ENVIRONMENTAL ASSESSMENT

FOR BRAC 05 RECOMMENDATION FOR CLOSURE, DISPOSAL AND REUSE OF U.S. ARMY RESERVE CENTER AND ARMY MAINTENANCE SUPPORT ACTIVITY #76,

NIAGARA FALLS, NEW YORK

prepared for

U.S. Army Reserve 99th **Regional Support Command**

prepared by

U.S. Army Corps of Engineers

Mobile District

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May 2012

FINDING OF NO SIGNIFICANT IMPACT

BRAC 2005 RECOMMENDATION FOR CLOSURE, DISPOSAL AND REUSE OF U.S. ARMY RESERVE CENTER AND ARMY MAINTENANCE SUPPORT ACTIVITY #76 NIAGARA FALLS, NEW YORK

On September 8, 2005, the Defense Base Closure and Realignment (BRAC) Commission recommended closure of the Niagara Falls U.S. Army Reserve Center (USARC) and realignment of essential missions to a new USARC to be constructed at a Niagara Falls Air Reserve Station. This recommendation was made in conformance with the provisions of the BRAC Act of 1990, as amended (Public Law, 101-510). The deactivated USARC property is excess to Army military needs and will be disposed of according to applicable laws, regulations, and national policy.

The U.S. Army Corps of Engineers, Mobile District, has prepared an Environmental Assessment (EA) for the U.S. Army Reserve, 99th Regional Support Command which identifies, documents, and evaluates environmental effects of the proposed closure, disposal and reuse of the Niagara Falls USARC and Area Maintenance Support Activity (AMSA) #76. The EA has been developed in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code § 4321 et seq.), *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Part 1500-1508), and *Environmental Analysis of Army Actions* (32 CFR Part 651). The 2006 Base Realignment Closure Manual for Compliance with the National Environmental Policy Act was used for guidance in preparing the EA.

1.0 PROPOSED ACTION

The Proposed Action is the closure and disposal of surplus property made available by the realignment of the Niagara Falls USARC. Redevelopment and reuse of the surplus USARC property would occur as a secondary action under disposal.

Under BRAC law, the Army was required to close the Niagara Falls USARC and AMSA #76 not later than September 15, 2011. The Niagara Falls USARC and AMSA #76 closed on September 15, 2011 and the Army will dispose of the property. As a part of the disposal process, the Army screened the property for reuse with the Department of Defense (DoD) and other federal agencies. No federal agency expressed an interest in reusing this property for another purpose.

2.0 ALTERNATIVES CONSIDERED

The EA evaluated the following three alternatives:

Traditional Reuse and Disposal (Preferred Alternative). Under the Traditional Army Disposal and Reuse Alternative, the Army would make a below fair market value Economic Development Conveyance (EDC) of the entire USARC parcel to the Town of Niagara for reuse. In its approved reuse plan (2008) supplemented by its December 2011 EDC application, the Town of Niagara LRA recommended a mix of commercial and industrial uses for the property as summarized below.

- Building 4 (the hangar on the property) would be marketed to aviation and aerospace firms as a potential location for aircraft modifications, renovations, research and testing, overhauls and storage of air cargo. Buildings 4N and 4S (both attached to the hangar) would be included in solicitations of interest to provide space for offices, classroom training, engineering, computer operations, locker rooms, and storage.

- The remainder of the site would be utilized on a building-by-building basis for a mix of commercial and industrial uses that are permitted under the Town's zoning ordinance, including users such as metal fabricators, maintenance business, professional service firms, training providers, storage operations, motor vehicle service stations or aviation support type business such as food caterers, a commissary, avionics shop or other maintenance operations.

In order for the USARC site to be used in an effective manner several capital improvements would be needed. These would include demolishing five minor structures totaling 9,900 SF (Building 19 – 1,600 SF; Building 20 – 2,550 SF; Building 23 – 2,000 SF; Building 25 – 1,750 SF; and Building 26 – 2,000 SF); refurbishing interior building spaces, including making them Americans with Disabilities Act (ADA) compliant; installing utility meters for individual buildings on site; replacing the hangar doors and roof on Building 4; repaving the aircraft apron on the east side of Building 4; installing fencing between the site and the airfield; repaving vehicular areas on the site; restriping parking areas; and installing signage for the facility.

With the demolition of the five smaller buildings, the total amount of leasable space would be 146,360 SF. Based on zoning; proximity to the Niagara Falls International Airport; the age, quality, condition, and configuration of the space to be leased; as well as competition in the local real estate market, the LRA expects demand for the property to be modest and estimates that reuse of the USARC site would generate approximately 149 to 251 jobs.

Although these are the current plans, the LRA would remain flexible to the dictates of the market to take advantage of any opportunities to create new jobs. This may include demolition of additional buildings and construction of new build-to-suit space for tenants or prospective tenants. Long term, the site may also include a hotel. However, the development of a hotel on the site is at this time only conceptual, for it is not mentioned in the Town of Niagara LRA's EDC application and it is not accounted for in their economic analysis for redevelopment of the site. Since development of a hotel on the site is only conceptual at this time, it is not analyzed as part of this alternative; however, it is analyzed as a potential cumulative effect in the *Cumulative Effects Summary* section of the EA.

Caretaker Status Alternative. The Army secured the USARC and AMSA #76 after the military mission ended on September 15, 2011 to ensure public safety and the security of remaining government property and to complete any required environmental remediation actions. From the time of operational closure until conveyance of the property, the Army would provide sufficient maintenance to preserve and protect the site for reuse in an economical manner that facilitates redevelopment. Because the USARC was not transferred by September 15, 2011, the Army reduced maintenance levels to the minimum level for surplus government property as specified in 41 CFR 101-47.402, 41 CFR 101-47-4913, and Army Regulation 420-70 (Buildings and Structures).

No Action Alterative. Under the No Action alternative, the Army would continue operations at the USARC at levels similar to those that occurred prior to the BRAC Commission's recommendations for closure becoming final. Implementation of the No Action alternative is not possible due to the BRAC Commission's recommendation to close the USARC and AMSA #76 having the force of law and the fact that the property is currently in caretaker status.

3.0 ENVIRONMENTAL ANALYSIS

The EA, which is incorporated by reference into this Finding of No Significant Impact (FNSI), evaluated the potential effects of the action and no action alternatives on seven resource areas of environmental and socioeconomic concern: land use, geology and soils, water resources, socioeconomics (including environmental justice and protection of children), transportation, utilities and hazardous and toxic substances. The following paragraphs summarize the expected effects associated with the Preferred Alternative for each resource, as discussed in the EA. Fifteen other resource areas were not evaluated in-depth because they are either not present on or near the Niagara Falls USARC property, they are present but would not be impacted by any of the alternatives, or the proposed action would have little or no measureable environmental affect on the resources.

Land Use. Long-term direct impacts to land use that would not be significant are anticipated. The USARC property would change from a military site to industrial and commercial facilities and would be consistent with zoning, ordinances, community land use plans, and existing land uses in the vicinity of the property. The Army would include land use restrictions in property transfer documents to mitigate potential exposure of construction workers to impacted groundwater on the southeast portion of the property, and while these restrictions may alter how construction activities occur, they would not affect the planned reuse of the property.

Geology and Soils. Long-term direct impacts on geology and soils that are not significant would occur under the Preferred Alternative. Demolition and construction of structures on the site would disturb soils, but this action is not considered significant since soils in the project area have been previously disturbed and the majority of the site consists of impervious surfaces.

Water Resources. Approximately 95 percent of the site is covered by impervious surface and no new impervious surfaces would occur under the Preferred Alternative. Following an approved storm water pollution prevention plan and a State Pollution Discharge Elimination System General Permit for Storm Water Discharges Associated with Industrial Activity would result in no significant impacts to the nearby surface waters of Cayuga Creek or groundwater. If a Floodplain Development Permit is required for new construction along the northern boundary of the property of renovation to Building 4N, adhering to the provisions of the permit would prevent long-term significant impacts to the floodplain or to the facility itself.

Socioeconomics (including environmental justice and protection of children). There would be no significant impact on socioeconomic resources. There would be no change in the population of the region of influence, no disproportionately high and/or adverse impacts on minority or low income populations, and no adverse impacts to children in the area. Reuse of the property would provide both short-term beneficial impacts to the local economy during construction activities and operation of the facilities respectively.

Transportation. There would be no significant direct or indirect impact on traffic. Some short-term adverse impacts could occur during demolition and renovation activities, but these would be temporary and not significant. While reuse of the USARC would increase daily traffic to and from the site during weekdays, this increase would not be significant since local intersections are currently working at an acceptable Level of Service (LOS) and traffic generated from the reuse of the property would not increase the LOS to unacceptable levels.

Utilities. Overall effects on utilities would not be significant. Existing utility services provided to the site are expected to be adequate for future usage demand. Some highly localized, short-term disruptions would be expected as utility lines and linkages are adjusted or extended as necessary.

Hazardous and toxic substances. Potential impacts to hazardous and toxic substances from the traditional disposal and reuse of the USARC would be expected to have no significant effect, though they would be long-term. Due to the known or suspected ACM materials and LBP on the structures, occupancy, use, and, if the buildings are renovated or demolished, abatement and disposal will be in accordance with applicable federal and state regulations. The use of hazardous materials and handling of hazardous waste would also be managed in accordance with all applicable federal and state regulations. Based on the findings of soil and groundwater investigations completed in 2011, and Interim Remediation Activities that removed approximately 40 tons of contaminated soil and approximately 2,000 gallons of contaminated groundwater from the excavation, a Human Health Risk Assessment (HRRA) concluded that the only potential risk on the site to human health and the environment is a carcinogenic risk for construction workers exposed to contaminated groundwater during subsurface activities (e.g. site upgrades, new construction etc.). The HRRA recommended the development and implementation of a land use restriction in the form of a Site Management Plan as an adequate remedy to reduce the risk or exposure to contaminated groundwater for construction workers during construction. Therefore, to mitigate the potential exposure of construction workers to impacted groundwater on the southeast portion of the Property, the Army will place land use restrictions in the form of a Site Management Plan in the property transfer documents.

4.0 PUBLIC COMMENT

Interested parties were invited to review and comment on the EA and Draft FNSI during the 30-day comment period, June 6, 2012 through July 5, 2012. A Notice of Availability was published in the *Niagara Gazette* on June 6 and 7, 2012. During the 30-day comment period, no public comments were received on the Final EA and Draft FNSI.

5.0 CONCLUSION

Direct, indirect, and cumulative impacts of the Preferred Alternative, the Caretaker Status Alternative, and the No Action Alternative have been considered. The evaluation performed within the Environmental Assessment concludes that there would be no significant impact to the human or natural environment as a result of the implementation of any of the alternatives. Therefore, the issuance of a Finding of No Significant Impact is warranted, and preparation of an Environmental Impact Statement is not required.

Date: 12 March 2013

WILLIAM J.P. SLORA
LTC, EN
Regional Engineer
U.S. Army Reserve, 99th Regional Support Command

ENVIRONMENTAL ASSESSMENT

FOR BRAC 05 RECOMMENDATION FOR CLOSURE, DISPOSAL AND REUSE OF U.S. ARMY RESERVE CENTER AND ARMY MAINTENANCE SUPPORT ACTIVITY #76, NIAGARA FALLS, NEW YORK

Approved by:

99th Regional Support Command

for
JOSE E. CEPEDA
COL, EN
DPW Regional Engineer

JEFFREY HRZIC, GS13
Chief, ENV Division

ENVIRONMENTAL ASSESSMENT

LEAD AGENCY: U.S. Army Reserve 99th Regional Support Command

TITLE OF PROPOSED ACTION: Environmental Assessment for BRAC 05 Recommendation for Closure, Disposal and Reuse of U.S. Army Reserve Center and Army Maintenance Support Activity #76 Niagara Falls, New York

AFFECTED JURISDICTIONS: Niagara County, New York

PREPARED BY: Steven J. Roemhildt, Colonel, U.S. Army Corps of Engineers, Mobile District, District Commander.

APPROVED BY: Jose E. Cepeda, Colonel, U.S. Army Reserve, 99th Regional Support Command, Regional Engineer.

ABSTRACT: On September 8, 2005, the Defense Base Realignment and Closure (BRAC) Commission recommended closure of the Niagara Falls USARC and realignment of essential missions to a new U.S. Army Reserve Center (USARC) to be constructed at Niagara Falls Air Reserve Station in Niagara Falls, New York. These recommendations were approved by the President on September 15, 2005, and forwarded to Congress. The Congress did not alter any of the BRAC Commission's recommendations, and on November 9, 2005, the recommendations became law. The BRAC Commission's recommendations must now be implemented as provided for in the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510), as amended.

The deactivated USARC property is excess to Army military needs and will be disposed of according to applicable laws, regulations, and national policy. Pursuant to the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations, the Army has prepared this Environmental Assessment (EA) to address the environmental and socioeconomic impacts of disposing of the property and reasonable, foreseeable reuse alternatives.

None of the predicted effects of the Proposed Action would result in significant impacts to the quality of the human or biological environment in Niagara Falls, NY. Moreover, mitigation would not be necessary to offset impacts. Therefore, preparation of an Environmental Impact Statement is not required and a Finding of No Significant Impact (FNSI) will be published in accordance with the NEPA.

REVIEW PERIOD: A notice of availability (NOA) for the EA and draft FNSI was published in The Niagara Gazette on June 6 and 7, 2012 announcing the beginning of the 30-day public review period from June 6, 2012 to July 5, 2012. In the NOA, interested parties are informed that the EA and Draft FNSI are available via the World Wide Web at http://www.hqda.army.mil/acsim/brac/env_ea_review.htm and at the Niagara Falls Public Library, 1425 Main Street, Niagara Falls, NY 14305. Interested parties are invited to submit comments on the EA and Draft FNSI during the 30-day public comment period via mail or email to the following:

Ms. Amanda Murphy
NEPA and Cultural Resources Specialist
United States Army Reserve 99th Regional Support Command
5231 South Scott Plaza
Fort Dix, NJ 08640
email: amanda.w.murphy.ctr@us.army.mil

STATE OF NEW YORK
NIAGARA COUNTY,} SS,__________

Linda Elliott, of said county, being duly sworn, deposes and says that she is now and during the whole time hereinafter mentioned was the Clerk of

NIAGARA GAZETTE

A newspaper published in the County and State aforesaid, and that the annexed printed legal # 29156 was printed and published in said paper on the following dates:

06/06/2012 06/07/2012

Linda Elliott
Principal Clerk

Subscribed and sworn to before me this
11 June 2012

PATRICIA J. KING
Notary Public, State of New York
Qualified in Niagara County
My Commission Expires ~~March 30, 19~~......

Patricia J King 07/27/2014

Notary Public Expiration Date

PUBLIC NOTICE OF AVAILABILITY

ENVIRONMENTAL ASSESSMENT AND DRAFT FINDING OF

NO SIGNIFICANT IMPACT FOR THE BRAC 05 CLOSURE, DISPOSAL, AND REUSE OF U.S. ARMY RESERVE CENTER AND ARMY MAINTENANCE SUPPORT ACTIVITY

NIAGARA FALLS, NEW YORK

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 CFR 1500), and 32 CFR 651 Environmental Analysis of Army Actions, the U.S. Army Reserve (USAR) 99th Regional Support Command (RSC) conducted an Environmental Assessment (EA) of the potential environmental and socioeconomic effects associated with implementing the Defense Base Realignment and Closure (BRAC) Commission's recommendations for the U.S. Army Reserve Center (USARC) and Army Maintenance Support Activity (AMSA) #76, Niagara Falls, New York. The EA evaluated the potential environmental impacts associated with the closure, disposal, and reuse of the USARC.

Two reasonable alternatives were identified and evaluated in addition to the No Action Alternative: the Traditional Disposal and Reuse Alternative (Preferred) and the Caretaker Status Alternative. The Traditional Disposal and Reuse Alternative would close the Niagara Falls USARC and AMSA and transfer the property to the Town of Niagara as a below fair market value Economic Development Conveyance for reuse by aviation and aerospace firms (Building 4, the hangar, and its two attached buildings, 4N and 4S) and a mix of light industrial and commercial uses permitted by the Town of Niagara zoning (remainder of site on a building by building basis).

The EA and Draft Finding of No Significant Impact (FNSI) will undergo a 30-day public comment period, from the date of this publication. This is in accordance with requirements specified in 32 CFR Part 651.14 Environmental Analysis of Army Actions. During this period the public may submit written comments on the EA and draft FNSI.

The EA and draft FNSI are available for review on the World Wide Web at
http:/www.hqda.army.mil/acsim/brac/env_ea_review.htm

Printed copies of the EA and Draft FNSI can also be viewed at the Niagara Falls Public Library, 1425 Main Street; Niagara Falls, NY14305.

Comments on the EA and draft FNSI and requests for information should be submitted during the 30-day public comment period via mail or electronic mail to the Environmental Coordinator of the USAR 99th RSC at:

Ms. Amanda Murphy
USAR 99th RSC
5231 South Scott Plaza
Fort Dix, New Jersey 08640
Email: amanda.w.murphy.ctr@us.army.mil

#N29156 6/6,7/2012

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

On September 8, 2005, the Defense Base Realignment and Closure (BRAC) Commission recommended closure of the Niagara Falls U.S. Army Reserve Center (USARC) and Army Maintenance Support Activity (AMSA) #76 and realignment of essential missions to a new USARC to be constructed at Niagara Falls Air Reserve Station. This recommendation was made in conformance with the provisions of the BRAC Act of 1990, (Public Law, 101-510) as amended. The deactivated USARC property is excess to Army military needs and will be disposed of according to applicable laws, regulations, and national policy. Pursuant to the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations, the Army has prepared this Environmental Assessment (EA) to address the environmental and socioeconomic impacts of disposing of the property and reasonable, foreseeable reuse alternatives.

ES.2 BACKGROUND AND SETTING

The Niagara Falls USARC is located within the Town of Niagara, New York in Niagara County in northwestern New York. The Town of Niagara is a 16.8-square-mile community located approximately 6 miles east of the City of Niagara Falls, New York and 20 miles north of the City of Buffalo, New York.

ES.3 PROPOSED ACTION

The proposed action is the disposal of surplus property made available by the realignment of the USARC and AMSA #76 in Niagara Falls, NY. Redevelopment and reuse of the surplus USARC property (the "Property") would occur as a secondary action under disposal.

Under BRAC law, the Army was required to close the Niagara Falls USARC and AMSA #76 not later than September 15, 2011. The Niagara Falls USARC and AMSA #76 closed on September 15, 2011 and the Army will dispose of the property. As a part of the disposal process, the Army screened the property for reuse with the Department of Defense (DoD) and other federal agencies. No federal agency expressed an interest in reusing this property for another purpose.

ES.4 ALTERNATIVES

Preferred Alternative: Traditional Disposal and Reuse

Under the Traditional Army Disposal and Reuse Alternative, the Army would make a below fair market value EDC of the entire USARC parcel to the Town of Niagara for reuse. In its approved reuse plan (2008) supplemented by its December 2011 EDC application, the Town of Niagara LRA recommended a mix of commercial and industrial uses for the property as summarized below. The EDC application, which contains the reuse plan, is included in Appendix A of this EA.

- Building 4 (the hangar on the property) would be marketed to aviation and aerospace firms as a potential location for aircraft modifications, renovations, research and testing, overhauls and storage of air cargo. Buildings 4N and 4S (both attached to the hangar) would be included in solicitations of interest to provide space for offices, classroom training, engineering, computer operations, locker rooms, and storage.

- The remainder of the site would be utilized on a building-by-building basis for a mix of commercial and industrial uses that are permitted under the Town's zoning ordinance, including users such as metal fabricators, maintenance business, professional service firms, training providers, storage operations, motor vehicle service stations or aviation support type business such as food caterers, a commissary, avionics shop or other maintenance operations.

In order for the USARC site to be used in an effective manner several capital improvements would be needed. These would include demolishing five minor structures totaling 9,900 SF (Building 19 – 1,600 SF; Building 20 – 2,550 SF; Building 23 – 2,000 SF; Building 25 – 1,750 SF; and Building 26 – 2,000 SF); refurbishing interior building spaces, including making them Americans with Disabilities Act (ADA) compliant; installing utility meters for individual buildings on site; replacing the hangar doors and roof on Building 4; repaving the aircraft apron on the east side of Building 4; installing fencing between the site and the airfield; repaving vehicular areas on the site; restriping parking areas; and installing signage for the facility.

With the demolition of the five smaller buildings, the total amount of leasable space would be 146,360 SF. Based on zoning; proximity to the Niagara Falls International Airport; the age, quality, condition, and configuration of the space to be leased; as well as competition in the local real estate market, the LRA expects demand for the property to be modest and estimates that reuse of the USARC site would generate approximately 149 to 251 jobs (Town of Niagara LRA, 2011).

Although, these are the current plans, the LRA would remain flexible to the dictates of the market to take advantage of any opportunities to create new jobs. This may include demolition of additional buildings and construction of new build-to-suit space for tenants or prospective tenants. Long term, the site may also include a hotel (CHA, 2011). However, the development of a hotel on the site is at this time only conceptual, for it is not mentioned in the Town of Niagara LRA's EDC application and it is not accounted for in their economic analysis for redevelopment of the site (Town of Niagara LRA, 2011). Since development of a hotel on the site is only conceptual at this time, it is not analyzed as part of this alternative; however, it is analyzed as a potential cumulative effect in the *Cumulative Effects Summary* section of this EA.

