil and subsequent truck traffic will be calculated during the design phase. The design will include provisions for minimizing impacts from truck traffic to the surrounding community.

COMMENT 20: Regarding the site access road, the site owner that is adjacent to the access road does not want you to use the access road because he is concerned with will splash contaminated water onto his property.

RESPONSE 20: This comment has been noted. The Department will ensure remedial activities will not expose neighboring properties to the on-site contamination. A decontamination pad will be required to ensure that all pieces of equipment, including trucks, are cleaned before leaving the site.

COMMENT 21: I am concerned about current General Motors' workers accessing the site during cleanup. How will you protect them?

RESPONSE 21: General Motors' employees should not have access to the site. There should not be any public access or trespassing at the site as the site is completely fenced. During construction the contractor will be responsible for site security.

Health-Related Questions

COMMENT 22: The [RI] report shows the contaminants that are found now. Did they look at the locations of contamination prior to cleanup or during the facility operation? What are the health impacts from these contaminants?

RESPONSE 22: For purposes of selecting the site remedy, the Department did not consider data from the operational period of the facility. To the extent that past operations may have affected site soil and groundwater, the remedy will protect human health going forward.

COMMENT 23: Regarding the risks – The health impacts you mentioned are all based on assuming those exposed are adult men. What about the impacts to children under the age of 10?

RESPONSE 23: The health impacts from contaminants discussed during the meeting were for those individuals that were likely exposed (i.e., adult men) as this was an active industrial facility. Impacts to children were not likely but we do take these sensitive populations into consideration when determining whether or not the proposed remedy is protective of public health.

COMMENT 24: You mentioned the current health threats presented by SVOCS and VOCs on site during your presentation. Can you speak to us about the health impacts that have existed on the site historically, prior to clean up? Such as the workers that formerly worked at the site?

RESPONSE 24: We cannot answer qualitatively or quantitatively as there are many variables that go into that evaluation that we do not have data for. Our goal is to minimize or eliminate exposures from the historical contamination from this site.

COMMENT 25: During cleanup, you mentioned that there will be air monitoring to help protect the community and workers. In terms of health impacts, what kinds of health impacts/symptoms could the hazardous compounds you mentioned cause?

RESPONSE 25: The CAMP is designed and implemented to prevent/minimize the potential for exposure. Potential impacts to health are unlikely with this CAMP.

COMMENT 26: You said you are not a medical professional. Do you have any medical professionals on staff that we could contact with our questions?

RESPONSE 26: Please contact Mr. James Bowers, NYS Department of Health, at (518) 402-7950 for medically related questions.

COMMENT 27: You collect data based on assessments and records. How do you compile that with all of the HIPA privacy policies in place? It seems like it would present inherent inaccuracy in your assessments if your data did not include certain information from people's health records. How do you account for or quantify that?

RESPONSE 27: The NYS Health Department does collect some information and data under certain programs, such as the Cancer Registry, and from individuals that have been determined to have elevated levels of heavy metals in their blood, such as lead. The HIPPA privacy policies do apply and the NYSDOH does adhere to these policies when addressing these issues and evaluating data generated from them.

COMMENT 28: Did you look at worker exposure impacts from past site use? Did you look at any health records from workers who worked at this site in the past? That seems like it would be relevant. How would you know what the health impacts have been at this site, or are, without that type of data? Have you looked at cancer surveillance and registries?

RESPONSE 28: See response to Comment 27.

COMMENT 29: Have you looked at data from the UAW? Their health and safety considerations – UAW has a mechanism to monitor employees, training and medical records.

RESPONSE 29: Neither NYSDEC nor NYSDOH have access to employee health data from past operations on the site or operations on neighboring properties.

Comments from Letters

James F. Hartnett on behalf of General Motors, LLC submitted a letter dated March 9, 2020 which included the following comments:

COMMENT 30: What is to prevent impacted groundwater or impacted soil (PCBs<25 ppm soil cleanup objective) transported via groundwater from infiltrating the newly installed storm sewers and causing contamination of these structures, as well as off-site discharge?

RESPONSE 30: See response to Comment 13.

COMMENT 31: Does the Department have an anticipated timeframe for addressing groundwater impacts at the site and potentially off-site? What are the next steps in advancing the plans to address impacted site groundwater?

RESPONSE 31: The Department will address groundwater in a separate operable unit (OU) after the remedy is completed for OU 1. Monitoring of groundwater will continue across the site to assess the impacts soil source removal has on groundwater.

COMMENT 32: Section 5, Enforcement Action, lists General Motors, LLC (GM LLC) as a potentially responsible party (PRP). GM LLC does not agree that it is a PRP at this Site. GM LLC is a new company formed in 2009 after the bankruptcy of General Motors Corporation, and long after General Motors Corporation sold the Forge site to American Axle. GM LLC has no environmental liability related to General Motors Corporation under the terms of the bankruptcy. Therefore, there is no basis on which to consider GM LLC a PRP.