Caretaker Status Alternative

The Army secured the USARC and AMSA #76 after the military mission ended on September 15, 2011 to ensure public safety and the security of remaining government property. From the time of operational closure until conveyance of the property, the Army would provide sufficient maintenance to preserve and protect the site for reuse in an economical manner that facilitates redevelopment. If the USARC was not transferred by September 15, 2011, the Army would reduce maintenance levels to the minimum level for surplus government property as specified in 41 CFR 101-47.402, 41 CFR 101-47-4913, and Army Regulation 420-70 (Buildings and Structures).

No Action Alternative

Under the No Action alternative, the Army would continue operations at the USARC at levels similar to those that occurred prior to the BRAC Commission's recommendations for closure becoming final. Implementation of the No Action alternative is not possible due to the BRAC Commission's recommendation to close the USARC and Army Maintenance Support Activity (AMSA) #76 having the force of law. However, inclusion of the No Action alternative is prescribed by the CEQ regulations implementing NEPA, and serves as a benchmark against which the environmental impacts of the action alternatives may be evaluated. Therefore, the No Action alternative is evaluated in the EA.

ES.5 ENVIRONMENTAL CONSEQUENCES

Consequences of the Preferred Alternative: Traditional Disposal and Reuse

Under the Preferred Alternative there would be no significant effects on any of the environmental or related resource areas within the local or surrounding areas. All of the resource areas were evaluated to be at the No Effects or No Significant Effect levels.

Consequences of the Caretaker Status Alternative

Under the Caretaker Status Alternative, the Army would retain the USARC as-is with on-going maintenance and there would be no significant effects on any of the environmental or related resource areas within the local or surrounding areas. All of the resource areas were evaluated at the No Effects or No Significant Effect levels.

Consequences of the No Action Alternative

Under the No Action Alternative, the proposed closure, disposal and reuse of the property would not take place and there would be no significant effects on any of the environmental or related resource areas within the local or surrounding areas. All of the resource areas were evaluated to be at the No Effects or No Significant Effect levels.

A summary of impacts by resource area for the two action alternatives and the No Action Alternative is provided in Table ES-1.

Table ES-1. Summary of the Impacts of the Proposed Action Alternatives

Resource	Preferred Alternative	Caretaker Status Alternative	No Action Alternative
Land Use			
Regional Geographic Setting and Location	No effect.	No effect.	No effect.
Site Land Use	No significant effect.	No effect.	No effect.
Current and Future Development in the Region of Influence	No effect.	No effect.	No effect.
Coastal Zone	Resource not present	Resource not present	Resource not present
Aesthetic and Visual Resources	No effect.	No effect.	No effect.
Air Quality			
Ambient Air Quality Conditions	No significant effect.	No effect.	No effect.
Meteorology/Climate	No effect.	No effect.	No effect.
Air Pollutant Emissions at Project Site	No significant effect.	No effect.	No effect.
Regional Air Pollutant Emissions Summary	No significant effect.	No effect.	No effect.

Resource	Preferred Alternative	Caretaker Status Alternative	No Action Alternative
Noise	No significant effect.	No effect.	No effect.
Geology and Soils			
Geologic and Topographic Conditions	No effect.	No effect.	No effect.
Soils	No significant effect.	No significant effect.	No significant effect.
Prime Farmland	Resource not present	Resource not present	Resource not present
Water Resources			
Surface Water	No significant effect.	No effect.	No effect.
Wetlands	Resource not present	Resource not present	Resource not present
Hydrogeology/Groundwater	No significant effect.	No significant effect.	No significant effect.
Floodplains	No significant effect.	No effect.	No effect.
Storm water System	No effect.	No effect.	No effect.
Biological Resources			
Vegetation	No effect.	No effect.	No effect.
Wildlife	No effect.	No effect.	No effect.
Threatened, Endangered, and Sensitive Species	Resource not present	Resource not present	Resource not present
Cultural Resources			
Archaeology	Resource not present	Resource not present	Resource not present
Built Environment	Resource not present	Resource not present	Resource not present
Socioeconomics			
Economic Development	No significant effect.	No significant effect.	No effect.
Demographics	No effect.	No effect.	No effect.
Environmental Justice	No effect.	No effect.	No effect.
Protection of Children	No effect.	No effect.	No effect.
Transportation			

Resource	Preferred Alternative	Caretaker Status Alternative	No Action Alternative
Roadways and Traffic	No significant effect.	No effect.	No effect.
Public Transportation	No significant effect.	No effect.	No effect.
Utilities			
Potable Water Supply	No significant effect.	No effect.	No effect.
Sanitary Sewer System	No significant effect.	No effect.	No effect.
Electrical Service and Distribution	No significant effect.	No effect.	No effect.
Natural gas	No effect.	No effect.	No effect.
Communications	No significant effect.	No effect.	No effect.
Municipal Solid Waste	No significant effect.	No effect.	No effect.
Hazardous and Toxic Substances			
Uses of Hazardous Materials	No significant effect.	No effect.	No effect.
Storage and Handling Areas	No significant effect.	No effect.	No effect.
Site Contamination and Cleanup	No significant effect.	No significant effect.	No significant effect.
Cumulative Effects	No significant effect.	No effect.	No effect.

ES.6 MITIGATION RESPONSIBILITY AND PERMIT REQUIREMENTS

Beyond the placement of land use restrictions on the Property, no specific mitigation is required of the Army. Based on the findings of soil and groundwater investigations completed in 2011, Interim Remediation Activities removed approximately 40 tons of contaminated soil and approximately 2,000 gallons of contaminated groundwater from the excavation. Also, an approximate 8-foot long section of 6-inch diameter cast iron fire protection main was removed and the open ends of the pipe were fitted with a Fernco and polyvinyl chloride (PVC) cap prior to backfilling. A Human Health Risk Assessment (HRRA) concluded that the only potential risk on the site is a carcinogenic risk for construction workers exposed to contaminated groundwater during subsurface activities (e.g. site upgrades, new construction etc.). The HRRA recommended the development and implementation of a land use restriction in the form of a Site Management Plan as an adequate remedy to reduce the risk or exposure to contaminated groundwater for construction workers during construction. Therefore, the Army would impose in the transfer or conveyance of the USARC property appropriate land use restrictions to protect construction workers. The Army will document their proposed plan for a remedial action in the form of a land use restriction in a

"Proposed Plan." The "Proposed Plan" will be released for public review in the near future. Any comments received will be documented in the Decision Document.

ES.7 CONCLUSIONS

Based on the analysis performed in this EA, implementation of the proposed action under any of the action alternatives would have no significant direct, indirect, or cumulative effects on the quality of the natural or human environment. Preparation of an Environmental Impact Statement is not required and issuance of a FNSI would be appropriate.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

1.0 **INTRODUCTION**

This Environmental Assessment (EA) analyzes the environmental impacts of the proposed closure, disposal and reuse of the United States Army Reserve Center (USARC) and Army Maintenance Support Activity (AMSA) #76 in Niagara Falls, New York (Figure 1-1). This EA was developed in accordance with the *National Environmental Policy Act of 1969* (NEPA) [42 United States Code (U.S.C.) § 4321 et seq.]; implementing regulations issued by the President's Council on Environmental Quality (CEQ), 40 *Code of Federal Regulations* (CFR) Parts 1500-1508; and *Environmental Analysis of Army Actions*, 32 CFR Part 651. The purpose of the EA is to inform decision makers and the public of the likely environmental consequences of the Proposed Action and alternatives.

1.1 PURPOSE AND NEED OF THE PROPOSED ACTION

On September 8, 2005, the Defense Base Realignment and Closure (BRAC) Commission recommended closure of the USARC and AMSA #76 and realignment of essential missions to a new U.S. Armed Forces Reserve Center (AFRC) to be constructed on the existing site or on the Niagara Falls Air Reserve Station (ARS) in Niagara Falls, NY. The new AFRC was constructed at a site on the Niagara Falls ARS; therefore, the deactivated USARC property is excess to Army military need and will be disposed of according to applicable laws and regulations.

1.2 PUBLIC INVOLVEMENT

The Army is committed to open decision-making. The collaborative involvement of other agencies, organizations, and individuals in the NEPA process enhances issue identification and problem solving. In preparing this EA, the Army consulted with the State Historic Preservation Officer (SHPO), U.S. Fish and Wildlife Service (USFWS), Native American Tribes, federal, state and local regulatory agencies, state and local governments, non-governmental organizations, individuals and others as appropriate.

The 30-day public-review period begins by placing a Notice of Availability (NOA) of the final EA and a draft Finding of No Significant Impact (FNSI) in a local newspaper, *The Niagara Gazette*. The EA and draft FNSI are made available at the Niagara Falls Public Library, 1425 Main Street, Niagara Falls, NY 14305 and on the BRAC website at http://www.hqda.army.mil/acsim/brac/env_ea_review.htm. The Army invites the public and all interested and affected parties to review and comment on this EA and the draft FNSI. Comments and requests for information should be submitted to the Environmental Coordinator of the United States Army Reserve (USAR) 99th Regional Support Command (RSC): Ms. Amanda Murphy at United States Army Reserve 99th Regional Support Command, 5231 South Scott Plaza, Fort Dix, New Jersey 08640 or amanda.w.murphy.ctr@us.army.mil.

At the end of the public review period, the Army will review all comments received; compare environmental impacts associated with reasonable alternatives; revise the FNSI or the EA, if necessary; supplement the EA, if needed; and make a decision. If the impacts of the proposed action are not significant, the Army will execute the FNSI and the action can proceed immediately. If potential impacts are found to be significant, the Army may decide not to implement the proposed action, commit in the FNSI to mitigation reducing the anticipated impact(s) to a less than significant impact, or publish a Notice of Intent to prepare an Environmental Impact Statement in the Federal Register.

Figure 1-1. Niagara Falls USARC Location

2.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the disposal of surplus property made available by the realignment of the USARC and AMSA #76 in Niagara Falls, NY. Redevelopment and reuse of the surplus USARC property (the "Property") would occur as a secondary action under disposal.

Under BRAC law, the Army was required to close the Niagara Falls USARC and AMSA #76 not later than September 15, 2011. The Niagara Falls USARC and AMSA #76 closed on September 15, 2011 and the Army will dispose of the property. As a part of the disposal process, the Army screened the property for reuse with the Department of Defense (DoD) and other federal agencies. No federal agency expressed an interest in reusing this property for another purpose.

2.1 BRAC COMMISSION'S RECOMMENDATION

The BRAC Commission's recommendation is to:

> *"Close the United States Army Reserve Center and Army Maintenance Support Activity, Niagara Falls, NY and construct a new Armed Forces Reserve Center on the existing site or on the former Niagara Falls Air Reserve Station, if a suitable site is available, in Niagara Falls, NY. The new AFRC shall have the capability to accommodate the NY National Guard units from the Niagara Falls Readiness Center, if the state of New York decides to relocate those National Guard units."* (BRAC Commission, 2005)

The environmental impacts resulting from the construction and operation of the new AFRC on the Niagara Falls ARS, Niagara Falls, NY are analyzed in *Environmental Assessment, Construction of an Armed Forces Reserve Center Complex and Implementation of BRAC 05 Realignment Actions in Niagara Falls, New York*, July 2007 (USACE, 2007a).

2.2 LOCAL REDEVELOPMENT AUTHORITY'S REUSE PLAN

The Town of Niagara, as the governmental entity that will have jurisdiction over the property after base closure, has been designated by the DoD as the Local Redevelopment Authority (LRA) for the USARC facility. According to the Federal Property Administrative Services Act of 1949 and the Base Closure Community Redevelopment and Homeless Assistance Act of 1994, the LRA screened this Federal Government surplus property by soliciting notices of interest from state and local governments, representatives of the homeless, and other interested parties. After reviewing two reuse proposals and recommendations and all public comments, the LRA recommended that the property be transferred to the Town of Niagara as a below fair market value Economic Development Conveyance (EDC) for reuse by aviation and aerospace firms (Building 4, the hangar, and its two attached buildings, 4N and 4S) and a mix of light industrial and commercial uses permitted by the Town of Niagara zoning (remainder of site on a building by building basis) (Appendix A). On February 12, 2008 the Draft Redevelopment Plan and Homeless Assistance Submission for U.S. Army Reserve Center/Area Maintenance Center #76, was approved by a resolution of the Niagara Town Board. The reuse planned was approved by the U.S. Department of Housing and Urban Development on April 1, 2009 (Town of Niagara LRA, 2011).

2.3 HISTORY AND DESCRIPTION OF THE NIAGARA FALLS USARC AND AMSA #76 (THE "PROPERTY")

In 1959 the U.S. Army Reserve acquired 21.88 acres of property along the north side of Porter Road in Niagara County that was part of a Naval Air Reserve Station and put it into use as a U.S. Army Reserve Center. At that time, the site contained several buildings and a large aircraft hangar. Additional buildings were later built on the site. Although no documentation has been found that indicates the Navy's use of the site until after World War II, the Naval Aeronautical Organization for Fiscal Year 1948 report showed that a new facility would be added in the vicinity of the Syracuse-Buffalo, New York for Air Reserve training, and Niagara Falls was first listed among existing Naval Air Reserve Stations in the Naval Aeronautical Organization for Fiscal Year 1950 report (U.S. Army, 2011). Prior to use by the Navy, the site was a city-owned airport (U.S. Army, 2011). Since the U.S. Army Reserve officially acquired the land, various units with the U.S. Army Reserve have used the property including current units consisting of the 277th Quartermasters Corps (a refueling unit), the 865th Combat Support Hospital (a field medical unity), and the 1982nd Forward Surgical Unit (a field surgical unit) and AMSA #76.

The New York Army National Guard was a tenant on the property from 1972 to 1995, and from about 1970 to 1975 the site was also used for servicing Nike Ajax missile warheads (conventional warheads only) from missile batteries around the state of New York.

Currently the property consists of 14 structures, including ancillary structures such as a guardhouse, hazardous material sheds, and an electrical building, and three parking/equipment storage areas (Figure 2-1). The property is almost entirely covered by impervious surfaces such as building footprints, asphalt parking areas, and driveways. Small areas are grass covered (south-central area) or have a mix of grass and gravel, such as in the southwestern corner of the Property. Buildings on site include:

- Building 4 is a 33,750 square-foot (SF) hangar constructed in 1956. It is a large, metal-framed hangar with two-story buildings attached to the north (Building 4N – 27,000 SF) and south (Building 4S – 36,000 SF) sides. Currently these three buildings are used to store equipment such as tents, clothing, boots, vests, and other similar materials. There are also administrative offices, classrooms, a mailroom, bathrooms, a garage, an air compressor room, a kitchen, boiler/mechanical room, and a flight locker room among other things.
- Building 17 consists of a petroleum, oil and lubricant (POL) shed and an above ground storage tank (AST) for waste oil.
- Building T18 is an L-shaped, single story, 13,670 SF structure built in 1956 and expanded in 1990. The building houses an organizational maintenance shop (OMS) and an AMSA. Trench drains throughout the building connect to an oil/water separator (OWS) which connects to the sanitary sewer. In addition to the vehicle maintenance bays there are tool and storage rooms.
- Building T19 is a single-story, 1,600 SF Quonset Hut storage building.
- Building 20 is a single-story, 2,550 SF storage building. It also contains a natural gas-fired boiler room and electronics service room.
- Building T21 is a single-story, 13,540 SF building that currently serves as offices and an OMS with two vehicle maintenance bays. The OMS has trench drains leading to an OWS which is connected to the sanitary sewer system. This building also has a boiler room, classrooms, offices, bathrooms, and storage areas.
- Building 22 is a two-story, 20,000 SF building used for storage, classroom training, and administrative tasks. The building also has a kitchen and dining hall. The second floor consists of classrooms and office space, storage room for flight gear and bathrooms.
- Building T23 is a single-story, 2,000 SF storage building.

Figure 2-1. Niagara Falls Site Plan

- Building T24 is a single story, 2,400 SF storage shed with two metal roll-up vehicular doors. The building has electricity and heat but no plumbing.
- Building 25 is a single story, 1,750 SF building originally constructed as the heating plant for the property. It is currently used as a storage building.
- Building T26 is a single story, 2,000 SF building constructed of a metal frame as well as metal siding and roof. It is primarily used to store equipment.
- There is also a one-story, one bay wide and one bay deep electrical building on the property and a small guard shed at the entrance to the property.

In addition to the buildings there is a vehicle wash rack outside of Building 18 (the AMSA) and three OWS on the property.

Prior to closure, the Army units stationed at the site were made up of 412 reservists who drilled on the weekends and 35 full-time employees. The facilities on the site were used for vehicle maintenance; classroom training of reservists; and storage of equipment such as boots, clothing, tents, medical supplies, oil and lubricants and other materials used to support troops in the field.

3.0 ALTERNATIVES TO THE PROPOSED ACTION

A key principle of NEPA is that agencies are to give full consideration to all reasonable alternatives to a proposed action. Considering alternatives helps to avoid unnecessary impacts and allows analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative must be affordable, capable of implementation, and satisfactory with respect to meeting the purpose of and need for the action. The following discussion identifies alternatives considered by the Army and identifies whether they are feasible and, hence, subject to detailed evaluation in this EA.

3.1 PREFERRED ALTERNATIVE: TRADITIONAL ARMY DISPOSAL AND REUSE

Under the Traditional Army Disposal and Reuse Alternative, the Army would make a below fair market value EDC of the entire USARC parcel to the Town of Niagara for reuse. In its approved reuse plan (2008) supplemented by its December 2011 EDC application, the Town of Niagara LRA recommended a mix of commercial and industrial uses for the property as summarized below. The EDC application, which contains the reuse plan, is included in Appendix A of this EA.

- Building 4 (the hangar on the property) would be marketed to aviation and aerospace firms as a potential location for aircraft modifications, renovations, research and testing, overhauls and storage of air cargo. Buildings 4N and 4S (both attached to the hangar) would be included in solicitations of interest to provide space for offices, classroom training, engineering, computer operations, locker rooms, and storage.

- The remainder of the site would be utilized on a building-by-building basis for a mix of commercial and industrial uses that are permitted under the Town's zoning ordinance, including users such as metal fabricators, maintenance business, professional service firms, training providers, storage operations, motor vehicle service stations or aviation support type business such as food caterers, a commissary, avionics shop or other maintenance operations.

In order for the USARC site to be used in an effective manner several capital improvements would be needed. These would include demolishing five minor structures totaling 9,900 SF (Building 19 – 1,600 SF; Building 20 – 2,550 SF; Building 23 – 2,000 SF; Building 25 – 1,750 SF; and Building 26 – 2,000 SF); refurbishing interior building spaces of the remaining buildings, including making them Americans with Disabilities Act (ADA) compliant; installing utility meters for individual buildings on site; replacing the hangar doors and roof on Building 4; repaving the aircraft apron on the east side of Building 4; installing fencing between the site and the airfield; repaving vehicular areas on the site; restriping parking areas; and installing signage for the facility.

With the demolition of the five smaller buildings, the total amount of leasable space would be 146,360 SF. Based on zoning; proximity to the Niagara Falls International Airport; the age, quality, condition, and configuration of the space to be leased; as well as competition in the local real estate market, the LRA expects demand for the property to be modest and estimates that reuse of the USARC site would generate approximately 149 to 251 jobs (Town of Niagara LRA, 2011).

Although, these are the current plans, the LRA would remain flexible to the dictates of the market to take advantage of any opportunities to create new jobs. This may include demolition of additional buildings and construction of new build-to-suit space for tenants or prospective tenants. Long term, the site may also include a hotel (CHA, 2011). However, the development of a hotel on the site is at this time only conceptual, for it is not mentioned in the Town of Niagara LRA's EDC application and it is not accounted for in their economic analysis for redevelopment of the site (Town of Niagara LRA, 2011). Since development of a hotel on the site is only conceptual at this time, it is not analyzed as part of this alternative; however, it is analyzed as a potential cumulative effect in the *Cumulative Effects Summary* section of this EA.

3.2 CARETAKER STATUS ALTERNATIVE

The Army secured the USARC and AMSA #76 after the military mission ended on September 15, 2011 to ensure public safety and the security of remaining government property and to complete any required environmental remediation actions. From the time of operational closure until conveyance of the property, the Army would provide sufficient maintenance to preserve and protect the site for reuse in an economical manner that facilitates redevelopment. Because the USARC was not transferred by September 15, 2011, the Army reduced maintenance levels to the minimum level for surplus government property as specified in 41 CFR 101-47.402, 41 CFR 101-47-4913, and Army Regulation 420-70 (Buildings and Structures).

3.3 NO ACTION ALTERNATIVE

Under the No Action alternative, the Army would continue operations at the USARC at levels similar to those that occurred prior to the BRAC Commission's recommendations for closure becoming final. Implementation of the No Action alternative is not possible due to the BRAC Commission's recommendation to close the USARC and AMSA #76 having the force of law and the fact that the property is currently in caretaker status. However, inclusion of the No Action alternative is prescribed by the CEQ regulations implementing NEPA, and serves as a benchmark against which the environmental impacts of the action alternatives may be evaluated. Therefore, the No Action alternative is evaluated in the EA.

3.4 ALTERNATIVES CONSIDERED AND ELIMINATED FROM FURTHER ANALYSIS

3.4.1 Early Transfer and Reuse Before Cleanup is Completed

Under this alternative, the Army would take advantage of various property transfer and disposal methods that allow the reuse of contaminated property to occur before all remedial actions have been completed. One method is to transfer the property to a new owner who agrees to perform, or to allow the Army to perform, all remedial actions required under applicable Federal and state requirements. This alternative would require concurrence of the appropriate environmental agency and the governor of the affected state. The property must be suitable for the new owner's intended use, and the intended use must be consistent with protection of human health and the environment.

The Environmental Condition of Property (ECP) Report for the USARC property (CH2MHILL, 2007) initially classified the Property as an ECP Category 7 (an area or parcel of real property that is unevaluated or requires additional evaluation) due to reports of a former landfill on the Property, published reports on the Nike missile program indicating that there is the potential for environmental effects related to Nike missile operations and maintenance, and an outstanding recommendation from a 1994 Preliminary Assessment (PA) to perform sediment sampling in Cayuga Creek to evaluate discharges from floor drains into the storm sewer from Building 4 prior to oil water separators (OWS) being installed. A Supplemental Phase 1 Assessment concluded that "no definitive evidence was obtained that confirms the presence of a landfill on the Property." (CH2MHILL, 2009). Though no evidence of a landfill was found, the Supplemental Phase 1 Assessment continued to classify the Property as an ECP Category 7 primarily due to a polychlorinated biphenyl (PCB) investigation going on at that time (CH2MHILL. 2009).

In 2008, a liquid later determined to contain PCBs was observed flowing out of the 24-inch storm water pipe along the southeastern portion of property into a drainage swale off-site along Porter Road. In 2008 and 2009, an investigation to establish the spill boundaries and delineate the contaminated area was conducted. Sampling data indicated that PCB contamination extended beyond the sampling area and that concentrations were more than triple the regulatory threshold (PARS, 2009). In 2009, a remedial action in the form of a soil excavation occurred and 134 tons of PCB contaminated soil was removed in the off-site drainage swale. Post-excavation soils samples were below the maximum contamination level of 1 milligram per kilogram (mg/kg) established by the New York State Department of Environmental Conservation (NYSDEC) (PARS, 2009). In 2009, a Site Inspection occurred to investigate the origin of PCBs on the site. During the Site Inspection additional contaminants were found in soil and groundwater samples taken in the southeast portion of the property that were in concentrations above New York restricted commercial soil cleanup objectives and New York Class GA Groundwater Criteria (all fresh groundwater in NY is classified as GA, and its defined best use is as a source of potable water) (PARS, 2011). As a result, additional soil and groundwater investigations were conducted in the Remedial Investigation (RI), an interim remedial action (IRA) was performed, and a Human Health Risk Assessment (HHRA) and Feasibility Study were conducted (PARS, 2012). See Appendix C for the *Final – Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment*.

The IRA consisted of removal of approximately 40 tons of contaminated soil and approximately 2,000 gallons of contaminated groundwater from the excavation (PARS, 2012). Also, an approximate 8-foot long section of 6-inch diameter cast iron fire protection main was removed and the open ends of the pipe were fitted with a Fernco and polyvinyl chloride (PVC) cap prior to backfilling. The HRRA was conducted to evaluate the potential risks to human health from exposure to volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and PCBs in subsurface soils and groundwater. The HRRA concluded that the only potential carcinogenic risk on the site would be to construction workers from exposure to groundwater during subsurface activities (e.g. site upgrades, new construction etc.), and that the risk was only slightly above the U.S. Environmental Protection Agency (U.S. EPA) acceptable exposure risk range. As an adequate remedy to reduce the risk or exposure to groundwater for construction workers during construction, the HRRA recommended that a land use restriction, in the form of a Site Management Plan, be developed based on the planned redevelopment and use of the site and implemented by the future owner of the Property. The Army will document their proposed plan for a remedial action in the form of a land use restriction in a “Proposed Plan.” The “Proposed Plan” will be released for public review in the near future. Any comments received will be documented in the Decision Document.

Regarding potential impacts from the maintenance of Nike missiles in Building 4 and outstanding sediment sampling in Cayuga Creek; the report cited in the ECP indicating “disposal practices…could have included storage in drums as well as “unofficial” disposal to the ground and subsurface” pertained to Nike missile battery sites and not Nike maintenance facilities like the USARC site (Law Engineering Testing Company, 1986). There have been no reports of stressed vegetation at any of the outfalls in Cayuga Creek, nor has there been any evidence of industrial discharge leaving the property via the storm system associated with Building 4 that would indicate any contamination occurred as a result of maintenance operations in Building 4. Additionally, during a 2011 RI the NYSDEC informed the Army that sediment sampling at Outfalls 1, 2 and 3 in Cayuga Creek was not required due to accessibility issues and outfall’s position below the creek’s water line (PARS, 2012).

Any previous spills associated with activities on the Property have been remediated and are considered complete. Therefore, no further site investigations are warranted for this Property, and land use restrictions would be included in the property deed for transfer, providing adequate protection for construction workers from contaminated groundwater. Therefore, the Property will be classified as an ECP Category 4 (an area or parcel of real property where release, disposal, or migration, or some combination thereof, of hazardous substances has occurred an all remedial actions necessary to protect human health and the environment have been taken) at the time of property transfer. Since no further remediation actions would be needed this alternative is not carried forward for further analysis.

3.4.2 Other Reuse Alternatives

The LRA screened this Federal Government surplus property by soliciting notices of interest from state and local governments, representatives of the homeless, and other interested parties, as required by the Federal Property Administrative Services Act of 1949, the Base Closure Community Redevelopment and Homeless Assistance Act of 1994, and the Redevelopment and Homeless Assistance Act of 1994. The LRA received two notices of interest to consider.

- The Niagara County Community College initially expressed interest in the property to the U.S. Department of Education in late summer of 2006 (Town of Niagara LRA, 2008). Though discussions took place between the LRA and the Niagara County Community College, after considering the size and nature of the facility, the Community College ultimately decided that the installation was not suited for its education programs and in September of 2006 confirmed that they no longer had interest in the property (Town of Niagara LRA, 2008).
- Niagara Falls Redevelopment, LLC (NFR), a private development corporation, expressed interest in reusing the property for activities such as air cargo, basing of general aviation aircraft, training, catering services etc. However, while the NFR had specific uses and users in mind for the property, they considered such information proprietary and did not share it with the LRA. Without this information, the LRA could not determine the eligibility and feasibility of NFR's proposal, the benefit to the community, or what repairs and improvements to the property would be needed to transition the property. Therefore, the LRA did not further consider NFR's expressed interest in the property as a viable alternative.

No notices of interest were received from homeless providers.

In addition to alternative concepts from outside parties, the LRA also considered three other internally developed alternative concepts for the property as described below (Town of Niagara LRA, 2008):

- *Conversion to Air Cargo Transportation Center*. While there is the potential for air cargo operations to grow at the Niagara Falls International Airport, air cargo volume is expected to remain fairly level over the near term future because of the sluggish U.S. economy, competition from other modes of traffic and high oil prices. Existing air cargo activity in Western New York is modest in comparison to many other areas and considerable marketing would have to be done to entice airfreight forwarders to consider a Niagara Falls location since the air cargo industry is very reticent change and investments in other airports have already been made and contracts negotiated (Town of Niagara LRA, 2008). In addition to the limited air cargo activity in the area, modern air cargo facilities are highly specialized buildings that utilize state-of-the-art technology and mechanical systems. Given the age and configuration of the existing facilities, without demolition of Buildings 4N and 4S (both attached to Building 4 – the hangar) and substantial reconstruction of the hangar to add truck bays, and aircraft loading and unloading bays, the property would have only limited value as a cargo terminal. The size and configuration of the remaining buildings on the property also do not lend themselves well to air cargo activities. Additionally, a recent agreement between the Niagara Frontier Transportation and Niagara Cargo Port will see Niagara Cargo build and market new cargo facilities at the Niagara Falls International Airport. If these new modern facilities are built, the value of the

USARC hangar as an air cargo facility would likely be diminished. Due to the modest air cargo activity in the area, the planned construction of new cargo facilities at the Niagara Falls International Airport, and the existing configuration of the hangar on the property, this alternative was dismissed by the LRA.

- *Conversion for aircraft modification, renovation, testing, overhaul and storage*. Under this alternative, the facilities would be marketed to private sector firms engaged in aeronautic research, aircraft renovation, and aircraft maintenance and storage. While there are many firms involved in specialized aviation and aerospace activities throughout the U.S. and Canada, finding a match for a firm's business needs with the location and facilities at the USARC would not be easy. It would also require significant investment to repair and improve the facilities to attract these types of firms. Additionally, the buildings other than the hangar are not necessarily suitable for activities complementary and ancillary to aviation-related businesses such as research and design, engineering, and testing because of their design and separation from one another. For these reasons, this alternative was dismissed as a stand-alone alternative; however, aspects of this alternative were considered and made a part of the Preferred Alternative.
- *Conversion of site to Mixed Commercial and Industrial Uses*. Under this alternative the property would be marketed for use by a mix of commercial and industrial uses such as professional administrative offices, service industries, and light industry. However, demand for older buildings, particularly for what would be considered Class C office space is very soft in the local market place and tenants are seeking higher quality space. Because demand for older office space is soft and the expense involved in remodeling and renovating various structures to meet potential tenant standards might exceed revenues to be generated through leases of the property, this alternative was dismissed as a stand-alone alternative by the LRA.; however, aspects of it were considered and made a part of the Preferred Alternative.

Since the other reuse alternatives were not selected by the LRA as their official Reuse Plan, they are not carried forward for further analysis in this EA.

4.0 AFFECTED ENVIRONMENT AND CONSEQUENCES

4.1 ENVIRONMENTAL RESOURCES ELIMINATED FROM FURTHER CONSIDERATION

Section 651.14 of the Army NEPA Regulations (32 CFR Part 651) states the NEPA analysis should reduce or eliminate discussion of minor issues to help focus analyses. This approach minimizes unnecessary analysis and discussion during the NEPA process and in analysis documents. The CEQ Regulations for implementing NEPA (40 CFR Parts 1500 - 1508) emphasize the use of the scoping process (*see e.g.*, 40 CFR § 1500.4(g)), not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues, narrowing the scope of the environmental assessment/environmental impact statement process. The following impact topics are not carried forward for further analysis in this EA because either they are not present on or near the USARC property, they are present but would not be impacted by any of the alternatives, or the proposed action would have little or no measurable environmental affect on these resources.

4.1.1 Environmental resources that are not present

None of the Alternatives would have direct, indirect or cumulative impacts on these environmental resources, because these resources do not exist on or near the Property:

Wetlands – Approximately 95 percent of the Niagara Falls USARC property is covered by impervious surfaces and according to the U.S. Fish and Wildlife's National Wetlands Inventory online-mapper there are no wetlands located on the site. The nearest wetlands are a palustrine wetland located across Porter Road approximately 105 feet to the south of the USARC, a palustrine wetland located approximately 260 feet to the north of the USARC, and a palustrine wetland located approximately 260 feet northwest of the USARC associated with Cayuga Creek.

Coastal Barriers and Zones –The USARC property is not included in the coastal zone management plan, nor is it in the coastal zone of New York (NYSDOS, 2004).

National and State Parks – There are no national or state parks adjacent to the USARC property. The nearest National Historic Site is the Johann Williams Farm located approximately 1.2 miles to the southeast of the USARC property. Reservoir State Park, approximately 4 miles to the northwest is the nearest state park.

Wilderness Areas and Wildlife Refuges – There are no National Wilderness areas in Niagara County or the surrounding areas. The Iroquois National Wildlife Refuge is located approximately 35 miles to the west of the USARC property.

National Wild and Scenic Rivers – There are no rivers in western New York that are designated as National Wild and Scenic Rivers.

Federal- and State-Listed Threatened, Endangered, or Candidate Species –A list of federally-listed species for Niagara County was obtained from the USFWS website as well as an official response letter (see Appendix F). According to the USFWS, the bald eagle (delisted, but still receives protection under the Bald and Golden Eagle Protection Act) and the Eastern prairie fringed orchid (*Platanthera leucophaea*) (threatened) are listed species known or likely to occur in Niagara County, NY. The USARC property is located in an urban area adjacent to the Niagara Falls International Airport and impervious surfaces cover approximately 95 percent of the property with grass and gravel areas comprising the rest of the site. With no trees, the bald eagle would only be transient to the site. The Eastern prairie fringed orchid is noted as Historic on the USFWS Niagara County list. According to the Determination of Threatened Status for Eastern and Western Prairie Fringed Orchids (50 CFR Part 17) and the USFWS' species profile (USFWS, 2007), the Eastern prairie fringed orchid was historically found in New York, but is currently no longer found in the state, and no critical habitat has been designated for the species.

Critical Habitat – The property is in an urban setting, impervious surfaces cover approximately 95 percent of the site providing no natural habitat, and the U.S. Fish and Wildlife Service has not designated critical habitat on or in the vicinity of the property (Appendix F).

***Prime and Unique Farmlands* –** The property is not prime or unique farmland as defined by 7 CFR 658.2(a), because the definition of farmland does not include land already in or committed to urban development.

***Cultural, Historic, and Archeological Resources* –** the Army conducted a Phase 1A archaeological survey of the property in 2007 and found the project site to contain low potential for prehistoric or historical archaeological resources (PARS and LBG, 2007). In 2011, the Army conducted a historic resource inventory of the buildings on the project site and determined that there are no historic properties present on the project site. By letter dated June 23, 2011 the Army conveyed its determination that the proposed action would have no adverse effect on any cultural, historic, or archeological resources to the State Historic Preservation Officer (SHPO). The SHPO concurred with this determination on October 27, 2011 (Appendix F).

4.1.2 Environmental resources that are present, but not impacted

None of the Alternatives would have direct, indirect or cumulative impacts on these environmental resources, because no demolition, renovation, construction or landscaping activities are planned that would alter or affect these resources:

***Vegetation* –** The USARC property is approximately 95 percent impervious surface with grass and gravel comprising the rest of the site. Therefore no vegetation would be impacted by the proposed action.

***Wildlife* –** The USARC property is approximately 95 percent impervious area and located in an urban environment providing no natural habitat on the property. Species habituated to urban settings such as some birds (sparrows, starlings, robins etc) and some mammals (mice, rabbits etc) likely visit the site, but would not be impacted by the proposed action.

4.1.3 Environmental resources are present, but the proposed action would have little or no measureable effect on these resources

***Aesthetics and Visual resources* –**While demolition of five structures on the site totaling 9,000 SF would occur under the proposed action, the overall aesthetics and visual resources of the area would not be impacted because the USARC property is located within an industrial setting adjacent to the Niagara Falls International Airport, and the site would still be dominated by impervious surfaces and a number of other large buildings on the site. If additional older buildings are replaced in the future with new modern buildings the overall aesthetics and visual resources of the site would be improved.

Air – Niagara County is in basic non-attainment for ozone. Ozone is classified as a secondary pollutant because it is not directly emitted by a source. Therefore, when determining potential impacts the emissions for the ozone precursor pollutants nitrogen oxides (NO_x) and volatile organic compounds (VOC) are taken into consideration. Under the Preferred Alternative, impacts to air quality would occur from the addition of a maximum 215 commuters. Using the EPA's *MOBILE6* modeling program for the

2013 Niagara County Fleet, emission rates for ozone precursors and greenhouse gases (GHG) (i.e. carbon dioxide [CO_2]) for cars would be:

NO_x = 0.496 grams/mile (g/mi)

VOC = 0.854 g/mi

CO_2 = 368.1 g/mi

For light duty gas trucks, including Sport Utility Vehicles (SUVs), emission rates would be:

NO_x = 0.646 g/mi

VOC = 0.952 g/mi

CO_2 = 478.4 g/mi

This analysis uses the national fleet average and assumes that 40 percent of commuters would drive a car while 60 percent would drive a pick-up truck or SUV. Using the assumption of two trips a day at 20 miles per trip (40 miles round trip) and an additional 10 miles a day to go off site to eat lunch (total of 50 miles traveled per day) for 240 days per year, the estimated increase in annual emissions as a result of the Preferred Alternative would be:

NO_x = 1.667 tons per year (TPY)

VOC = 2.596 TPY

CO_2 = 1,235.08 TPY

Additionally, temporary emissions would be expected from the construction and renovations associated with the Preferred Alternative, however these emissions would be negligible and would not result in an adverse impact on air quality in the region.

The estimated increase shows that the emissions associated with renovation, demolition, and operation of facilities under the Preferred Alternative, when compared to the *de minimis* values for this basic ozone non-attainment area, fall well below the *de minimis* levels of 100 TPY for NO_x and 50 TPY for VOCs, even under the initial conservative assumptions that were employed. As a result, the Proposed Action is not subject to the General Conformity Rule requirements. Appendix D contains a draft Record of Non-Applicability.

Additionally, the Preferred Alternative would not produce a significant amount of GHG emissions. This alternative would be expected to cause direct emissions of 988.07 metric tons of CO_2 annually, which is below the recommended screening level for including a quantitative and qualitative assessment of GHG emissions of 25,000 metric tons of CO_2 emissions annually.

This action would not represent a net incremental addition to the global climate change phenomenon.

Noise –The USARC property is located in an industrial setting zoned for light industrial use and reuse of the property would be consistent with that zoning and comply with the town’s noise ordinance. Sources of noise on the property include commuter traffic Heating, Ventilation, and Air Conditioning (HVAC) and mechanical equipment. Under the No Action alternative noise sources and level would not change. Under the Caretaker Alternative, noise levels would decrease without any daily commuter traffic or use of the property. Under the Preferred Alternative, reuse of the property would not likely change the types of noise sources, which would still be daily commuter traffic, HVAC, and the use of mechanical equipment; however, with a greater daily use of the site, there would be a slight, but not likely measurable, increase in noise on the site. Demolition activities to remove several small old and outdated buildings as well as building renovations and possibly some construction activities would create temporary noise impacts. If additional buildings are demolished in the future and replaced with new buildings, these demolition and construction activities would also result in temporary noise impacts. Contractors, however, would need to adhere to noise regulations for construction equipment and work hours, ensuring no significant impact to surrounding areas. Additionally, the property is immediately adjacent to the Niagara Falls International Airport which is the dominant source of noise in the immediate vicinity. The nearest sensitive receptor is a residence located approximately 200 feet away south of the USARC property across Porter Road.

Public Services – None of the Alternatives would have a significant direct, indirect, or cumulative impact on these public services, because the level of service is currently below the providers' capacity to provide service and any changes in demand would be negligible:

- **Niagara Falls Municipal Police Department, 1925 Main Street, Niagara Falls, New York, 14305:** Currently, the police department consists of 155 sworn officers and 30 civilian staff. The addition of approximately 251 workers at the USARC site would have no significant effect on the ability of the police department to provide adequate service to the City of Niagara Falls (Chella, 2011).
- **Niagara Falls Fire Department, 3115 Walnut Avenue, Niagara Falls, New York, 14301:** Currently, the fire department consists of 135 members, with five fire stations located throughout Niagara Falls. The Preferred Alternative would not affect the fire departments ability to provide service to City of Niagara Falls (Niagara Falls Fire Department, 2011).
- **Niagara Falls Memorial Medical Center, 621 Tenth Street, Niagara Falls, New York, 14304:** The exact number of rooms and doctors present at the Niagara Falls Memorial Medical Center is unknown. However, the center is the main provider of healthcare in the greater Niagara area and adding approximately 251 jobs under the Preferred Alternative would have no significant effect on the ability of the medical center to continue to provide sufficient medial access to the Niagara community (Niagara Falls Memorial Medical Center, 2011).

4.2 ENVIRONMENTAL RESOURCES CARRIED FORWARD FOR ANALYSIS

The following sections describe the current environmental conditions of the areas that would be affected should the Proposed Action be implemented. They also analyze the potential effects arising from implementing the Proposed Action. The description of environmental conditions represents the baseline conditions, or the "as is" or "before the action" conditions at the installation and is defined as the level of operations and environmental conditions as of 2011. The baseline facilitates subsequent identification of changes in conditions that would result from the realignment. The environmental consequences portion represents the culmination of scientific and analytic analysis of potential effects arising from implementing the Proposed Action. Direct, indirect, and cumulative effects of the Proposed Action are also addressed.

For each environmental resource area the baseline conditions are presented first followed immediately thereafter by evaluation of the potential impacts of the two action and the No Action alternatives. Where appropriate and definable, a specific Region of Influence (ROI) is indicated for a given resource area. Environmental effects are characterized as either direct or indirect. Direct effects are those caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Effects are also characterized as short-term or long-term in duration, with short-term effects being defined as occurring during construction phases, and long-term effects occurring for longer periods of time.

4.3 LAND USE

4.3.1 Affected Environment

This section describes existing land use conditions on and surrounding the Niagara Falls USARC. It considers natural land uses and land uses that reflect human modification. Natural land use classifications include wildlife areas, forests, and other open or undeveloped areas. Human land uses include residential, commercial, industrial, utilities, agricultural, recreational, and other developed uses. Management plans, policies, ordinances, and regulations determine the types of uses that are allowable, or protect specially designated or environmentally sensitive uses. The following sections discuss the regional geographic setting and location, site land use, surrounding land use, and current and future development.

4.3.1.1 Regional Geographic Setting and Location

The Niagara Falls USARC is located within the Town of Niagara, New York in Niagara County in northwestern New York (Figure 1-1). The Town of Niagara is a 16.8-square-mile community located approximately 6 miles east of the City of Niagara Falls, New York and 20 miles north of the City of Buffalo, New York.

4.3.1.2 Site Land Use

In 1955, the U.S. Army Reserve acquired 21.88 acres of property that was part of the Naval Air Reserve Station and put it into use as a USARC. Currently the property consists of 14 structures including ancillary structures such as a guardhouse, hazardous material sheds and an electrical building, and three parking/equipment storage areas. The site functions as a maintenance and training facility and equipment storage center. Prior to closure, the site functioned as a maintenance and training facility and equipment storage center. The USARC units that trained at the facility are a part of the 277th Quartermasters Corps, the 865th Combat Support Hospital and the 1982nd Forward Surgical Unit and the AMSA #76. There were 35 full-time employees and 412 reservists that reported on weekends.