RESPONSE 32: The Department is diligently investigating all potentially responsible parties (PRPs) for this site. No formal enforcement has commenced at this time.

COMMENT 33: Section 6.2, IRMs: There is discussion about removing PCB-contaminated LNAPL from monitoring well AOC-14-MW-21I and an underground pipeline and associated subgrade vault. Were these structures removed or filled in place as part of the IRM, or will addressing these structures be part of the remedy? The PRAP is unclear. If still present, are these structures being monitored for the reoccurrence of LNAPL?

RESPONSE 33: To clarify, the initial ground penetrating radar survey indicated the possible presence of underground piping and a vault. Due to the proximity of AOC-14-MW-21I, it was thought these structures could be the source of LNAPL. However, during excavation activities around AOC-14-MW-21I, no piping was found. Instead, a dense slag layer was found, which was thought to have impacted the survey. As an LNAPL source was not found, the excavated material was replaced. All LNAPL have been removed from AOC-14-MW-21I and extraction activities have ceased.

COMMENT 34: Section 6.3, Groundwater: Arsenic, chromium, and lead are indicated to exceed groundwater standards. It is understood that unfiltered groundwater is regulated by NYS, however, filtered data are also useful in evaluating whether groundwater impacts are attributable to solids in the sample. Were filtered samples collected and analyzed as well?

RESPONSE 34: Filtered samples were only collected during the RI Phase I groundwater event in January 2014 where iron, manganese, and methane were detected.

COMMENT 35: Section 7.6, Surface Water Control: The remedy proposes detention of collected stormwater within the collection system, if necessary, to meet peak flow criteria in the Town of Tonawanda storm sewer. How will this be achieved? Also, sampling is proposed of the collected water prior to discharge. Is this only when water is detained in the system, i.e., sampling on a batch discharge basis? What about normal dry weather flow or during light precipitation events? What if discharge limits are not met? Are there contingency provisions such as interim storage and treatment?

RESPONSE 35: Details of the surface water control system will be finalized during the design phase. The system is being installed using drop inlets and piping to address surface water runoff from rain events so that it no longer ponds onsite. This water does not contact contaminated soil and is clean, and therefore would not need to be sampled prior to discharge into the storm sewer. However, surface water will be sampled to confirm it meets SPDES discharge limits prior to discharge (see response to Comment 15).

COMMENT 36: Exhibit A, Waste/Source Areas – Asbestos: ACM is present at the surface across much of the Site. Is this friable or non-friable? What measures are being taken to address this surface contamination and protect the public? The Plan states that a Community Air Monitoring Plan is applicable during Site activities, but what about in the interim? Is there ongoing air monitoring? Asbestos also is present in pipe insulation at the site and appears to be in a damaged state. How are the potential exposure risks from damaged asbestos insulation being addressed by the Department?

RESPONSE 36: Air monitoring is not currently being conducted on-site and will not begin until construction activities start. Asbestos poses a problem if disturbed. As the property is vacant, there is no need for interim air monitoring. Furthermore, asbestos is not defined as a hazardous waste and will only be addressed if it must be removed to implement the remedy.

COMMENT 37: Exhibit A, Waste/Source Areas – LNAPL: Figure 3 shows MH-119 as having LNAPL present, but there is no indication of PCB content. Were no PCBs present?

RESPONSE 37: PCBs were detected in MH-119 but had a total concentration of 21 ppm, which is under the 50 ppm hazardous waste definition for PCBs. Only exceedances of hazardous waste limits are illustrated on Figure 3. Analytical results for LNAPL samples are included in Table 4-1 of the 2018 Remedial Investigation Report.

COMMENT 38: Exhibit A, Waste/Source Areas – Surface Materials. The text indicates one brick chip sample and one bulk solid sample exceeded 50 ppm for PCBs,

yet only one location is shown on Figure 4. Where was the other sample located?

RESPONSE 38: The brick chip sample is located in AOC-2 (AOC-02-CC-01) and the bulk sample is located in AOC-14 (AOC-14-GB-02). Figure 4 has been corrected to include the bulk sample location.

COMMENT 39: Exhibit A, Waste/Source Areas – Sewer Sediments. Paragraph 3 indicates six catch basins and three manholes with PCBs >50 ppm, yet Figure 5 shows six catch basins and four manholes.

RESPONSE 39: The text in Exhibit A has been revised. Six catch basins and four manholes have PCBs that exceed 50 ppm.

Jeffrey C. Stravino on behalf of American Axle and Manufacturing, Inc. submitted a letter dated March 9, 2020 which included the following comments:

COMMENT 40: For reasons set forth below, American Axle respectfully requests that NYSDEC modify the proposed remedy and/or select another of the alternatives presented in the PRAP. The PRAP evaluates various alternatives, but we do not believe the Alternative chosen (Number 4) is appropriate.