4.3.1.3 Surrounding Land Use

The area surrounding the USARC is zoned as light industrial. The nearest residence is approximately 200 feet to the southeast of the property on the opposite side of Porter Road. The nearest residential community is approximately 1,000 feet to the south of the USARC. Immediately to the south of the property on the other side of Porter Road is woodland. To the west of the property is Cayuga Creek with commercial development beyond that. To the north and east, the property is bordered by the Niagara Falls International Airport (CH2MHILL, 2007).

4.3.1.4 Current and Future Development in the Region of Influence

Currently there are no projects or developments occurring in the immediate vicinity of the site. The vacant land located directly south of the site, is listed for sale as commercial property, however, the property has not yet been sold and remains vacant. Recent developments have occurred along Military Road approximately 1.5 miles southeast of the site including the construction of a Wal-Mart, Chili's Restaurant and Olive Garden Restaurant (Bragg, 2011).

4.3.2 Environmental Consequences

The intensity of impacts to land use was determined using the following thresholds:

No Effect – No impacts to surrounding land use from the proposed project.

No Significant Effect **–** The impact to land use would be measurable or perceptible, but would be limited to a relatively small change in land use that is still consistent with the surrounding land uses and would conform with zoning and community land use plans and policies.

Significant Effect **–** The impact to land use would be substantial. Land uses are expected to substantially change in the short- and long-term. The action would not be consistent with the surrounding land use and would not conform with zoning and community land use plans and policies.

4.3.2.1 Preferred Alternative: Traditional Disposal and Reuse

Under the Traditional Disposal and Reuse Alternative, the Niagara Falls USARC buildings and real estate would be transferred to the Town of Niagara. Building 4 would be marketed for use as a location for aircraft modifications, renovations, research and testing, overhauls and storage of air cargo. The attached Buildings 4N and 4S would be marketed for use as offices, classrooms, storage and for engineering and computer operations. The remainder of the site would be marketed for use on a building-by-building basis for a mixture of commercial and industrial operations permitted under the Town's zoning ordinance. Since the future use of the site as industrial/commercial space is similar to surrounding land uses and consistent with the current and allowable land use of the site, no significant effects are expected. Investigations into the contamination on the southeast portion of the Property are complete and IRA removed approximately 40 tons of contaminated soils. However, a HRRA found that construction workers conducting subsurface activities (e.g. site upgrades, demolition, new construction etc.) would be at risk from exposure to impacted groundwater. Due to this risk the Army would include land use restrictions in the property transfer documents to mitigate potential exposure of construction workers to impacted groundwater. While these restrictions would likely have short-term impacts on how construction activities occur, they would not be significant, and they would not preclude any long-term planned reuse of the site.

Overall, impacts to land use from closure, disposal, and reuse would be both short- and long-term, and not significant as land use of the Property would change from a military site to industrial and commercial facilities.

4.3.2.2 Caretaker Status Alternative

Under the Caretaker Status Alternative, land use would change from an active military reserve center to a facility under caretaker status. Maintenance activities to preserve and protect the facilities would take place. These activities would not conflict with applicable ordinances, existing land use plans, or surrounding land use and would result in no effect on land use.

4.3.2.3 No Action Alternative

Under the No Action Alternative, the Army would continue use of the Niagara Falls USARC at pre-closure levels, and no land use changes or impacts would occur, resulting in no effect to land use.

4.4 GEOLOGY AND SOILS

4.4.1 Affected Environment

This section describes the existing geology and soil conditions in the area of the Niagara Falls USARC. Geologic and topographic conditions are discussed first, followed by soils.

4.4.1.1 Geologic and Topographic Conditions

The USARC is located in the Erie-Ontario Lowlands Physiographic Province. The region is characterized by relatively flat topography and dissected by the east-west trending Niagara Escarpment, which is located about five miles north of the USARC. The Niagara Falls area is underlain by glacial sediment consisting mainly of till and lacustrine silt and clay, approximately 5-80 feet thick. The glacial deposits overlay weathered dolomite and limestone of the Lockport Group (Niagaran Series of Middle Silurian age). The Lockport Group is underlain by approximately 100 feet of shale and limestone (Clinton Group), which is underlain by about 110 feet of sandstone and shale (Medina Group) (PARS, 2011).

Based on the Tonawanda West United States Geologic Service (USGS) topographic quadrangle, the elevation of the USARC site is approximately 575 feet above mean sea level. The topography at the site is relatively flat with a slight gradient to the west/southwest towards Cayuga Creek.

4.4.1.2 Soils

While approximately 95 percent of the USARC site is covered by impervious surfaces such as concrete, asphalt, and building footprints (Engineering Technology Associates, Inc. 1994) the underlying soils at the site consist of two types: Lakemont silty clay loam (85 percent of the area on site) and the Fonda mucky silt loam (15 percent of the area on site) (Engineering Technology Associates, Inc. 1994). Both soil types are described as fine-to moderately fine-textured, of flow permeability, and a prolonged high water table at 0 to 0.5 feet below ground surface (bgs). Due to the high clay content, these soils are subject to ponding. In addition to native soils, a site inspection conducted in the southeast portion of the site in November 2010 also encountered non-cohesive fill material from 0 to 4 feet bgs, and in some locations it extended from 8 to 15 feet bgs. The fill material encountered comprised a course-grained mixture of sand and gravel with varying amounts of fine-grained silt and clay. Varying amounts of brick, slag, concrete, rebar, asphalt and wood were observed within the matrix as well (PARS, 2011). It is also possible that fill material exists in other portions of the site as well, as it may have been used to fill in low lying areas along the banks of Cayuga Creek (CH2MHILL, 2009).

4.4.2 Environmental Consequences

To assess the intensity of impacts to geology, topography, and soils in the area of the project sites, the following impact thresholds were used.

> ***No Effect* -** Geology, topography, or soils would not be impacted or the impact to these resources would be below or at the lower levels of detection. Any impacts would be slight.
>
> ***No Significant Effect* -** Impacts to geology, topography, or soils would be detectable. Impacts to undisturbed areas would be proportionally small to the site.
>
> ***Significant* -** Impacts on geology, topography, or soils would be readily apparent and result in a change to the character of the resource over a relatively wide area. Mitigation measures would be necessary to offset adverse impacts and may or may not be successful.

4.4.2.1 Preferred Alternative: Traditional Disposal and Reuse

Geologic and Topographic Conditions – No effects to geologic or topographic conditions would be expected. The site is relatively flat, previously disturbed and is approximately 95 percent covered by impervious surfaces. Demolition of buildings, replacement of the concrete apron by Building 4, and any potential future construction on the site would not require large amounts of leveling, grading, excavation, and compaction of soils. Alterations of the general topographic character of the site would not occur.

Soils – No significant adverse impacts to soils would be expected, though impacts would be long-term. Soils found within the footprints of any buildings to be demolished, the concrete apron to be replaced, and any future buildings to be constructed would likely have been previously affected by activities associated with construction of the existing facilities on the site.

4.4.2.2 Caretaker Status Alternative

Under the Caretaker Status Alternative no demolition of buildings, replacement of the concrete apron, or new construction would occur, thus there would be no changes or effect to the geologic or topographic character of the site.

4.4.2.3 No Action Alternative

Under the No Action Alternative, no ground disturbing activities would take place as a result of normal operations; therefore there would be no effect to the geology or topography of the site.

4.5 WATER RESOURCES

4.5.1 Affected Environment

The following sections provide a summary of the general condition and character of water resources found on the USARC property and on adjacent areas within the Town of Niagara, NY.

4.5.1.1 Surface Waters

There are no surface waters within the property boundary of the USARC site. Cayuga Creek, a tributary of the Niagara River, flows south just west of the property and receives storm water from the site. Ultimately Cayuga Creek drains into the Niagara River approximately 5 miles upstream of the American and Horse Shoe Falls as part of the Lake Erie River Basin.

4.5.1.2 Hydrogeology/Groundwater

The aquifers of the Lake Erie-Niagara River Basin are primarily carbonate-rock aquifers, characteristic of the Central Lowland Province of western New York. Glacial deposits act as a confining unit for the weathered bedrock aquifers below. Water is stored and moves mainly in secondary fractures. The aquifers typically produce only small to moderate amounts of water to wells. Minerals in solution are calcite, dolomite, gypsum, and halite, resulting in hard and salty groundwater. Much of the groundwater contains sulfate and chloride ions in excess of 250 milligrams per liter, so quality of water is poor and deteriorates further with depth. Groundwater must be treated for most uses. The soils on the site are subject to ponding and the water table in the vicinity of the site is typically at a depth of less than four feet bgs (CH2MHILL, 2007). During a site inspection conducted in the southeast portion of the site in November 2010, ground water was encountered at depths ranging from two to six feet bgs in soil probes and exploratory excavations. It was concluded that the perched groundwater conditions at the site were likely due to coarse-grained fill material overlying less permeable native fine-grained clay (PARS, 2011).

4.5.1.3 Floodplains

A review of the Federal Emergency Management Agency Flood Insurance Rate Map dated September 17, 2010 indicates that the extreme northern portion of the property, including a portion of Building 4N lies within the 100-year floodplain (Figure 4-1).

Figure 4-1. 100-Year Floodplain in Vicinity of Niagara Falls USARC

4.5.2 Environmental Consequences

To assess the intensity of impacts to water resources in the area of the project sites, the following impact thresholds were used:

> ***No Effect*** – Current water quality and hydrologic conditions would not be altered or conditions do not exist for impacts to occur.
>
> ***No Significant Effect*** – Impacts (chemical, physical, or biological effects) would be either not detectable, or detectable, but at or below water quality standards or criteria. Alterations in water quality and hydrologic conditions relative to historical baseline may occur, however, only on a localized and short-term basis.
>
> ***Significant Effect*** – Impacts (chemical, physical, or biological effects) would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria would be locally, slightly and singularly, exceeded on either a short-term or prolonged basis.

4.5.2.1 Preferred Alternative: Traditional Disposal and Reuse

Surface Waters - Building renovations, demolition, and potentially some new construction could occur under the reuse of the property. Employing best management practices during demolition and construction of structures would prevent potential impacts to Cayuga Creek from runoff. Currently, approximately 95 percent of the site is covered by impervious surfaces and no new impervious surfaces would occur under the Preferred Alternative. It is anticipated that the new property owner would be required to hold a State Pollution Discharge Elimination System (SPDES) Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity and implement a storm water pollution prevention plan (SWPPP) for the property. By implementing and following a SWPPP and complying with a SPDES permit, there would be long-term, no significant impacts to nearby surface waters under the Preferred Alternative.

Hydrology/Groundwater – Long-term, no significant impacts to hydrology or groundwater would be expected under the Preferred Alternative. Demolition and any new construction, as well as operation of facilities would adhere to existing applicable groundwater protection protocols as required under the Safe Drinking Water Act. Approximately 95 percent of the site is covered by impervious surfaces and complying with a SPDES permit and implementing a SWPPP would help prevent any contaminated storm water from leaving the site and infiltrating the groundwater off-site.

Floodplains –The 100-year flood plain encroaches only slightly (approximately 75 feet) upon the northern boundary of the site. Given the small area that it encroaches upon the Property and the amount of open space on the site to the south of the floodplain, any new construction would likely be able to avoid impacting the floodplain. If construction need to encroach upon the floodplain, then a floodplain development permit from the Town of Niagara would be required. The floodplain also encroaches upon Building 4N, if renovations to the building equals or exceed 50 percent of the market value of the structure before the start of the renovation, then a floodplain development permit would be required from the Town of Niagara. By adhering to the provisions of the floodplain development permit would minimize impacts to the floodplain and result in long-term, no significant impacts.

4.5.2.2 Caretaker Status Alternative

There would be long-term, no significant impact to surface water, groundwater or floodplains under the Caretaker Status Alternative. Operations would no longer occur on the property, reducing the likelihood of spills or other discharges that could impact Cayuga Creek. While the site would no longer be occupied, the Army would still own the property and would still need to comply with its SPDES permit, preventing adverse impacts to Cayuga Creek. There would be no change to the buildings on the site, so there would be no impact to the 100-year floodplain.

4.5.2.3 No Action Alternative

Under the No Action Alternative pre-closure operations would continue on the property. No rehabilitation of the buildings or new construction is currently planned and there would be no new impervious surfaces created. As a result, there would be no impact to any water resources.

4.6 SOCIOECONOMICS

Socioeconomic analysis considers factors affecting the quality of life and financial well being of the surrounding community where residents live, work, shop, and play. These factors include employment, income, housing, and public services such as fire, police, hospitals, schools, and parks. The ROI is Niagara County, New York.

The Affected Environment and Environmental Consequences sections of the socioeconomics resource area of this EA are presented in limited detail due to the fact that jobs created by the potential reuse would be expected to come from within the ROI and not require people to move into the local area from outside the ROI. Since the Proposed Action would not require people to relocate into the ROI or require people to leave the ROI, housing and public services are not included for full analysis. There would be no change to these socioeconomic resources.

4.6.1 Affected Environment

4.6.1.1 Economics

Table 4-1 compares the general ethnic and economic characteristics of the local community to the state and the nation, based on the most recent U.S. Census data (U.S. Census 2011a, b, and c). According to the Census, the types of occupations for the labor force in the surrounding area include mainly educational services, health care and social assistance, manufacturing, and retail trade. In recent years, several well-known companies including Occidental, Nabisco, Birdseye, and Delphi all closed or downsized their facilities in Niagara County (Niagara County, 2011). However, positive economic development in the tourism sector has become a catalyst in the development of downtown Niagara Falls, and the Seneca Niagara Casino and Hotel is one of Niagara County's largest employers (Niagara County, 2011). The three largest employers in Niagara County are the Niagara Falls ARS, Delphi Harrison Thermal Systems, and the Seneca Niagara Casino and Hotel (Town of Niagara LRA, 2008).

4.6.1.2 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* directs Federal agencies to analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities.

As shown in the Table 4-1, the ROI has a lower percentage of minority populations and a similar percentage of low-income populations when compared to New York State or the U.S. The largest minority population is Black or African American. Niagara County's minority population (11.5 percent) is lower the nation (36.3 percent the state (41.7 percent). Median household income in Niagara County ($42,580) is lower than the national ($50,222) and state ($54,554) averages; however, the percentage of the population living below the poverty level in the county (13.9 percent) is lower than both the nation (14.3 percent) and the state (14.2 percent).

4.6.1.3 Protection of Children

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* directs Federal agencies to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Table 4-1. Socioeconomic Data for Niagara County, New York State, and the U.S. (2009)

	Niagara County	New York	United States
Population (2010 data)	216,469	19,378,102	308,745,538
Median household income	$42,580.	$54,554	$50,221.
Persons below poverty level*	13.9%	14.2%	14.3%
Unemployment rate	7.7%	8.0%	9.1%
White	88.5%	65.7%	72.4%
Overall % minority population	11.5%	41.7%	36.3%
Black or African American	6.9%	15.9%	12.6%
American Indian & Alaskan Native	1.1%	.6%	0.9%
Hispanic	2.2%	17.6%	16.3%
Asian	.8%	7.3%	4.8%
Native Hawaiian and other Pacific Islander	0.0%	0.0%	0.2%
Other race	0.4%	7.4%	6.2%
Two or more races	2.2%	3.0%	2.9%

Source: U.S. Census 2011a, b, and c

Notes: *This is persons below poverty level for whom poverty status was determined.

The property is fenced and there are no schools or childcare facilities in the vicinity of the site. The nearest residence is located approximately 200 feet southeast of the property on the opposite side of Porter Road. The nearest residential community is approximately 1,000 feet to the south of the USARC site. The USARC property is bordered on three sides by wooded land and commercial development associated with Niagara Falls International Airport (Town of Niagara LRA, 2008). Directly across Porter Road on the south side of the property is another stretch of forested property.

4.6.2 Environmental Consequences

The economic effects of implementing the preferred alternative are estimated using the Economic Impact Forecast System (EIFS) model, a computer-based economic tool that calculates multipliers to estimate the direct and indirect effects resulting from a given action. Based on the input data and calculated multipliers, the model estimates changes in sales volume, income, employment, and population in the ROI, accounting for the direct and indirect effects of the action.

For purposes of this analysis, a change is considered significant if it falls outside the historical range of the ROI's economic variation. To determine the historical range of economic variation, the EIFS model calculates a rational threshold value (RTV) profile for the ROI. This analytical process uses historical data for the ROI and calculates fluctuations in sales volume, income, employment, and population patterns. The historical extremes for the ROI become the thresholds of significance (i.e., the RTVs) for social and economic change. If the estimated effect of an action falls above the positive RTV or below the negative RTV, the effect is considered to be significant. Appendix E discusses this methodology in more detail.

4.6.2.1 Preferred Alternative: Traditional Disposal and Reuse

4.6.2.1.1 Economic Development

Based on EIFS, reuse of the USARC property under the Preferred Alternative would have a slight beneficial socioeconomic impact both in the short-term during construction activities as well as long-term through the creation of jobs. The results of the EIFS analysis are provided in Appendix E. Given that the Preferred Alternative includes flexibility for the LRA to take advantage of any opportunities to create new jobs, additional demolition of buildings and construction of new build-to-suit space for tenants or prospective tenants beyond those analyzed in the EIFS model would increase the beneficial economic impact to the ROI. Should future construction activities be approved, additional beneficial impacts would include the construction dollars spent on materials and construction labor within the ROI as well as any additional long-term positions beyond the 149-251 expected under the current reuse plan. The exact salary of the proposed long-term positions is not known, therefore this analysis assumed the median salary of the new positions would be equivalent to the current median salary of Niagara county, or $42,000 annually. Therefore, the Preferred Alternative would have beneficial impacts from job creation and would not impact the median income of the ROI.

4.6.2.1.2 Environmental Justice

Reuse of the property under the Preferred Alternative would not result in adverse impacts to any demographic group residing or working within the ROI; therefore, there would be no disproportionately high and/or adverse impact on minority populations or low income populations.

4.6.2.1.3 Protection of Children

The Preferred Alternative would not likely pose any adverse or disproportionate health or safety risks to children living in the vicinity of USARC property. There are no schools or childcare facilities in the vicinity of the property and the property would remain fenced and gated to prevent children from entering the property.

4.6.2.2 Caretaker Status Alternative

This alternative would have a small, temporary, adverse socioeconomic impact because while the property is unoccupied it would not be generating any economic input to the local economy. However, given that it was an Army Reserve Center mostly used on the weekend by reservists with only a small full-time workforce during the week, the impact would not be significant. The property would remain fenced and gated, preventing children from entering the property. Therefore, no adverse impacts would be expected to children.

4.6.2.3 No Action Alternative

No direct or indirect effects would be expected. Under the No Action Alternative, the installation working population and installation expenditures would remain unchanged from pre-closure levels. As a result, economic activity levels and ROI population growth would not change. In addition, there would continue to be no disproportionately high and adverse impacts to minority or low income populations. Thus, the No Action Alternative would not result in any environmental justice impacts. The property would remain fenced and gated, preventing access to the site by children. Therefore, there would be no adverse impacts to children under the No Action Alternative.

4.7 TRANSPORTATION

4.7.1 Affected Environment

This section describes the existing transportation conditions at and surrounding the Niagara Falls USARC. Roadways and traffic are discussed first, followed by site and public transportation.

4.7.1.1 Level of Service Definition

The level of service (LOS) of a signalized intersection is defined in terms of control delay per vehicle (seconds per vehicle). Control delay is the portion of total delay experienced by a motorist that is attributable to the traffic signal. It is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The LOS criteria for signalized intersections, as defined in the Highway Capacity Manual (HCM) (Transportation Research Board, 2000), are provided in Table 4-2.

LOS A describes operations with minimal delays, up to 10 seconds per vehicle, while LOS F describes operations with delays in excess of 80 seconds per vehicle. Under LOS F, excessive delays and longer queues are common as a result of over-saturated conditions (i.e., demand rates exceeding the capacity). Delays experienced at LOS A, B, C, or D (below 55 seconds per vehicle) are generally considered acceptable. LOS E and F represent unacceptable operating conditions.

Table 4-2. Signalized Intersection LOS Criteria

LOS	Control Delay per Vehicle (Seconds Per Vehicle)
A	≤ 10
B	> 10 to 20
C	> 20 to 35
D	> 35 to 55
E	> 55 to 80
F	> 80

Source: Transportation Research Board, 2000.

4.7.1.2 Roadways and Traffic

The Niagara Falls USARC is located adjacent to and north of New York State Route 182 (NY 182 or Porter Road) approximately ½ mile east of the intersection of NY 182 and United States Route 62 (US 62 or Niagara Falls Boulevard) (Figure 4-2). Tuscarora Road approaches NY 182 from the south and intersects NY 182 approximately 1,500 feet west of the USARC. Portions of the Niagara Falls International Airport are located north and east of the USARC. A small creek (Cayuga Creek) separates the USARC from commercial facilities located west of the facility, and a mix of undeveloped parcels, residential and commercial uses occupy land south of the facility. Public vehicle access to USARC is only via NY 182.

Vehicular access to the area of the USARC is via Interstate Routes, New York State Routes and local roads. Interstate 190 and US 62 are the principal routes serving the USARC. Interstate 190 (I-190) extends north-south in the area of the USARC and is located approximately 2.5 miles west of the facility. US 62 is a major four-lane east-west roadway south of the facility. Access from I-190 to the facility is via US 62 (Niagara Falls Boulevard) or NY 182 (Porter Road) which is a two-lane road that provides the main access to the facility. The La Salle Expressway and River Road extend east-west and are located approximately two miles south of the facility. Access to the USARC from La Salle Expressway or River Road is via Williams Road. Williams Road is a north-south four-lane road that intersects at a signalized intersection with US 62 approximately ½ miles east of the facility. Tuscarora Road is a north-south two-lane road that intersects at a signalized intersection with NY 182 west of the facility.

According to the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC), the functional classification of US 62 is principal arterial and Porter Road is minor arterial in the vicinity of the USARC (GBNRTC, 2007). Annual Average Daily Traffic (AADT) volumes are available from GBNRTC for the road network in the City of Niagara Falls. In 2010, AADT volumes along NY 182 were 9,225 vehicles, and in 2009, AADT volumes along US 62 were 17,700 vehicles. In 2010, AADT volumes along Tuscarora Road were 3,000 vehicles, and in 2008, volumes along Williams Road were 12,100 vehicles (GBNRTC, 2011).

According to GBNRTC's 2035 Long Range Transportation Plan Update approved on May 2010, US 62 and NY 182 currently support a satisfactory LOS C or better within the vicinity of the project site.

The US 62 /Williams Road signalized intersection is at the entrance to the NFIA. In 2004 a traffic study was conducted by McFarland-Johnson Inc. to determine the current capacity and LOS for this intersection. The US 62 /Williams Road intersection currently supports an acceptable LOS C (NFTA, 2007).

4.7.1.3 Site Transportation

The entrance to the USARC is off NY 182 (Porter Road) near the west end of the facility. The entrance is gated and a security booth is located adjacent to the entrance road. No roads are located on the USARC. Expanses of asphalt surface, used for parking and circulation with the facility, occupy the areas between buildings on the site.

4.7.1.4 Public Transportation

Niagara Frontier Transportation Authority (NFTA) provides public transportation in Niagara Falls and Buffalo, including public bus service with bus stops at various locations around the cities. NFTA Route 55 extends along US 62 (Niagara Falls Boulevard) with service to the Niagara Falls International Airport. The bus stop is located approximately ½ mile east of the USARC.

Figure 4-2. Area Transportation Map

4.7.2 Environmental Consequences

The following criteria have been developed to assess the intensity of transportation impacts for each of the alternatives:

> ***No Effect*** – No alterations of traffic patterns and trends would result from the action.
>
> ***No Significant Effect*** – Short- or long-term alterations of traffic patterns and trends would result from the action. The intersections may reach capacity but this change would be temporary or managed through improvements.
>
> ***Significant Effect*** – Traffic patterns would be permanently altered from the action. The intersections would reach capacity and extensive delays would develop.

4.7.2.1 Preferred Alternative: Traditional Disposal and Reuse

Traffic: Existing traffic to the USARC is generated by the commuting of 412 reservists on the weekends and 35 full time employees during the work week. With the closing of the existing facilities, the reservists and employees are now relocated into new facilities on the Niagara Falls ARS along Lockport Road located north of the Niagara Falls International Airport. (The relocation of employees and reservists has already been analyzed in a separate EA for the construction of those new facilities and will not be addressed in this analysis). Under the Preferred Alternative, the facility would be transferred to Town of Niagara for potential reuse by aviation and aerospace firms and a mix of light industrial and commercial uses permitted by the Town of Niagara zoning.

Closing the facility would eliminate the daily vehicle traffic on the site for the current 35 workers and the weekend traffic for the 412 reservists. Since these personnel are moving to new facilities on the north side of Niagara Falls International Airport, their use of the local transportation network is analyzed as a cumulative effect with the proposed action in Section 4.10 – Cumulative Effects Summary. It is expected that total build-out of the USARC property under the Preferred Alternative would generate between 149 and 251 jobs at the site.

Trip Generation: Trip generation for the proposed reuse of the USARC site was conducted for the weekday and the Saturday weekend based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 8th Edition. ITE Land Use Code 715 (Single Tenant Office Building) was used for projections for the 35 existing USARC employees. For the proposed reuse by aviation and aerospace firms and a mix of light industrial and commercial uses, the ITE Trip Generation Manual does not provide guidelines for this combined type of land uses. Therefore, three land uses were used to project the trips for the proposed developments. ITE Land Use Code 760 (Research & Development Center) was used to project trips for the proposed Building 4 (for reuse by aviation and aerospace firms); ITE Land Use Code 710 (General Office Building) was used to project trips for the proposed Buildings 4N and 4S (for reuse by offices, classroom training, engineering, computer operations, locker rooms, and storage); and ITE Land Use Code 110 (General Light Industrial) was used to project trips for the proposed mix of commercial and industrial developments.

Trip generation estimates were developed for the typical weekday AM and PM peak hours, and weekend based on a survey of developments with different land uses and a regression analysis. The net increase in weekday peak hour vehicles projected for the Preferred Alternative is summarized in Table 4-3 and Table 4-4 assuming the generation of 149 and 251 new jobs, respectively. As shown on Table 4-3 and Table 4-4, the Preferred Alternative would generate between 154 and 203 new vehicle trips during the AM peak hour and between 186 and 227 new vehicle trips during the PM peak hour on weekdays, assuming 149 and 251 new jobs, respectively.

In addition, based on the mix of existing USARC full-time personnel (35) and part-time (weekend) reservists (412), the following working assumptions were made to estimate the existing trips that would be relocated from the immediate vicinity of the USARC property to the new facilities on the Niagara Falls ARS:

- Assume that all the full time personnel (35) access the USARC site on weekdays and the 412 reservists access the USARC site on weekends (USACE, 2007a).
- Assume three drill weekends a month, which would result in a maximum of 200 reservists accessing the site on the maximum drill weekend (USACE, 2007a).
- Also it was assumed four vehicle trips for each reservist to account for lunch break.

Based on the working assumptions described above, and as shown on Table 4-3 and Table 4-4, 35 and 48 weekday vehicle trips would be removed from Porter Road and shifted to Lockport Road during the AM and PM peak hours respectively. During the weekend approximately 800 daily vehicle trips (two trips in and two trips out for 200 reservists) associated with the existing USARC would be removed from Porter Road and shifted to Lockport Road to access the new facilities on the Niagara Falls ARS.

Table 4-3. Additional Trips Generated by the Preferred Alternative – 149 Employees

Facility	ITE Code	Amount	AM			PM			Saturday Daily Trips
			In	Out	Total	In	Out	Total	
Existing trips relocated to new facilities on the Niagara Falls ARS									
USARC (Existing)	715	35 Employees	31	4	**35**	7	41	**48**	**0**
USARC (Existing)	N/A	412 Reservists	0	0	**0**	0	0	**0**	**800**
New trips									
Reuse (Buildings 4N & 4S)	710	50 Employees	30	5	35	4	32	36	160
Reuse (Building 4)	760	50 Employees	32	4	36	13	65	78	50
Reuse (Commercial & Industrial)	110	49 Employees	69	14	83	15	57	72	117
Net Increase			**131**	**23**	**154**	**42**	**154**	**186**	**327**

Source: ITE Trip Generation Manual, 8th Edition.

Table 4-4. Additional Trips Generated by the Preferred Alternative – 251 Employees

Facility	ITE Code	Amount	AM			PM			Saturday Daily Trips
			In	Out	Total	In	Out	Total	
Existing trips relocated to new facilities on the Niagara Falls ARS									
USARC (Existing)	715	35 Employees	31	4	**35**	7	41	**48**	**0**
USARC (Existing)	N/A	412 Reservists	0	0	**0**	0	0	**0**	**800**
New trips									
Reuse (Buildings 4N & 4S)	710	84 Employees	45	7	52	5	49	54	170
Reuse (Building 4)	760	84 Employees	51	7	58	15	76	91	66
Reuse (Commercial & Industrial)	110	83 Employees	77	16	93	17	65	82	130
Net Increase			**173**	**30**	**203**	**37**	**190**	**227**	**366**

Source: ITE Trip Generation Manual, 8th Edition.

It is anticipated that closing the existing USARC and reusing the property according to the Town of Niagara's Reuse Plan, which would involve some demolition and construction activities as well as interior renovations, would have long-term, no significant effects on traffic. However, some short-term adverse impacts could occur depending on the measures taken to manage disruptions, such as restricting construction materials deliveries to off-peak traffic hours and designating sufficient parking and storage space for construction related vehicles and materials.

After full build out, it is estimated that vehicles would enter and exit the site via NY 182 (Porter Road) by traveling through the Tuscarora Road/NY 182 signalized intersection or the US 62 (Niagara Falls Boulevard)/Williams Road signalized intersection. It is not expected that these intersections would experience significant effects due to traffic generated under the Traditional Disposal and Reuse Alternative. It is estimated that approximately 2 cars per minute would be passing through these intersections during the PM peak hour as a result of implementing the Traditional Disposal and Reuse Alternative (worst case scenario, Table 4-4: 227 vehicles per hour).

Only a portion of the new vehicle trips would access the facility via US 62/Williams Road. The addition of fewer than 150 vehicle trips in the morning or afternoon in one direction would not have a significant effect on the traffic patterns or significantly impact trends. A typical roadway would need a higher additional volume of traffic to affect the LOS. Since the US 62 and Williams Road intersection is currently working at an acceptable LOS C, conditions under the Preferred Alternative are not expected to have a significant impact on traffic conditions, or result in a change of LOS that would be noticeable to the driving public. Long-term, no significant effects to traffic are anticipated as a result of implementing the Preferred Alternative.

Although, this analysis is based on the current plans, the demolition of additional buildings and construction of new build-to-suit space for tenants or prospective tenants may occur in the future. These additional demolition / construction activities would result in the addition of more jobs and could generate more traffic activity that could cause short-term and long-term adverse alterations of traffic patterns in the future. These short-term adverse alterations from construction / demolition activities could be mitigated through measures taken to manage disruptions, such as requiring most of the construction vehicles delivering materials to do so during off-peak traffic hours and designating sufficient parking and storage space for construction related vehicles and materials. Also, all construction traffic would follow special routing and management procedures during this period. Therefore, construction related traffic impacts are not considered significant. The long-term adverse alterations on traffic patterns depend on the number of additional jobs generated by the construction of additional buildings. Since NY182 and US62 are currently working at an acceptable LOS C or better, it is expected that small increments on additional traffic would not result in long-term significant effects to traffic in the future.

4.7.2.2 Caretaker Status Alternative

No adverse impacts to traffic would be expected under the Caretaker Status Alternative since the USARC would be closed and no reuse of the site would occur. Some beneficial impacts would occur as a result of decreasing the amount of weekday and weekend traffic generated by the site. Maintenance activities at the property would have no effects on transportation.

4.7.2.3 No Action Alternative

Implementation of the No Action Alternative would not alter the existing transportation infrastructure at the USARC or in surrounding areas. Therefore, no effects would be expected.

4.8 UTILITIES

4.8.1 Affected Environment

The ROI is defined as utility services at the Niagara Falls USARC site and any potential effects on public utility service providers in the area. Local municipal and commercial utility entities provide all major utilities (water, sewer, natural gas, electricity) at the property.

All federal agencies are required to adhere to Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance. This Executive Order requires each agency to implement a Strategic Sustainability Performance Plan which includes a reduction in energy intensity for agency buildings and the increased use of renewable energy (Federal Register, 2009).

4.8.1.1 Potable Water Supply

Niagara Falls USARC has no active potable water wells. The property's primary potable water is acquired from the City of Niagara Falls (CH2MHILL, 2007). Water from these sources comes from the Niagara River, is pre-treated prior to it reaching the property, and meets all U.S. EPA potable water standards.

The water acquired from the Niagara Falls system is delivered to the USARC via a 12"-16" line. The supply enters Building 21, which is the central point for water distribution for the entire property. Currently, some buildings have had the service disconnected. The water line is relatively new, approximately 12 years old, and is in satisfactory condition (Town of Niagara LRA, 2008). The average water pressure supplied to the property is approximately 75 pounds per square inch (psi).

Fire protection (sprinkler) systems are located in all structures except Buildings 19, 23 and T-26. Two fire protection water loops exist on site, one serving the south and west areas and another heading north and serving the north side of the Building 4 hanger and office areas.

4.8.1.2 Sanitary Sewer Service

The Town of Niagara provides sanitary sewer service to the property. The primary source of wastewater directed to the sewer system during operation of the USARC included non-process wastewater (bathrooms, sinks, etc), the discharge from oil/water separators, and vehicle washing and maintenance runoff (CH2MHILL, 2007).

The sewer system is vitrified clay and was installed in 1956. Currently, the condition of the line is unknown and an evaluation was recommended in the Reuse plan. No sewer problems currently exist (Town of Niagara LRA, 2008).

4.8.1.3 Electrical Service and Distribution

Electric service is supplied by National Grid. National Grid extends electric from the trunk line to a sub-station on the property. A transformer vault is located in the Hanger Building (Town of Niagara LRA, 2008).

Power is fed to the site via an overhead medium voltage line to an open tube bus substation where it terminates in an enclosed switch. Service continues underground to Building 4 where the voltage is stepped down to 480/227 volts (V) and 208/120V via two transformers (Town of Niagara LRA, 2008).

4.8.1.4 Storm Water System

Drainage at the property flows across the pavement to inlet structures (catch basins) and is then piped to Cayuga Creek. Some storm water is also conveyed to a drainage swale along Porter Road that is eventually conveyed to Cayuga Creek as well. There are no drainage issues on the Property (Town of Niagara LRA, 2008).

4.8.1.5 Natural Gas

The gas supplier to the property is National Fuel Gas. National Fuel Gas owns the service from the connection point to the meter; after the meter, the line is privately owned inside the facility. The underground gas lines in the facility are steel and are cathodically protected. Cathodic protection protects the pipes against corrosion. The lines are approximately 20 years old (Town of Niagara LRA, 2008).

A single point main gas meter and regulator set are located on the south wall of Building 21. The 2-inch high pressure gas service is regulated and metered to feed a 3-inch diameter medium pressure gas main and is then distributed through an underground steel piping system to the site buildings. Building gas loads include heating boilers and some forced air heating equipment. No gas-fired kitchen equipment (ranges, griddles, etc) was observed (Town of Niagara LRA, 2008).

4.8.1.6 Communications

Telephone service enters the property at Building 25, the former powerhouse, and is distributed underground to the other buildings on site. This is a basic copper service used for telephone only. The service is 5-6 years old and is in good condition (Town of Niagara LRA, 2008).

4.8.1.7 Solid Waste

Solid waste is collected and shipped offsite by a commercial contractor (USAR, 2001).

4.8.2 Environmental Consequences

Effects on infrastructure are considered in terms of increases in demands on systems and the ability of existing systems to meet those demands. Potential effects to the environment could occur if the existing systems are insufficient to handle the increased demands requiring construction and operation of a new system. Utility demands include both renovation and operations usage. Individual segments that comprise the totality of the infrastructure are discussed below.

To assess the intensity of impacts to utilities the following impact thresholds were used for each utility:

> ***No effect*** – The proposed action does not impact the human or natural environment.
>
> ***No Significant Effect* –** An impact to the human and/or natural environment would occur, but it is less than thresholds indicated below for "significant effect."
>
> ***Significant Effect* –** thresholds for significance are defined below:
>
> *General Utility Construction* – Impacts from construction of utilities would be considered potentially significant if expected to cause human health and safety issues considerably above industry norms or Army acceptable standards and there were no ways to mitigate the disruptions.
>
> *Potable Water Supply* – Impacts would be considered potentially significant if the proposed action or alternatives would require more potable water than could be reliably provided by the combination of available potable water sources, leading to shortages, or if regulatory limitations on withdrawals or the treatment plant would potentially be exceeded. Major systemic distribution constraints could also be potentially significant; however, the fact that major investments would be required to provide potable water reliably would not necessarily constitute a significant impact if the investments were reasonable for the overall magnitude of proposed construction, or to provide needed restoration or modernization, and would prevent shortages or harm to the environment.
>
> *Wastewater System* – Impacts would be considered potentially significant if the proposed action or alternatives would require more wastewater treatment capacity than could be reliably provided by the municipal wastewater treatment system, potentially leading to the discharge of effluents in excess of standards, or if regulatory limitations on the wastewater effluent would potentially be exceeded. Major shortfalls in collection capacity could also be potentially significant; however, the fact that major investments would be required to collect wastewater reliably would not necessarily constitute a significant impact if the investments were reasonable for the overall magnitude of proposed construction, or to provide needed restoration or modernization, and would prevent overflows or harm to the environment.
>
> *Energy Sources* – Impacts would be considered potentially significant if the proposed action or alternatives would require energy in quantities that would exceed local and/or regional capacities for supply, leading to potentially unreliable service or shortfalls of power or other energy that could affect the USARC's mission. Major systemic distribution constraints could also be potentially significant; however, the fact that major investments would be required to provide energy reliably would not necessarily constitute a significant impact if the investments were reasonable for the overall magnitude of proposed renovation, or to provide needed restoration or modernization, and would prevent shortages that could affect the USARC's mission.

Communications – Impacts would be considered potentially significant if the proposed action or alternatives would require communication systems to meet mission requirements that could not be provided without major modifications to the existing communications systems.

Municipal Solid Waste – Impacts would be considered potentially significant if the proposed action or alternatives would require collection and/or disposal that could not be provided in a reliable manner, which could cause waste to accumulate or be disposed of in a manner that could adversely affect human health or the environment.

4.8.2.1 Preferred Alternative: Traditional Disposal and Reuse

Overall effects on utilities as a result of implementation of the Preferred Alternative would not be significant, since existing utility services are expected to be adequate for future usage demands. Some highly localized, short-term disruptions would be expected as utility lines and linkages are adjusted or extended as necessary. The impact on utilities from the potential for more construction or demolition to meet market flexibility needs would need to be analyzed on a case by case basis, but it would be expected that any additional tenant would conform to the light industrial zoning code and would be a similar use to the USARC. An expansion of buildings would be expected to increase the demand on utility providers, but within the current capacity. Therefore, the impacts would be long-term and not significant. Under the Preferred Alternative, the Property would no longer be owned by the Federal government and therefore adherence to Executive Order 13514 would no longer be required, though the LRA may still pursue sustainable energy use on their own. Eliminating the requirement for sustainable energy usage at the property would result in long-term adverse impacts to utilities but they would not be significant.

Potable Water Supply – Adverse impacts would be long-term and not significant. There are existing potable water supply lines nearby that can provide potable water to the proposed reuse facilities. The change in use would not be expected to substantially increase the amount of potable water required for the property, as it would remain as a light industrial use.

Sanitary Sewer System – Adverse impacts would be long-term and not significant. The amount and type of sanitary sewer discharge would be expected to be similar to discharges from the pre-closure operation of the USARC. However, the reuse plan noted that the plumbing system at the property is well maintained but aging and may be inadequate for a major change in use of the property. Though an upgrade may be required, no significant impacts would be expected from the reuse of the property.

Electric Distribution System – Similar to the sanitary sewer system, the reuse plan noted that the electric system is aging and, while it is in satisfactory condition, an upgrade may be required to adequately meet the needs of a new tenant. Electrical demand from the new tenants would be expected to be similar to the pre-closure maintenance, classroom, and light industrial uses on the property and it is expected that National Grid, which supplies power regionally in the northeast, would be able to accommodate the similar demand. Adverse impacts would therefore be long-term and not significant.

Storm Water System – Adverse impacts would be short- and long-term and not significant. There is not expected to be an increase in impervious surface which already covers 95 percent of the site; therefore, the expected load for storm water runoff would be similar to existing conditions.

It is anticipated that the new property owner would be required to hold a SPDES Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity, similar to the permit held by the USAR, and implement a SWPPP for the property. If any utility upgrades require trenching or other construction activities, a SPDES permit for construction would be required. Through the adherence to provisions specified in an appropriate SPDES permit and site specific SWPPP, it is expected that there would be no significant impacts on the storm water system as a result of implementing the Preferred Alternative. Impacts would be short-term during construction activities and long-term during the operation of the facilities.

Natural Gas - It is expected that demand for natural gas would be similar to the demand under pre-closure operations as the USARC and that no new major supply lines would be necessary. No adverse impacts to natural gas systems would result from the Preferred Alternative.

Communications – The existing communications system on the property adequately met the needs of the USARC's pre-closure operations. Given a similar light industrial reuse of the property, it is expected that communications providers in the area would continue to be able to provide adequate services to the site. Therefore, impacts would be long-term and not significant.

Solid Waste – Solid waste generation would be at volumes and management would be handled in a similar fashion to pre-closure operations. During the proposed demolition of buildings and necessary renovation of the existing buildings, more solid waste would be produced than the current load. This would also occur with any future demolition and new construction on the site; however, the duration of additional solid waste during demolition, renovation, and construction of buildings would be short-term and would be accommodated by local landfills. Therefore, there would be no significant effect on solid waste.

4.8.2.2 Caretaker Status Alternative

Under the Caretaker Status Alternative, there would be no adverse effects to utility systems. Impacts to utility systems would be beneficial in that there would be a significant reduction in or elimination of demand for utility resources.

4.8.2.3 No Action Alternative

Under the No Action Alternative, there would be no change to utility resources as operations would continue at pre-closure activity levels. As a result, there would be no effect on utilities.

4.9 HAZARDOUS AND TOXIC SUBSTANCES

This section addresses potential site contamination issues; the use, handling, and storage of hazardous and toxic substances and the generation and disposal of hazardous materials associated with the proposed operations and at the Niagara Falls USARC facility. Hazardous materials are substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present a substantial danger to public health or the environment if released. These typically include reactive materials such as explosives, ignitables, toxics (such as pesticides), and corrosives (such as battery acid). When improperly stored, transported, or otherwise managed, hazardous materials can significantly affect human health and safety and the environment.

4.9.1 Affected Environment

Hazardous Substances.

Available records indicate that several buildings on the site have been historically used to store hazardous materials and POLs such as acid batteries, paints, methanol, fuel oil, lubricating oil, gear oil, waste oil, rifle bore cleaner, transmission fluid, acids, antifreeze, motor oil, gasoline, diesel, and acetylene and oxygen gas cylinders (CH2MHILL, 2007).