RESPONSE 40: The Department disagrees with this opinion and believes the selected remedy is the best alternative based on the evaluated alternatives in Feasibility Study and evaluation criteria in the PRAP Exhibit D: Basis for Selection.

COMMENT 41: However, NYSDEC and NYSDOH have failed to appropriately consider prior records, including a Report and Ruling by NYSDEC and the former General Motors Corporation ("Old GM") remediated its PCBs, and disposed of those PCBs off-site.

RESPONSE 41: This statement is inaccurate. The supporting documents included in the letter indicate that GM removed certain PCB-contaminated materials in an effort to correct exceedances of PCB concentration limits in its SPDES discharge permit. The documents do not state that GM "remediated its PCBs" across the entire Tonawanda Forge site, and do not address the extent of PCB contamination at the site after the limited materials were removed by GM. The comprehensive investigation and sampling in the Remedial Investigation Report (RI) demonstrate the extensive current contamination at the site.

COMMENT 42: Therefore, for the portion of AOC-12 in the vicinity of nine of the 12 samples mentioned, no further action is required since the existing cover meet[s] the Remedial Action Objectives for subsurface soil. (In the alternative, American Axle submits that if any cover is missing in any of

these sampling areas, then it is sufficient to repair the cover where necessary, as opposed to new cover over all of these areas.)

RESPONSE 42: Additional action is required in this area as several surface soil locations exceed soil cleanup objectives for industrial use. The existing cover (concrete, asphalt, and brick materials) does not apply as the upper one foot of soil does not meet applicable soil cleanup objectives for industrial use. Therefore, surface soil excavation is the most protective of public health and the environment.

COMMENT 43: The areas of the nine samples with PAHs at total concentrations below 500 mg/kg should be remediated by cover and not by removal, especially considering the amount of concrete that already exists in AOC-12.

RESPONSE 43: The 500 mg/kg soil cleanup level defined in CP-51 only applies to total PAHs in the subsurface. The nine soil samples referred to above in AOC-12 are surface soil samples and must be addressed according to Part 375 industrial use soil cleanup objectives.

COMMENT 44: As for the three sample locations that exceed industrial SCOs for arsenic or PCBs, the soil should be removed only in these particular areas rather than in the entire AOC [AOC-12].

RESPONSE 44: The current excavation area within AOC-12 is conservative and is reflective of data that indicate soil exceedances occur throughout the area, including SVOCs, which are listed as a site-related contaminant. However, additional samples will be collected in the design phase to refine the extent of the excavation.

COMMENT 45: Incorporating these comments into the remedy would be protective of the environment, reduce the use of resources, reduce potential exposure to human health, limit greenhouse gas emissions, reduce the carbon footprint of the cleanup, reduce costs to the State of New York and its taxpayers, and comply with the Climate Leadership and Community Protection Act of 2019.

RESPONSE 45: The remedy was selected based on the nine evaluation criteria listed in Exhibit D. The selected remedy is superior to a modified remedy with American Axle's proposed changes for several of the evaluation criteria, including: protection of human health and the environment, compliance with SCGs, long-term effectiveness and permanence, and reduction of toxicity, mobility and volume.

COMMENT 46: We question the value of excavation and removal of five of the six isolated areas of deep soil impacts [in AOCs 5, 8, 10, 13, and 15]. Since the subject

soils are in the subsurface, the exposure pathways are only completed if the soils are exposed and disturbed. Therefore, by implementing the proposed remedy, exposure and the risks attendant with exposure will increase!

RESPONSE 46: Again, the Department's goal is to remove the source material, to the extent practical, and to eliminate the potential for future groundwater contamination and completion of exposure pathways. The short-term impacts of the selected remedy create limited exposure to these contaminants, but only trained and certified workers will be allowed to handle the material. Additionally, excavation of these areas will provide greater long-term effectiveness (see PRAP Exhibit D: Basis for Selection).

COMMENT 47: Thus, the potential risks of future exposure to the subject soils [in AOCs 5, 8, 10, 13, and 15] should be addressed and sufficiently mitigated through the use of Institutional Controls ("ICs"/Engineering Controls ("ECs") including site use restrictions and requirements of an Excavation Work Plan.

RESPONSE 47: Institutional Controls and Engineering Controls implemented in the selected remedy address the potential risks of future exposure. The Department's goal is to remove the source material, to the extent practical, to eliminate the potential for future groundwater contamination and completion of exposure pathways, which will be achieved through soil excavation.