Building 4. Building 4 was used to service and maintain helicopters and airplanes by the Navy from its construction in 1956 to about 1970. From about 1970 until 1991, the Army used Building 4 for helicopter maintenance. USARC personnel indicated that the New York Army National Guard (NYARNG) used the hangar to park, service, and maintain two aviation companies, reduced to one aviation company of 21 UH-1 helicopters. USARC personnel also indicated that from about 1970 to 1975, Building 4 served as a Nike missile support center where conventional missile warheads were serviced and maintained from locations in the state of New York. From the late 1970s to about 1994, the 42nd Aviation Battalion, part of NYARNG, used and serviced about 30 helicopters in the hangar. The 865th Combat Support Hospital, which includes hospital units, a petroleum company, and a drill sergeant unit, used the building to store equipment, and for administrative, educational, and logistical purposes. Reservists of the 865th Combat Support Hospital historically used Building 4 for drill activities on weekends throughout the year (CH2MHILL, 2007).

Building 17. Building 17 was formerly used to store containers of POL products such as engine oil, lubricating oil, antifreeze, grease (including aircraft grease), diesel, hydraulic fluid, and gasoline; and windshield washer fluid (CH2MHILL, 2007).

Building 18. An OMS and the AMSA were formerly housed in Building 18. The OMS was used to perform vehicle maintenance and to store related equipment, tools, POL, and hazardous waste prior to offsite disposal by a licensed contractor. Materials stored include engine oil, used oil, degreasing solvents, brake cleaning fluid, penetrating grease, lubricant sprays, adhesives, fiberglass resin, paint, insect killer and repellent, primer, isopropyl alcohol, denatured alcohol, coolant cleaner, floor cleaners, and methanol (CH2MHILL, 2007).

The AMSA was previously used to store used oil, engine oil, lubricants, paints, rust prevention sprays, spill kits, gasoline, diesel, vehicle batteries, crushed oil filters, a parts washer, nonpetroleum-based soap, and used rags The AMSA reportedly generated, on average, approximately 50 gallons of used engine oil, 10 gallons of antifreeze, 5 gallons of hydraulic fluid, and 5 gallons of waste diesel monthly (CH2MHILL, 2007).

Building 20. A battery room in Building 20 previously stored 1-gallon acid batteries, hydraulic oil, and washer fluid (CH2MHILL, 2007).

Building 21. Two maintenance bays in Building 21 were used to perform light vehicle maintenance. Flammables cabinets were used to store engine oil, diesel, lubricant oil, and gasoline in cans and small containers. Waste oil was also stored. Activities in Building 21 reportedly generated a minimal quantity of used oil each month (CH2MHILL, 2007).

Building 22. Flammable storage cabinets in Building 22 were used to store small cans of spray paint, rifle bore cleaner, glass cleaner, bleach, pine oil disinfectant, floor wax, and an assortment of household cleaners (CH2MHILL, 2007).

Storage Sheds. Storage sheds in the military equipment parking (MEP) area northeast of Building 21 housed 55-gallon drums that contained used motor oil and antifreeze. Two similar storage sheds were located in the military vehicle parking area (MVPA) east of Building 18. In the MVPA, one shed contained POL, including waste oil, antifreeze, diesel, diesel waste, and parts cleaners (CH2MHILL, 2007).

Underground Storage Tanks (USTs)/Aboveground Storage Tanks (ASTs)

There are no existing USTs located on site property. A 528-gallon waste oil AST installed around 1990 is located near Building 17. The AST is located within a concrete containment structure and formerly received used oil from the AMSA shop and OMS. Site records and former site personnel indicate that up to seven USTs and three ASTs were formerly located on the Property. All of the tanks reportedly have been removed, and no evidence of tanks were observed during the geophysical investigation as part of the Site Inspection that occurred in 2010 (PARS, 2011). Documented spills previously occurred from former 550-gallon and 1,000-gallon waste oil USTs. Both USTs received regulatory closure. A 200 gallon release of No. 2 fuel oil occurred during an UST removal. The spill was remediated and no further action was required. The incident was closed in March 1992. Documented removals and closure are not available for six of the tanks (CH2MHILL, 2007).

Polychlorinated biphenyls (PCBs)

No surveys of PCB-containing equipment have been performed for the Property (CH2MHILL, 2007). One pad-mounted dry transformer is located in Building 22. An overhead dry transformer is located close to the northeast corner of the first floor of Building 22. Another pad-mounted dry transformer is located in an enclosed area within Room 104, Building 21. An electrical room, located in the northeast corner of the first floor, Building 4S, contains dry transformers and associated equipment. All transformers observed appeared in good condition. Property personnel indicated that none of the transformers contained PCBs (CH2MHILL, 2007).

In 1991, a transformer fell and broke, releasing 120 gallons of transformer oil which contained 250 parts per million (ppm) of PCB into a storm sewer drain located east of Building 22. Surface paving materials, soils, and storm drain materials were remediated after the spill. NYSDEC indicated that the spill had been adequately remediated that same year (CH2MHILL, 2007).

Asbestos Containing Material (ACM)

A 2004 ACM survey identified ACM in Buildings 4, 19, 21, 22, 23, and 26, in floor tile, floor tile mastic, fire doors, piping thermal system insulation, vent ducts, and roofing mastic. According to personnel, no ACM abatement has been performed (CH2MHILL, 2007). An asbestos visual survey is planned prior to transfer of the Property (Dell'Olio pers. comm., 2012).

Lead-based paint (LBP)

Buildings 4, 18 through 23, 25, and 26 were constructed before 1981 and therefore potentially contain LBP. No LBP surveys have been conducted at the building on site. Facilities constructed before 1981 are likely to contain LBP. Buildings 17 and 24 were constructed after 1981 (CH2MHILL, 2007).

Radiological Materials

A radiological survey was performed at the USARC on December 12, 2011. A subsequent report and memorandum concluded that no further action is required with respect to the radioactive devices or materials identified and that the site is free of radiological concerns (Department of the Army, 2011) (Appendix B).

Radon

A radon survey was conducted at the site in August 1998. Radon test results indicated radon levels between 0.1 and 0.2 picoCuries per liter (pCi/L) which is well below the U.S. EPA recommended action level of 4 pCi/L (CH2MHILL, 2007).

Munitions and Explosives of Concern (MEC)

The 2007 ECP indicated that a review of available records, the site reconnaissance, and interviews with USARC personnel, no munitions and explosives of concern (MEC) are present on the Property. Nike missiles with conventional warheads were historically serviced and maintained in the hangar part of Building 4. The principal munitions associated with Nike missiles included the missiles themselves and propellants and fuels associated with the missile components. The exact components of the warheads serviced, missile propellants, and fuels used (if any) at the site were not detailed in documents reviewed during the preparation of the 2007 ECP report (CH2MHILL, 2007).

No evidence was identified to indicate that firing ranges are currently located or have been historically located on site property (CH2MHILL, 2007).

4.9.1.1 Hazardous Materials Use

CERCLA hazardous substances pursuant to CERCLA §101(14) (42 United States Code 960 (14)) were previously used on the property site. Chemicals formerly used and stored at the USARC site were associated with aircraft and vehicle maintenance, Nike missile servicing, and facility maintenance activities and janitorial services. No specific records were available regarding hazardous substances used in site operations. Chemicals typically used in aircraft maintenance and to service Nike missiles include solvents such as tetrachloroethylene (PCE); trichloroethylene (TCE); benzene; carbon tetrachloride; 1,1,1-trichloroethane (TCA) and 1,1,2-TCA; nitric acid; sodium dichromate; sulfuric acid; zinc chromate; and paint. The solvents were typically used in cleaning, corrosion removal, painting, and preparation of parts. Sodium dichromate and zinc chromate were used in metal cleaning and paints, respectively. Sulfuric acid was used in lead acid batteries. Metallic selenium was used in rectifier parts. The Nike Ajax missiles used a 28-volt silver-cadmium battery that used potassium hydroxide as the electrolyte (CH2MHILL, 2007).

Historical site reports indicate aircraft service mechanics used Stoddard solvent to clean aircraft parts until about 1991. A July 2003 USACE-Hazardous, Toxic and Radiological Waste (HTRW)-Categorical Exclusion (CX) report on Nike missile batteries indicated the service and maintenance of Nike missiles routinely involved use of POL and hazardous substances, including TCE (CH2MHILL, 2007).

4.9.1.2 Hazardous Waste Storage/Handling Areas and Contaminated Sites

The 2007 ECP report indicated there may be a landfill on the Property. The ECP cited a 1994 PA (Engineering Technology Associates Inc, 1994) that discussed a 1970's funding request to replace corroding water lines on the Property which blamed the corrosion failures on an underlying landfill located on the Property. However, an engineering study revealed that the probable reason for the failed piping was mechanical failure due to water hammer because the installation failed to maintain the jockey pump on the fire water system (Minvielle pers. comm., 2012). There is also no historical evidence to support the presence of a landfill on the Property as several excavation operations on the Property did not reveal any evidence of one, and historical topographic maps and aerial photographs do not show any waste management activities taking place on the Property (Minvielle pers. comm., 2012). Additionally, after a chain-of-title review and several interviews with city and state officials a Supplemental Phase I Assessment conducted in 2009 to further investigate the potential presence of a landfill, found no definitive evidence that confirmed the presence of a landfill on the Property (CH2MHILL, 2009).

The 2007 ECP report noted that several published reports on the Nike missile program indicate there is the potential for environmental effects related to Nike missile operations and maintenance. It also noted that drainage from the Building 4 hangar, where maintenance was historically conducted on Nike missile conventional warheads, reportedly flowed into storm drains for several decades before the installation of the OWS near Building 4, and that the 1994 PA recommended sediment sampling in Cayuga Creek to evaluate discharges from Building 4 floor drains into the storm sewer (CH2MHILL, 2007).

While the ECP did not find any information indicating that sediment sampling had occurred, there have been no reports of stressed vegetation at any of the outfalls, nor any evidence of industrial discharge leaving the property via the storm system associated with Building 4 that would indicate any contamination occurred as a result of maintenance operations in Building 4. Additionally, during a 2011 RI the NYSDEC informed the Army that sediment sampling at Outfalls 1, 2 and 3 was not required due to accessibility issues and outfall's position below the creek's water line (PARS, 2012).

Three spills have been documented on the Property associated with USTs (CH2MHILL, 2007). During the removal of a 550-gallon UST associated with a wash rack outside Building 18 in September 1999, TCE was detected in the soil at concentrations exceeding the NYSDEC allowable soil concentration, but below the NYSDEC recommended soil cleanup objective of 700 parts per billion (ppb). During the removal of a 1,000-gallon UST in September 2009, the tank was turned over in the excavation pit, allowing groundwater to flow into and out of the tank. Soil and water samples from the excavation indicated the presence of polycyclic aromatic hydrocarbons; however, they were at levels significantly less than the recommended soil clean-up objective (CH2MHILL, 2007). The closure report recommended no further action for both tanks, and the both received regulatory closure on February 22, 2000. On October 18, 1999, 200 gallons of No. 2 fuel oil were release while a UST was being removed. The tank contents were stored in a concrete vault, and sorbents were use to hold the spill. The sorbents were later disposed of, and not further action was required. The spill received regulatory closure on March 6, 1992 (CH2MHILL, 2007)

In 1991, a transformer fell and broke, releasing 120 gallons of transformer oil which contained 250 parts per million (ppm) of PCB into a storm sewer drain located east of Building 22. Surface paving materials, soils, and storm drain materials were remediated after the spill. NYSDEC indicated that the spill had been adequately remediated that same year (CH2MHILL, 2007).

On June 24, 2008, a milky white substance was observed discharging from a 24-inch diameter pipe at an outfall located immediately southeast of the property. PCB was detected in the soil samples collected from the drainage swale at concentrations ranging from non-detect to 1,060 mg/kg. The storm water outfall was investigated and remediated with approximately 134 tons of PCB impacted soil removed from the drainage swale. The 24-inch storm sewer was cleaned and post –excavation soil samples from the drainage swale were below the maximum contaminant level of 1 mg/kg per NYSDEC regulations (PARS, 2011).

In 2010, a Site Inspection was conducted at the USARC property to evaluate potential sources of the PCBs that were detected in 2008. The inspection included a one acre site in the southeast portion of the USACE property at the locations of the former USTs at Building 2 and in the vicinity of the former fire protection main; exploratory excavations to investigate the former fire protection main; and the collection of and analysis of soil and water samples to evaluate potential impacts related to the former USTs and fire protection main (PARS, 2011).

Soil sampling detected semi-volatile organic compounds (SVOC) at concentrations exceeding the NYSDEC Unrestricted and Restricted Use Soil Cleanup Objectives. Chromium, iron, and PCBs were detected at concentrations exceeding the Unrestricted use Soil Cleanup Objectives. Follow-up soil sampling in December 2010 detected acetone in five samples at concentrations exceeding the Unrestricted Use Soil Cleanup Objective and was identified as a possible laboratory contaminant. Barium was detected in one soil sample at a concentration that exceeds the Residential and Commercial Restricted use Soil Cleanup Objectives, and manganese and chromium were detected in several samples at concentrations exceeding the Residential Restricted Use Soil Cleanup Objectives. PCBs were detected in five soil samples exceeding the Residential and Commercial restricted Use Soil Cleanup Objective and in seven soil samples concentrations exceeded the Unrestricted Soil Cleanup Objective.

Analysis of water collected from a 6-inch diameter pipe indicated the presence of several compounds including toluene, naphthalene, PCBs and chromium in concentrations exceeding the NYSDEC Class GA objectives (PARS, 2011). Analysis of groundwater indicated the presence of two VOCs, four SVOCs, and PCBs at several sampling locations at concentrations exceeding NYSDEC Class GA Criteria. Additionally, at one of the exploratory excavations, petroleum product was observed within the fill material of the excavation and on the surface of the groundwater (PARS, 2011).

Based on the results of the Site Inspection, a RI/IRA/HRRA/Feasibility Study was initiated and removed and disposed of approximately 40 tons of contaminated soil and approximately 2,000-gallons of contaminated groundwater from the excavation. An 8-foot section of the 6-inch diameter pipe in the excavation was also removed and the open ends of the pipe were fitted with a Fernco and PVC cap prior to backfilling. No further investigations are warranted for this site as a HRRA for the site identified exposure to impacted groundwater by construction workers as the only risk to human health and the environment and recommended that a land use restriction in the form of a Site Management Plan be developed and implemented as mitigation for limiting exposure to construction workers.

4.9.1.3 Environmental Condition of Property

The 2007 ECP Report for the USARC property (CH2MHILL, 2007) initially classified the Property as an ECP Category 7 (an area or parcel of real property that is unevaluated or requires additional evaluation) due to reports of a former landfill on the Property, published reports on the Nike missile program indicating that there is the potential for environmental effects related to Nike missile operations and maintenance, and an outstanding recommendation from a 1994 Preliminary Assessment (PA) to perform sediment sampling in Cayuga Creek to evaluate discharges from floor drains into the storm sewer from Building 4 prior to oil water separators (OWS) being installed. A Supplemental Phase 1 Assessment concluded that "no definitive evidence was obtained that confirms the presence of a landfill on the Property." (CH2MHILL, 2009). Though no evidence of a landfill was found, the Supplemental Phase 1 Assessment continued to classify the Property as an ECP Category 7 primarily due to a PCB investigation going on at that time (CH2MHILL. 2009). As noted above under Section 4.9.1.2, further soil and groundwater investigations resulted in IRA activities, and a HRRA recommended that a land use restriction in the form of a Site Management Plan be developed and implemented as mitigation to limit exposure of construction workers to contaminated groundwater.

No further site investigations are warranted for this Property and land use restrictions would be included in the property deed for transfer, providing adequate protection for construction workers. Therefore, the Property will be classified as an ECP Category 4 (an area or parcel of real property where release, disposal, or migration, or some combination thereof, of hazardous substances has occurred an all remedial actions necessary to protect human health and the environment have been taken) at the time of property transfer.

4.9.2 Environmental Consequences

For the purposes of assessing the intensity of impacts related to hazardous and toxic substances, the following impact thresholds were developed:

> ***No Effect –*** There would be no increase in the amount of hazardous materials or waste handled, stored, used, or disposed of. There would be no interference with the implementation of the

selected remedy for site contamination, no unacceptable risk to human health and the environment, and no worsening of the condition of site contaminants.

No Significant Effect **–** Action would result in an increase in the amount of materials or waste to be handled, stored, used, or disposed; but all hazardous or toxic materials and/or wastes could be safely and adequately managed in accordance with all applicable regulations and policies, with limited exposures or risks. Action would potentially interfere with remedy implementation or cause worsening of site contamination, but with applicable mitigation measures, protection of human health and the environment would be ensured and worsening in the condition of site contamination would be prevented.

Significant Effect – Action would result in a substantial increase (more than 100 percent) in the amount of materials or waste to be handled, stored, used, or disposed of, and this could not be safely or adequately handled or managed by the proposed staffing, resulting in unacceptable risk, exceedance of available waste disposal capacity, or probable regulatory violation. Action would interfere with the remedy implementation (including long term protectiveness where relevant) for site contamination, result in unacceptable risk to human health and the environment, or result in worsening or improvement in contaminant conditions (i.e., migration v. source removal/isolation.

4.9.2.1 Preferred Alternative: Traditional Disposal and Reuse

Implementation of the Preferred Alternative would result in long-term, no significant adverse effects in relation to hazardous and toxic substances. Due to potential exposure of construction workers performing subsurface activities (e.g. site upgrades, demolition, construction etc.) to impacted groundwater on the southeast portion of the Property, the Army would place land use restrictions in the property transfer documents to ensure no future activities in the area with known contaminated groundwater would pose a risk to human health and the environment.

Asbestos. ACM is known to be present in several buildings on the USARC property. Upon transfer of the property, the LRA would be responsible for properly managing any ACM, including the proper abatement and disposal of it if encountered during the renovation or demolition of buildings, in accordance with all applicable federal and state regulations. Thus, no significant effects would be expected.

Lead-Based Paint. LBP is known to be present on several buildings on the USARC property. Upon transfer of the property, the LRA would be responsible for properly managing any LBP, including the proper abatement and disposal of it if encountered during the renovation or demolition of buildings, in accordance with all applicable federal and state regulations. Thus, no significant effects are expected.

Munitions and Explosives of Concern. Based on a review of existing records and available information, there is no evidence that MEC are present on the property. Thus, no impacts to the health and safety of anyone using the facility would occur.

PCBs. Based on the previous investigations there is no known PCB Containing Equipment on the property; however, PCB contaminated soils and groundwater were found on the southeast portion of the Property. Site investigations have been completed and soil was remediated as part of an IRA .The Army would incorporate land use restrictions into the property transfer documents to limit any potential adverse impacts to construction workers from exposure to groundwater. Therefore, impacts would be long-term but not significant.

Radiological Materials. A radiological survey was completed in December 2011 and found the site to be free of radiological concerns (Department of the Army, 2011). Therefore, there would be no effects related to radiological material.

Underground Storage Tanks. All known USTs have been removed from the USARC property and all associated remedial actions have been completed. There are no effects related to USTs.

Waste Disposal Sites. Though previously reported that there may have been a landfill on the site, further investigation concluded that “no definitive evidence was obtained that confirms the presence of a landfill on the Property” and that fill material was likely used to cover low-lying areas along the banks of Cayuga Creek (CH2MHILL, 2009).

As indicated in the LRA’s reuse plan, the USARC site would be marketed for similar aviation related businesses and light industrial uses. As such, it is likely that hazardous materials would be used on the site and hazardous waste generated. The exact types and amounts of hazardous materials that would be used and the wastes generated is not known at this time. However, it expected that there would be no significant impact from the use of hazardous materials or the disposal of hazardous waste under the proposed reuse plan since the handling of these materials would managed in accordance with all applicable federal and state regulations

Overall, potential impacts to hazardous and toxic substances from the traditional disposal and reuse of the USARC would be expected to have no significant effect. Due to the known or suspected ACM materials and LBP on the structures, occupancy, use, and, if the buildings are renovated or demolished, abatement and disposal will be in accordance with applicable federal and state regulations. The use of hazardous materials and handling of hazardous waste would also be managed in accordance with all applicable federal and state regulations, and land use restrictions would be incorporated into the property transfer documents to limit the potential exposure of construction workers to impacted groundwater.

4.9.2.2 Caretaker Status Alternative

Implementation of the Caretaker Status Alternative would result in no adverse effects. Under this alternative, the site would continue to be maintained by the Army, but there would be no storage of hazardous materials on site. Implementation of the Caretaker Status Alternative would require closure of the facility and result in reduced demand for both hazardous materials and hazardous wastes management compared to those used during the operational status. Soil and groundwater investigations are complete and with no actions planned that would require ground disturbing activities, there would be no potential exposure of construction workers to impacted groundwater.

4.9.2.3 No Action Alternative

Under the No Action Alternative, operations would continue at pre-closure activity levels and no change would be expected regarding hazardous materials or hazardous wastes management.

4.10 CUMULATIVE EFFECTS SUMMARY

A cumulative impact is defined as “the impacts on the environment that result from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertake such other actions” (40 CFR 1508.7). The section goes on to note: “such impacts can result from individually minor but collectively significant actions taking place over a period of time.” Cumulative impacts associated with implementation of the Proposed Action would include any impacts from other on-going actions that would be incremental to the impacts of the proposed action alternatives.

Currently there are no projects or development occurring in the immediate vicinity of the site. Vacant land to the south across Porter Road is listed for sale as commercial property; however, the property has not been sold yet and remains vacant. Recent developments that have occurred along Military Road approximately 1.5 miles southeast of the site include the construction of a Wal-Mar, Chili's Restaurant, and Olive Garden Restaurant (Bragg, 2011). The Niagara Falls International Airport also opened a new 69,430 SF airline terminal building in 2009.The 412 reservists and 35 full time employees previously employed at the USARC site as well as the 129 reservists and 10 full time employees of the NY Army National Guard unit from Niagara Falls, NY now report to the new 71,720 SF AFRC and 17,476 SF OMS/AMSA that was constructed along Lockport Road on the Niagara Falls ARS to the north of USARC site. For future projects, there is a concept for a 10,300 SF hotel on the USARC site; therefore, it is being analyzed for its potential cumulative impacts.

4.10.1 Preferred Alternative: Traditional Disposal and Reuse

Overall, implementing the proposed action under the Preferred Alternative would not likely cause any long-term significant impacts.

The proposed action, when considered with the other development projects in the immediate vicinity, would result in long-term adverse impacts to transportation resources in the area, though it would not be a significant impact as the LOS would remain within acceptable limits. The new USARC facility would shift the existing USARC daily vehicle traffic for the current weekday workers and the weekend traffic for the reservists from NY 182 to Lockport Road to access the new facilities located to the north of the Niagara Falls International Airport. It is anticipated that vehicles coming from the north-west and south-west would access Lockport Road traveling on Packard Road (along the western boundary of the Niagara Falls ARS) and vehicles coming from the north-east and south-east would access Lockport Road traveling on Wallmore Road (along the eastern boundary of the Niagara Falls ARS) and Wall Road. As a result it is assumed that most of the existing USARC traffic and the new NY Army National Guard unit traffic would not use NY 182/Tuscarora Road, US 62/NY 182, and US 62/Williams Road signalized intersections to access the new facilities just north of the Niagara Falls International Airport, thus helping to minimize the adverse cumulative impact on the local roads around the redeveloped USARC property.

The development of a 10,300 SF hotel on the USARC site and other development projects would increase the demand for access along the local major roadways in the vicinity of the USARC property. The incremental increase in traffic flow from the proposed action and other developments in the area would affect the two signalized intersections (US 62/Williams Road and Tuscarora Road/NY 182). With a current LOS C at US 62/Williams Road intersection, and LOS C or better at NY 182 (Porter Road) and US 62 (Niagara Falls Boulevard), the long-term cumulative impact of the proposed action would not likely increase the LOS to unacceptable levels and would therefore not be significant.

The cumulative impacts from the proposed action in conjunction with the other development projects would have a beneficial impact on socioeconomics as the projects are designed to increase commercial employment and local expenditures in the ROI.

4.10.2 Caretaker Status Alternative

Implementation of the Caretaker Status Alternative would avoid new impacts that could interact with the impacts of other projects in the vicinity of the USARC. Therefore, there would be no cumulative impacts associated with the Caretaker Status Alternative.

4.10.3 No Action Alternative

Implementation of the No Action Alternative would avoid new impacts that could interact with the impacts of other developments in the vicinity of the USARC property. Therefore, there would be no cumulative impacts associated with the No Action Alternative.

4.11 MITIGATION SUMMARY

Beyond the placement of land use restrictions on the Property, no specific mitigation is required of the Army. Based on the findings of soil and groundwater investigations completed in 2011, Interim Remediation Activities removed approximately 40 tons of contaminated soil and approximately 2,000 gallons of contaminated groundwater from the excavation. Also, an approximate 8-foot long section of 6-inch diameter cast iron fire protection main was removed and the open ends of the pipe were fitted with a Fernco and polyvinyl chloride (PVC) cap prior to backfilling. A HRRA concluded that the only potential risk on the site is a carcinogenic risk for construction workers exposed to contaminated groundwater during subsurface activities (e.g. site upgrades, new construction etc.). The HRRA recommended the development and implementation of a land use restriction in the form of a Site Management Plan as an adequate remedy to reduce the risk or exposure to contaminated groundwater for construction workers during construction. Therefore, the Army would impose in the transfer or conveyance of the USARC property appropriate land use restrictions to protect construction workers. The Army will document their proposed plan for a remedial action in the form of a land use restriction in a “Proposed Plan.” The “Proposed Plan” will be released for public review in the near future. Any comments received will be documented in the Decision Document.

5.0 FINDINGS AND CONCLUSIONS

The purpose of the Proposed Action is to implement the Army's proposal to dispose of the Property following closure of the USARC and AMSA #76 in Niagara Falls, NY as directed by the BRAC Commission.

Traditional disposal via a below fair market value EDC to the Town of Niagara followed by property reuse by aviation and aerospace firms (Building 4 and its two attached buildings (4N and 4S) and a mix of light industrial and commercial uses permitted by the Town of Niagara zoning (remainder of site on a building by building basis) is the Army's Preferred Alternative. Direct, indirect, and cumulative impacts of the Preferred Alternative, the Caretaker Status Alternative, and the No Action Alternative have been considered. The evaluation performed within this EA concludes that there would be no significant impact to the human or natural environment as a result of the implementation of any of the alternatives. Therefore, the issuance of a Finding of No Significant Impact is warranted, and preparation of an Environmental Impact Statement is not required.

A summary of impacts by resource area for the Action and No Action Alternatives is provided in Table 5-1.

Table 5-1. Summary of the Impacts of the Alternatives

Resource	Preferred Alternative	Caretaker Status Alternative	No Action Alternative
Land Use			
Regional Geographic Setting and Location	No effect.	No effect.	No effect.
Site Land Use	No significant effect.	No effect.	No effect.
Current and Future Development in the Region of Influence	No effect.	No effect.	No effect.
Coastal Zone	Resource not present	Resource not present	Resource not present
Aesthetic and Visual Resources	No effect.	No effect.	No effect.
Air Quality			
Ambient Air Quality Conditions	No significant effect.	No effect.	No effect.
Meteorology/Climate	No effect.	No effect.	No effect.
Air Pollutant Emissions at Project Site	No significant effect.	No effect.	No effect.
Regional Air Pollutant Emissions Summary	No significant effect.	No effect.	No effect.
Noise	No significant effect.	No effect.	No effect.
Geology and Soils			

Resource	Preferred Alternative	Caretaker Status Alternative	No Action Alternative
Geologic and Topographic Conditions	No effect.	No effect.	No effect.
Soils	No significant effect.	No significant effect.	No significant effect.
Prime Farmland	Resource not present	Resource not present	Resource not present
Water Resources			
Surface Water	No significant effect.	No effect.	No effect.
Wetlands	Resource not present	Resource not present	Resource not present
Hydrogeology/Groundwater	No significant effect.	No significant effect.	No significant effect.
Floodplains	No significant effect.	No effect.	No effect.
Storm water System	No effect.	No effect.	No effect.
Biological Resources			
Vegetation	No effect.	No effect.	No effect.
Wildlife	No effect.	No effect.	No effect.
Threatened, Endangered, and Sensitive Species	Resource not present	Resource not present	Resource not present
Cultural Resources			
Archaeology	Resource not present	Resource not present	Resource not present
Built Environment	Resource not present	Resource not present	Resource not present
Socioeconomics			
Economic Development	No significant effect.	No significant effect.	No effect.
Demographics	No effect.	No effect.	No effect.
Environmental Justice	No effect.	No effect.	No effect.
Protection of Children	No effect.	No effect.	No effect.
Transportation			
Roadways and Traffic	No significant effect.	No effect.	No effect.
Public Transportation	No significant effect.	No effect.	No effect.
Utilities			

Resource	Preferred Alternative	Caretaker Status Alternative	No Action Alternative
Potable Water Supply	No significant effect.	No effect.	No effect.
Sanitary Sewer System	No significant effect.	No effect.	No effect.
Electrical Service and Distribution	No significant effect.	No effect.	No effect.
Natural gas	No effect.	No effect.	No effect.
Communications	No significant effect.	No effect.	No effect.
Municipal Solid Waste	No significant effect.	No effect.	No effect.
Hazardous and Toxic Substances			
Uses of Hazardous Materials	No significant effect.	No effect.	No effect.
Storage and Handling Areas	No significant effect.	No effect.	No effect.
Site Contamination and Cleanup	No significant effect.	No significant effect.	No significant effect.
Cumulative Effects	No significant effect.	No effect.	No effect.

6.0 LIST OF PREPARERS

Name	Title	Education/Responsibility	Experience
Wendy Aviles	Senior Transportation Planner	B.S. Civil Engineering, M.E. (Master in Engineering) Transportation. Responsible for Transportation Section	11 years
Rebecca Byron	Environmental Planner	MURP Urban and Regional Planning, B.S. Environmental Science and Policy. Responsible for Socioeconomic and Utilities.	6 years
Doug Pierson	Senior Planner	M.A. Geography Responsible for Transportation Section	13 years
David Plakorus	Environmental Planner	MBA, M.A Urban and Regional Planning, B.A. History. Responsible for Land Use	2 years
Catherine Price	Senior Environmental Engineer	B.S. Chemistry, B.S. Chemical Engineering. Responsible for Hazardous Wastes and Toxic Substances.	29 years
Spence Smith	Environmental Scientist	B.S. Zoology, M.A. Biology. Project Manager. Responsible for Soils, Water Resources and all sections prepared by Louis Berger staff.	14 years

7.0 AGENCIES CONTACTED

This section identifies local, state and federal agencies that were contacted or consulted during the EA process.

Federal Officials and Agencies

U.S. Fish and Wildlife Service

Native American Tribes

Tuscarora Indian Nation

Seneca Nation of Indians

Tonawanda Band of Seneca Indians

State Officials and Agencies

State Historic Preservation Officer

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9.0 ACRONYMS

AADT	Annual Average Daily Traffic
ACM	Asbestos Containing Material
ADA	Americans with Disabilities Act
AFRC	Armed Forces Reserve Center
AMSA	Army Maintenance Support Activity
ARS	Air Reserve Station
AST	Aboveground Storage Tank
bgs	below ground surface
BRAC	Base Realignment and Closure
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CX	Categorical Exclusion
DoD	Department of Defense
EA	Environmental Assessment
ECP	Environmental Condition of Property
EDC	Economic Development Conveyance
EIFS	Economic Impact Forecast System
ETA	Early Transfer Authority
FNSI	Finding of No Significant Impact
GBNRTC	Greater Buffalo-Niagara Falls Regional Transportation Council
GHG	Greenhouse Gas
g/mi	grams per mile
HCM	Highway Capacity Manual
HHRA	Human Health Risk Assessment

HTRW	Hazardous, Toxic and Radiological Waste
HVAC	Heating, Ventilation, and Air Conditioning
I	Interstate
IRA	Interim Remedial Action
ITE	Institute of Transportation Engineers
LBP	Lead Based Paint
LOS	Level of Service
LRA	Local Redevelopment Authority
MEC	Munitions and Explosives of Concern
MEP	Military Equipment Parking
MVPA	Military Vehicle Parking Area
NEPA	National Environmental Policy Act
NFR	Niagara Falls Redevelopment LLC
NFTA	Niagara Falls Transportation Authority
NO_x	Nitrongen Oxide
NOA	Notice of Availability
NYARNG	New York Army National Guard
NYSDEC	New York State Department of Environmental Conservation
OMS	Organizational Maintenance Shop
OWS	Oil/Water Separator
PA	Preliminary Assessment
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethylene
pCi/L	picoCuries per Liter
ppb	parts per billion
ppm	parts per million
POL	Petroleum, Oil, and Lubricant
psi	pounds per square inch

PVC	Polyvinyl Chloride
ROI	Region of Influence
RSC	Regional Support Command
RTV	Rational Threshold Value
SHPO	State Historic Preservation Officer
SPDES	State Pollution Discharge Elimination System
SUV	Sport Utility Vehicle
SVOC	Semi-Volatile Organic Compound
SWPPP	Storm Water Pollution Prevention Plan
TCA	1,1,1-trichloroethane
TCE	Trichloroethylene
TPY	Tons Per Year
USACE	U.S. Army Corps of Engineers
USAR	U.S. Army Reserve
USARC	U.S. Army Reserve Center
U.S.C.	United States Code
U.S. EPA	United States Environmental Protection Agency
USGS	U.S. Geologic Service
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
V	Volt
VOC	Volatile Organic Compound

EDC Application (Final)

Niagara Falls Army Reserve Center
EDC Business Plan

December 15, 2011

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TABLE OF CONTENTS

Contents

This study was prepared under contract with the Town of Niagara, with financial support from the Office of Economic Adjustment, Department of Defense. The content reflects the views of the Town of Niagara and does not necessarily reflect the views of the Office of Economic Adjustment.

I. INTRODUCTION

In 2005, the Base Realignment and Closure (BRAC) Commission recommended that the Niagara Falls Army Reserve Center/Area Maintenance Center #76 (NFARC) in the Town of Niagara, New York be closed, as part of the Reserve Component Transformation in New York. Many of the activities of the Reserves were transferred to a new joint-use facility located nearby. The NFARC site includes an estimated 20 acres of land and approximately 160,000 square feet of space in ten buildings. The facility fronts on Porter Road in Niagara, and abuts the Niagara Falls International Airport.

The Town of Niagara Local Redevelopment Authority is seeking to acquire the site and improvements from the United States through a less than fair market value Economic Development Conveyance (EDC). The LRA is uniquely positioned to redevelop the site in a cooperative manner with the private sector and potential public users, particularly the regional airport authority, in order to create new employment opportunities and to support existing public and private enterprises in the western New York region.

RKG Associates, Inc., in association with Jeffrey Donohoe Associates (JDA), Weston Solutions (Weston) and Clough, Harbor, and Associates (CHA), was retained by the Town of Niagara's Local Redevelopment Authority (LRA) to develop this application.

II. EDC OVERVIEW

As required by CFR 32 § 174.9 (Economic Development Conveyances), the Town of Niagara Local Redevelopment Authority (LRA) is pleased to present this application for a less than fair market value EDC of the former Niagara Falls Army Reserve Center (NFARC) located on Porter Road in the Town of Niagara, New York.

The LRA proposes to acquire all available real and personal property at the NFARC via an EDC, with a structured payment agreement which will allow the Army to participate in the successful redevelopment of the site, while minimizing the Army's risk. An EDC is necessary to generate new employment opportunities for the Town of Niagara and the larger region. This redevelopment of the site by the LRA will help replace the jobs lost as a result of the BRAC 2005 recommendation to close the NFARC in Niagara and to help revitalize the local economy. As discussed below, the redevelopment of the NFARC will require the LRA to invest in the marketing and promotion of the site as a competitive location for business investment, maintenance of the site and selective demolition.

As required under the statute, the Town of Niagara LRA is the designated Local Reuse Authority for the NFARC. The Town of Niagara Local Redevelopment Authority was recognized as the implementing Local Redevelopment Authority for the Army Reserve Center by the Office of

Economic Adjustment, as indicated in a letter dated March 31, 2011 from Patrick J. O'Brien, Director of the Office of Economic Adjustment. A copy of Mr. O'Brien's letter is included in Appendix A.

The Implementation LRA consists of the entire Town of Niagara's legislative body (Town Council) with additional expert community members. The table below lists the current members of the LRA.

First Name	Last Name	TITLE/PUBLIC POSITION
Daniel	Bristol – non-voting	Exec. Director
Steven	Richards	Chairman/Town Supervisor
Patrick	Brown	Member/President, Brown CPA, LLC
Carmen	Granto	Member/NFTA Commissioner
Marc	Carpenter	Member/Deputy Supervisor/Councilman
Robert	Clark	Member/Town Councilman
Samuel	Ferraro	Member/Niagara County Economic Development
Robert	Herman	Member/Town Highway Superintendent
Michael	Risman	Member/Town Counsel/Hodgson & Russ, LLC
Danny	Sklarski	Member/Town Councilman
Charles	Teixeira	Member/Town Councilman
Guenter	Feught	Member/President Emeritus Canadian Steel Corp.
Judith	Gatto	Member/VP HSBC Bank USA, Inc.

In addition to the RKG Associates team, legal counsel is provided to the LRA by Attorney George Schlossberg of the firm Kutak Rock LLP in Washington. DC, and Attorney Michael Risman of the firm Hodgson Russ LLP, of Buffalo, NY. The LRA voted to submit this EDC Application to the Army at its meeting on October 25, 2011. See meeting notes in Appendix A.

A. Description of the Property

This EDC application requests all of the excess real and personal property at the NFARC which is able to be transferred by the government under current environmental laws and regulations. It is estimated that this includes approximately 19.85 acres of real property, as well as the existing improvements (approximately 160,000 square feet located in ten structures) and related personal property associated with this acreage. The inclusion of available personal property is considered to be an important component of the LRA's ability to implement the reuse plan for the property, as the existing personal property will make the property more marketable, and enhance the ability to operate, manage, market and maintain the site. More rapid property occupancy by job-generating uses will help accelerate recovery and enhance the financial viability of the organization. Additional graphics of the requested acreage appears in Appendix B.

It is the LRA's understanding that the Army is moving forward with an environmental characterization and remediation program for the southeast corner of the property. This area is estimated to include approximately 1.8 acres of land, as well as Building 26, a 2,000 square foot storage facility.[1] As such, the LRA envisions a phased acquisition of the property, whereby environmentally clean property will be conveyed to the LRA, possibly as early as January 27, 2012. The remaining property, estimated to be approximately 1.8 acres, would be acquired by the LRA after remediation activities are completed or upon concurrence by regulatory authorities to convey under a Finding of Suitability to Transfer (FOST).

The largest building on the property, Building 4, contains approximately 96,750 square feet, or approximately 62% of the total built space. It includes a 33,750 square foot high-bay aircraft hangar with a poured-in-place barrel arched roof, along with two attached 2-story office and shop

[1] The Army's environmental analysis has not yet determined the extent of the suspected contamination or the affected property. The 1.8 acre parcel has been proposed by the LRA as a reasonable parcelization around the suspected area, based on existing fencelines and other demarcation, for purposes of moving ahead with the EDC. It can be changed based on the findings of the on-going investigation.

additions. The remaining buildings are one and two story office and shop facilities or small storage buildings.

A detailed analysis of the physical condition of the NFARC property is contained within a report entitled "Technical Memorandum: Baseline Conditions; Niagara Falls Army Reserve Center - EDC Business Plan; June 17, 2011" by RKG Associates, Inc. This report also contains a detailed analysis of the environmental condition of the property as well as market and economic information relating to the redevelopment. A copy of this report is included as Appendix C.

The Business and Operations Plan calls for the demolition of five of the smaller, older buildings on the property (totaling approximately 9,900 square feet) to support reuse of the other, more marketable facilities, which total approximately 146,360 square feet. Major infrastructure improvements that will be required prior to or during re-occupancy include building renovations, paving of aircraft aprons, parking area striping, replacement of roofs, security fencing and utility metering.

B. Intended Uses for the Property

The redevelopment of the NFARC site is expected to be consistent with the approved Reuse Plan for the property, and the more recent information collected and analyzed as part of this EDC. According to the Reuse Plan,

> *"Building 4, the large hangar, will be marketed to aviation and aerospace firms as a location for aircraft modifications, renovations, research and testing, overhaul and storage of air cargo. Building 4N and 4S, both of which are attached to the hangar, will be included in solicitations of interest and will provide space for offices, classroom training space, engineering, computer operations, locker rooms and storage. Given that the Niagara Falls International Airport is adjacent to the USARC and the reason the facility was built on that site, continued expansion and improvement of the airport should be a major driver for the reuse of the USARC.*
>
> *The remainder of the site will be utilized, on a building-by-building basis, for a mix of commercial and industrial uses that are permitted under the Town's zoning ordinance. As cited earlier, potential users of the buildings may include light industrial and commercial users such as metal fabricators, maintenance businesses, professional service firms, training providers, storage operations, motor vehicle service stations and a variety of others. Activity at the adjacent airport may also spur aviation support-type businesses such as food caterers, a commissary, avionics shop or other maintenance operations."*

The ability to reuse the hangar facility (Building 4) and adjacent apron areas for active aviation uses (approximately three acres), as envisioned in the Reuse Plan, will require a so-called "through-the-fence" access agreement with the Niagara Frontier Transportation Authority (NFTA).[2] Without

[2] Detailed information is provided in FAA Advisory Circular No. 150/5190-7, Exclusive Rights and Minimum Standards for Commercial Aeronautical Activities and FAA Order 5190.6B, Airport Compliance Requirements (Chapters 6 and 12).

access to the airfield, via an agreement with NFTA, the hangar would be marketable primarily as a warehouse building. It is anticipated that the LRA will work with NFTA on behalf of tenants that require access to the airport to get required FAA approval. Fees charged by NFTA for this access, as required under FAA regulations, will be passed through to tenants. The LRA is confident that the airport will support and accommodate through the fence access for bonafide aviation users that benefit and support the airport and that help create new jobs in the region. A member of the NFTA Board of Commissioners and a member of NFTA's Aviation Committee sit as members of the LRA.

The primary focus of the LRA will be to utilize the site to enhance economic performance and job creation in the region. This effort will include the reuse of many existing facilities, and may also include the development of new facilities on-site. The LRA has received some initial interest in the NFARC site, as a result of the public's knowledge of and participation in the reuse planning process. Public and private sector entities have expressed interest in aviation and non-aviation facilities. However, until conveyance occurs, the LRA cannot begin more detailed discussions or negotiations with these potential users.

These intended uses are allowed under the existing Light Industrial (LI) zoning for the site. The LI zoning permits a wide variety of uses including manufacturing, offices, assembly, warehousing and research & development.[3] In addition, special permits can be obtained for beneficial uses that fall outside of the stated zoning regulations, following the Town of Niagara regulatory process.