COMMENT 48: Finally, only one of the identified samples (AOC-15) was significantly above the ISCO for PCBs at 260 mg/kg. Considering that this sample is relatively shallow at a depth of 1.0' to 1.5', and that it appears to be from faulty demolition by the Lewis Brothers and/or their contractors, the Remedial Action Objective would be satisfied by removing soil from this area as part of Remedial Item #1 (Surface Soil Excavation).

RESPONSE 48: The final excavation depth(s) for AOC-15 will be determined during the remedial design. For the overall site remedy, subsurface excavation is needed to remove source material to the extent practical.

COMMENT 49: Similar to the point made for Remedial Item #1 above, by using the CP-51-allowed cleanup goal of 500 mg/kg for total PAHs in subsurface soil, the area of AOC-1 requiring cover should be reduced to approximately half of the AOC.

RESPONSE 49: The Department did not oversee any covering work in AOC-1, and therefore cannot verify any work that owners or operators conducted in that area. As there are various soil exceedances of soil cleanup objectives across AOC-1, a

soil cover following DER-10-4.1(f) requirements will be placed across the entire area to protect human health and the environment.

COMMENT 50: The subsurface sample data collected from AOC-1 are not exceedingly greater than their respective SCOs. Site-specific Action Levels ("SSALs") were not considered for this AOC. We suggest that SSALs be considered, which would likely further reduce the cover areas proposed.

RESPONSE 50: The Department selected a remedy that is protective of public health and the environment. Generally, SSALs are considered if a remedial party takes responsibility for implementing the remedy and can demonstrate that the SSALs are protective. To date, no PRPs have taken responsibility for the remedy; therefore, standards and cleanup objectives as defined in the PRAP will be used.

COMMENT 51: Within the past few years, AOC-1 was covered with 4-inches of topsoil, and URS used a brush hog to clear this area. This area is now covered with dense grass. Since NYSDEC can approve an alternative as already protective of the environment, the current vegetated topsoil cover should be considered sufficient cover, especially if it is inspected and maintained under a Site Management Plan. The use and maintenance of the current soil and vegetative cover at AOC-1 would be protective of the environment, reduce the use of resources, reduce potential exposure to human health, limit greenhouse gas emissions, reduce the carbon footprint of the cleanup, reduce costs to the State of New York and its taxpayers, and comply with the Climate Leadership and Community Protection Act of 2019.

RESPONSE 51: See response to Comment 49.

COMMENT 52: "We do not believe that the sewers need to be cleaned again…"

RESPONSE 52: The sewer system underneath the site is complex. The previous sewer cleanings were not comprehensive and did not involve the complete sewer system. The remedy will not only clean the sewer pipelines but will seal sewer pipelines to prevent the transport of contamination.

COMMENT 53: The potential impacts within the sewers should be managed with IC/ECs.

RESPONSE 53: See response to Comment 52.

COMMENT 54: Upon information and believe, new GM had a Stormwater Management Plan in place when they severed storm and sanitary sewer connections in 2010. We have not reviewed such a plan, but if appropriate, this plan should be incorporated into the final remedy. Furthermore, since the

flooding appears to be predominately occurring at the parking lot and the swale along Kenmore Avenue, the drainage system should be limited to the Eastern half of the site, thereby reducing the potential impacts and cutting the cost of this proposed Remedial Item #11 by at least half.

RESPONSE 54: The remedial design will include a stormwater management plan to properly drain the site. Flooding/ponding occurs across the site, and is not confined to the parking lot and swale along Kenmore Avenue. As extensive ponding has been documented in other areas across the site, including the western portions of the site, the drainage system element should address the entire site.

APPENDIX B

Administrative Record

Administrative Record

Tonawanda Forge
Operable Unit No. 01: Soil Contamination
State Superfund Project
Town of Tonawanda, Erie County, New York
Site No. 915274

1. *Proposed Remedial Action Plan for the Tonawanda Forge site*, dated February 2020, prepared by the Department.

2. *SSF Referral Memorandum,* dated August 6, 2013 for a state-funded Remedial Program.

3. *NYSDEC Standby Contract D007622* Letter, dated August 23, 2013, prepared by URS Corporation.

4. *Remedial Investigation Report*, dated January 2018, prepared by URS Corporation.

5. *Feasibility Study*, dated September 2019, prepared by URS Corporation.

6. *Interim Remedial Measure Construction Completion Report*, dated August 2016, prepared by URS Corporation.

7. *Excavation Summary Report*, dated April 2019, prepared by GES, Inc.

8. *Limited Environmental Site Assessment and Site Activities Summary Report*, dated October 2012, prepared by GES, Inc.

9. *Interim Corrective Measures Report – Addendum III*, dated October 2001, prepared by BBL, Inc.

10. Letter dated March 9, 2020 from Jeffrey C. Stravino, Hodgson Russ, LLP on behalf of American Axle and Manufacturing, Inc.

11. Letter dated March 9, 2020 from James F. Hartnett, General Motors, LLC.