Although the current plan calls for reuse of Building 4 and four additional buildings, the LRA must and will remain flexible to the dictates of the market, in order to take advantage of any opportunities to create new jobs. This may include demolition of the remaining buildings and site preparation to develop new build-to-suit space for a prospective tenant or tenants, including the development of speculative aviation-related or R&D facilities. Long term, it is envisioned that much of the site will be redeveloped with new aviation-related, light industrial and flex-space buildings to serve a variety of businesses.

The potential availability of state and federal economic development funding for tenant-specific projects will drive the financial feasibility of this approach. Towards that end, the LRA has worked closely with the Niagara County Department of Economic Development to begin preparation of required grant applications from a variety of sources. In mid-November, the Western New York Economic Development Council released its final strategic plan for the region, which included specific reference to the redevelopment of the Niagara Falls Army Reserve Center by the Town of Niagara as a priority project, and earmarked $2.5 million for capital improvements from 2012 State economic development and brownfields funds. A copy of this report can be found online at http://nyworks.ny.gov/content/western-new-york. However, the grant application process cannot be completed until the LRA gains control of the property, either by deed or by a signed MOA.

[3] See Section II E of the Reuse Plan for a complete list of allowed uses.

C. Economic Impact of the Closure on the Community

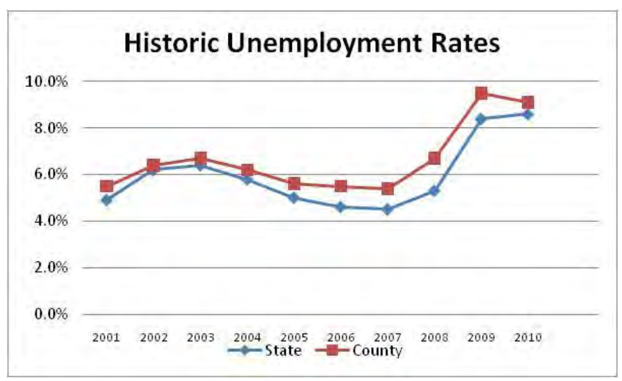
The Department of Defense activities are critically important components of the regional economy as a whole. As detailed in the Army's environmental assessment of developing a new Reserve Center, the net impacts associated with the relocation of the Reserve Center are minimal, citing "the construction of the new facilities on the installation will be the sole contributor to short-term increased economic activity due to the associated increase in expenditures on labor and materials during the building period."[4]

According to the *2005 Defense Base Closure and Realignment Commission Report*, the closure of the NFARC will result in the loss of just one direct job, as much of the existing activity will be relocated to the new Reserve Center. While this may seem an insignificant loss, the region's history of lagging the State of New York in terms of employment, and the ability to use the ARC to create an economic engine to help the region perform more consistently, are seen as key factors in the overall impact on the community and the larger region.

D. Job Losses and the Need for Recovery

The closure of the NFARC represented a limited loss of jobs for the community and the region. Since the Army Reserve is relocating to a new combined location nearby, there were virtually no jobs lost within the region. The BRAC Commission's final report indicates just one military job lost at the site.

However, according to the most recent unemployment information for Niagara County from the New York State Department of Labor, there were 10,264 unemployed persons in the County in 2010. This indicates an unemployment rate of 9.1%, one-half of a percentage point higher than the State of New York's unemployment rate of 8.6%. As shown in the graphic to the right, the County's unemployment rate has been consistently higher than the State's since 2001. Some of the improvement in the County's unemployment rate is attributable to a reduction in the labor force. The labor force was 109,383 in 2001, and peaked at 113,681 in 2008. Since that time, the labor force has declined, falling to 112,269 at the end of 2010. This means that despite a loss of more than 700 jobs between 2009 and 2010, the County's unemployment rate decreased from 9.5% in 2009 to 9.1% in 2010.



As discussed in later sections of this document, the proposed EDC transfer of property at the NFARC is expected to support as many as 149 to 250 high quality jobs within fifteen years. The addition of 200 jobs to the local employment base, with no change in labor force, would reduce the

[4] *U.S. Army Corps of Engineers, Mobile District Affected Environment and Consequences, Environmental Assessment – Niagara Falls AFRC, NY 4-40, July 2007, Page 4-39*

unemployment rate by 0.18%, bringing Niagara County's unemployment rate more in line with the State of New York.

E. Adopted Redevelopment Plan

The redevelopment plan for the NFARC was submitted to the Department of the Army and the Department of Housing and Urban Development in 2008. The redevelopment plan was reviewed and approved by the U.S. Department of Housing and Urban Development (HUD) on April 1, 2009. A complete copy of the approved redevelopment plan is included in electronic format in Appendix D. A copy of the approval letter from HUD is included in Appendix E.

The Reuse Plan envisions that the largest building on the property, Building 4 which consists of a former aircraft hangar (Building 4H) and the attached office/shop/classroom spaces (Buildings 4N and 4S), will be marketed to "aviation and aerospace firms as a location for aircraft modifications, renovations, research and testing, overhaul and storage". The remainder of the site is expected to be marketed to users that can benefit from the availability of lower cost space, while being less impacted by the negative attributes of the facilities. The focus is expected to be on commercial, R&D and light industrial uses, possibly in support of aviation or aerospace activity located in the region. These uses are consistent with the existing LI zoning for the property and are consistent with prior uses of the facilities by the Army.

F. Financial Condition of the LRA and Prospects for Redevelopment

As described above, the LRA consists of the entire Niagara Town Council along with other appointed members who bring expertise on financing, economic development and other disciplines. By inclusion of the entire Town Council, all LRA actions carry the full weight of the Town of Niagara. Detailed information regarding the Town can be found on the website - www.townofniagara.com.

It is anticipated that the redevelopment of the ARC will be managed through the Town of Niagara's Industrial Development Agency (IDA). According to its annual report, the IDA "*is a not-for-profit, public benefit corporation authorized under the laws of New York State and the New York State Industrial Development Agency Act and is a component unit of the Town of Niagara, New York. The Agency was established to promote, develop, encourage and assist in the acquisition, construction, reconstruction, importing, maintaining, equipping and furnishing of industrial, manufacturing, warehousing, commercial and research facilities; thereby advancing job opportunities, general prosperity and economic welfare of the people of New York State generally, and the Town of Niagara and surrounding area specifically*."

The IDA currently has no debt and a strong balance sheet. At the end of 2010, the IDA had almost $190,000 in cash. In addition, the IDA has a history of job creation without incurring debt. During 2010, the IDA closed on three projects which created 159 permanent non-construction jobs. Total cost for these projects was almost $4.3 million. These projects were self-financed (by the target companies along with grant sources), with no bonds issued by the IDA. The IDA has the experience and market understanding to help the Town of Niagara realize its vision for the ARC property. The

IDA's experience will help in negotiating with potential tenants, accessing financing for specific projects, implementation of a marketing plan and ensuring that viable redevelopment opportunities receive sufficient support resulting in new job creation. Appendix F contains financial information on the Town of Niagara and the Industrial Development Agency.

The LRA views the prospects for the redevelopment of the NFARC as good. The high profile and visibility of the project has resulted in multiple inquiries for both aviation and non-aviation uses. The LRA recognizes that the redevelopment of the site is a long term project which could require five to ten years to implement. As discussed elsewhere in this application, the LRA has developed a strategy for redeploying the property's assets while demolishing unmarketable and uninhabitable facilities. In addition, the LRA plans to invest in upgrading pavements to enhance the subject property.

G. Job Generation

The redevelopment of the NFARC is expected to result in employment gains, as the facilities at NFARC are converted to new uses. As discussed elsewhere in this application, it is anticipated that the reuse of the hangar and adjacent office and classroom facilities will occur during the initial five years of the project, assuming an agreement can be reached with NFTA to make aviation reuse of the hangar viable. These facilities constitute the largest block of floor space, and should result in the highest level of job creation at the NFARC. The Table below summarizes the estimated job creation in each facility.

		Jobs per 1,000 SF		Jobs	
Building	**SF**	**Low**	**High**	**Low**	**High**
4H	33,750	0.6	1	20	34
4N	27,000	1.5	2.5	41	68
4S	36,000	1.5	2.5	54	90
18	13,670	0.7	1.2	10	16
21	13,540	0.7	1.2	9	16
22	20,000	0.7	1.2	14	24
24	2,400	0.7	1.2	2	3
Total	**146,360**			149	251

Source: Jeffrey Donohoe Associates Figures may not add due to rounding

It should be noted that additional short-term jobs will be created as a result of construction and renovation projects within most of the facilities targeted for reuse. However, since the LRA does not plan to renovate spaces for tenants, these jobs will result from expenditures by the tenants, rather than the LRA. The LRA's primary capital expenditures are focused on repaving and demolition activities, which are expected to generate between three and eight construction jobs. In contrast, upgrades by tenants are likely to be in the range of $5 million or more, and will create substantially more construction jobs. The majority of job creation activity is expected to occur during the first five years of the project. At full occupancy, it is estimated that the project could support between 149 and 251 direct jobs on-site. Depending on the type of tenant, these jobs could include high-paying, skilled employment opportunities in the aerospace/aviation or R&D fields.

III. BUSINESS PLAN

The cash flow analysis for the redevelopment of NFARC is focused on reuse of the existing buildings in “as-is” condition. The LRA seeks to limit its financial exposure by utilizing grant funding for major improvements and operational support. The LRA may initially market the properties at a relatively low price, with the expectation that tenants will fund their own renovations to the facilities. The availability of grant funds or loan proceeds, either to the LRA or directly to tenants will be the primary source of funding for capital improvements. Early year deficits are expected to be funded by the LRA, through the IDA. The operating revenues will be closely monitored, and capital improvements such as demolition of unmarketable structures and repaving of grounds will be driven primarily by initial funding provided by the IDA, available grant funding or from operating cash flows as appropriate. The LRA intends to monitor its cash flows closely, and if necessary, delay capital improvements until cash is available to complete these programs. Payments to the Army are due and will be made starting at the end of year 6 but may be made earlier if cash flows are sufficient to justify early payments to the Army..

A. Real Estate Leasing

As part of the baseline analysis for the redevelopment of the NFARC, an evaluation of the regional real estate market was prepared along with a detailed evaluation of the physical condition of the buildings and site, and is reported in the baseline conditions report (Appendix C). Significant findings from that analysis include:

- The quality of existing buildings is generally considered to be below average. The hangar building will require significant investment in order to repair its heating system and roof. The large hangar doors will also need to be replaced in the near future, which will result in a large cost to the tenant and reduce the ability to pay market rates.
- The office and training spaces which are adjacent to the hangar require significant upgrades in order to be usable. In addition, there is some degree of interdependency between the buildings, such as shared use of bathrooms.
- Many existing facilities face a variety of code compliance issues, including both life safety codes and handicapped accessibility codes. For the types of uses envisioned, the cost of meeting these requirements is considered reasonable.
- In general, the storage and warehousing facilities on the site are in fair condition. Facilities are generally small, with three facilities between 13,000 and 20,000 square feet, with the remaining facilities being less than 2,600 square feet.
- A review of pavements on the site indicates that the majority of surfaces are in fair to poor condition. As such, it is anticipated that the LRA will need to invest in repaving portions of the site as funds are available.
- Some demolition will be required to eliminate substandard and/or unusable facilities. It is anticipated that five facilities which total less than 10,000 square feet will be demolished.
- The regional market for this type of space is currently relatively weak with high vacancy and low lease/sale rates. Absorption is anticipated to average approximately 25,000 to 30,000

square feet per year. The adjacency to the airport will serve to differentiate the site from competitive properties and enhance marketability.

- The Town, acting through its Industrial Development Authority, can provide potential financing as well as reduced electric rates to prospective tenants, thereby increasing the attractiveness of the site compared to other competitive venues.
- Revenues from real estate leasing are projected to begin at $67,500 in the first year, and peak at approximately $285,000 at full occupancy in Year 5. Annual per square foot lease rates for buildings are projected to range from $1.50 for the shop and warehouse building to $2.00 per square foot for the hangar and office/classroom spaces.

Absorption – Due to the site's location and affiliation with a major airport, and the LRA's marketing efforts aimed at aviation-related users, it is anticipated that the LRA will be able to lease an average of approximately 30,000 square feet per year, thereby requiring approximately 5 years to absorb all of the available space (146,000 SF). It is expected that the hangar space in Building 4 will lease in the first year, based on feedback from the market. The office, shop and classroom space in the adjoining portions of Building 4 (4N and 4S) will take longer to fill. Building 4S is expected to be leased in Year 2 and Building 4N is expected to be leased in Year 4. The ability to lease all or portions of Building 4 will depend on the type of tenants that can be found and the ability to acquire through-the-fence access for aviation users. The other buildings are expected to be leased up on a staggered basis over the first five years. Alternatively, if one or more potential tenants require new build-to-suit space, and grant or other funding is available, then the LRA may demolish existing buildings to make land available for such uses.

Gross Real Estate Revenues – Gross real estate revenues include the projected revenues from leasing of facilities. Overall, gross real estate revenues are projected to be approximately $67,500 in the first year, increasing to $284,685 annually by Year 5, for a total of $3.7 million over the 15 year forecast period.

Payment to Army - Payments to the government (Army) at the rate of $66,000 per year begin at the end of Year 6 and continue until Year 10, for a total payout price of $330,000, based on the terms of the 04Oct2011 Army- Town of Niagara EDC Agreement – Deal Points and subsequent discussions between the Town and the Army BRAC team. A Promissory Note for this amount will be provided by the Town of Niagara. The LRA reserves the right to accelerate payments to the Army as cash flow permits. Any excess revenues generated by the project prior to repayment of Promissory Note, as determined by audit will be used for economic development purposes on the site as required under 32 CFR 174.9 (d)(8)(K). A copy of the EDC Deal Points is included in Appendix H, and incorporated into this application by reference.

Operating Costs – Operating costs for the redevelopment will include contract employees for the LRA (part-time Project Director and Property Manager positions) as well as marketing costs, supplies, travel and office supplies/equipment. In addition, the Business Plan includes an allowance for insurance, legal support and costs for carrying vacant buildings during the marketing period.

Capital Improvements – It is anticipated that the LRA and/or tenants will have to invest significant funds in capital improvements at the NFARC site. Specifically, it is anticipated that at least four facilities will be demolished during the early years of the project. Major improvements include interior building refurbishment, the installation of utility meters for individual buildings, replacement of the hangar doors and the roof on Building 4, and repaving of the aircraft apron on the east side of the hangar. In addition, funds have been included for fencing between the site and the airfield, vehicular paving on the site, restriping of parking areas and signage for the facility. Total estimated capital improvements, excluding building renovations, is estimated at approximately $1.6 million, expended in the first 5 years of activity. Building renovation costs, to be assumed by tenants, are anticipated to be on the order of $400,000 to $500,000 (minimum). The LRA will fund approximately $100,000 in capital costs for building demolition, pavement striping and signage, and will actively seek grant and/or tenant commitments for the remainder.

Administrative Funding from OEA – In addition to real estate revenues, the business plan assumes funding from the Office of Economic Adjustment (OEA). Typically, OEA will fund a base year of operations at the time of transfer, followed by reduced budgets each year. In most cases, the base year budget is reduced 75% in the second year, to 50% in the third year and to 25% in the fourth year. For the NFARC LRA, a base year operating budget of $100,000 has been assumed.

More detailed information regarding the projected absorption of specific buildings and the development of land parcels is contained in the pro forma included in the Business Plan section of this EDC application.

B. Revenues

Overall, the redevelopment of the NFARC is expected to generate the majority of its revenues from leasing of the buildings on the site. The LRA anticipates that it will take approximately 5 years to fully lease up the remaining 146,360 square feet. Revenue may also be generated through leasing of land for equipment storage, parking or temporary uses; however, no revenue is shown due to the high degree of uncertainty regarding these potential uses.

Real estate revenues are projected to total approximately $900,000 during the first five years of the project. By Year 10, the cumulative real estate revenue is projected to exceed $2.3 million, and payments to the Army in Years 6 through 10 will be $330,000. Through the fifteen year planning horizon, real estate revenues to the LRA are expected to be $3.7 million.

Tenants requiring through-the-fence access to the Niagara Falls International Airport will be charged a premium based on the cost to the LRA that the airport operator, NFTA, will require be paid based on FAA regulations. It is anticipated that NFTA will charge fees based on square footage associated with aeronautical activities, similar to the current fee structure now in place, which is estimated to be in a range of $0.60 to $0.75 per square foot.

C. Operating Costs

The redevelopment of NFARC will require that the LRA invest in management, marketing, maintenance and facility improvements. The costs of managing and operating the facility will decline as occupancy increases. Among the expenses budgeted for the redevelopment of the NFARC are:

LRA Director/Property Manager – These positions are budgeted on a contract basis (non-employee) at an initial annual cost of $81,000, which includes a part-time (60%) LRA director and part-time (60%) facilities manager. The role of the director will be to market and manage the real estate assets as well as provide administrative duties regarding grants and IDA participation. The facility manager's role will be to oversee property maintenance and renovation/demolition activities. These roles will step down to 40% time in the second and third years, then to 20% thereafter.

Conferences and Travel – The redevelopment of NFARC will require that the LRA/Town staff stay up-to-date regarding issues associated with base closure and redevelopment, and to stay current on marketing issues and available economic development incentive programs from the State and Federal government. A budget of $2,500 in the first year, declining to $500 per year has been included to reflect attendance at various marketing venues and for travel to meetings, etc.

Supplies and Equipment – An annual budget of $1,500 in the first year, and $1,250 subsequently has been included to reflect the need for office equipment, computer supplies, and other operational supplies.

Marketing Materials – In order to effectively promote the site for redevelopment, it will be necessary to develop promotional materials for distribution to potential tenants, economic development professionals and members of the public. An initial budget of $10,000 has been included for development of materials. The budget is reduced to $5,000 for the next two years, and is further reduced to $750 annually as the occupancy increases at the site.

Legal Support – A budget of $20,000 has been included for legal services during the initial year of the project, primarily to develop a lease protocols for the property and to review other legal documents and agreements. For the ensuing four years, the budget is reduced to $10,000 in the second year, then to $7,500 and $5,000 annually. This budget for legal services does not include potential extraordinary costs associated with issues arising from the Army's environmental mitigation actions or subsequent activities.

Insurance – An allowance for general liability insurance has been included, consistent with good risk management practices. For purposes of the budget, an allowance of $15,000 has been included for the initial year, stepping down to $5,000 annually at full occupancy Environmental liability insurance is not included, as it is assumed that the Army will convey a "clean" site as per all Federal and State requirements.

Carrying Costs – The acquisition of buildings will result in some portion of the facilities being vacant each year. In order to maintain the facilities in a marketable condition, it will be necessary to provide some level of utilities to each facility. For budgetary purposes, an average of $1.00 per square foot has been included for vacant facilities each year during the lease-up period.

Grounds Maintenance – This cost is for general repairs and maintenance of the common areas around the property, including snow plowing and lawn mowing. It is estimated at $15,000 in the first two years and $10,000 annually thereafter.

Contingencies – In every new enterprise, unforeseen expenses occur. In order to prepare the LRA for the possibility of unplanned-for expenses, an allowance of 10% of other expenses has been included for each year of the forecast. This cost totals just over $128,000 over the fifteen year forecast period.

D. Capital Costs

As discussed above, the redevelopment of the NFARC will require substantial capital expenditures for the buildings and grounds in order to market them effectively. The capital items that will need to be addressed, and the anticipated sources of funding for them include the following:

Demolition – Five minor structures totaling 9,900 square feet will be razed over the first four years, making way for additional parking and improving the aesthetics of the site. Cost has estimated at $69,300 or $7.00 per square foot. The LRA will be responsible for these costs.

Utility Meters – The site is currently served with single point-of-entry for all utilities (water, sewer, gas, electric). In order to effectively measure usage for individual tenants, new meters will be required at an estimated cost of $50,000. This work will be done in Years 2 and 3, with funding provided by economic development grant funds or from the providers.

Building Refurbishment – Each of the buildings will require, at a minimum, basic refurbishment at an estimated cost of $3.00 per square foot for painting and minor repairs. These are assumed to be tenant costs (reflected in the relatively low achievable rent levels for the space "as-is"). ADA compliance will also be required in many of the facilities, which is also considered a tenant improvement cost. Tenant fit-out costs may be substantially more, depending on a business' specific space needs. At some point the HVAC systems in the buildings will need updating or replacement. *It is anticipated that these costs will be funded from a combination of economic development grants/loan proceeds and higher lease rates for improved space .*

Building 4 Roof – The membrane roof on the arch hangar portion of Building 4 was damaged on multiple occasions by high winds. The Army repaired the damage, but evidence of leakage and the overall age and condition of the roofs indicate that total replacement will be required within the first two years. The cost is estimated at $8.00 per square foot or a total of $486,000. This is anticipated to be funded from economic development grant funds.

Hangar Door Replacement – The large, multi-panel doors on both ends of the hangar are in poor condition and will require replacement during the first few years. This is also necessary for energy efficiency purposes. The cost per door has been estimated at $250,000 and is expected to be funded from economic development grant sources.

East Apron Paving – As noted in the Existing Conditions report, the paving on the east side of the hangar is in very poor condition and is not suitable for aviation uses. This will need to be replaced in Year 4 (concurrent with replacement of the east hangar door) at a cost of $350,000 (100,000 square feet @ $3.50). Potential sources of funding include economic development grants or possible FAA funding if the project is included in the airport's master plan and CIP.

Other Paving – Portions of the parking areas around the base will require replacement over the first few years of activity. A total of $100,000 is allocated for this need, funded from economic development grants. In addition, pavement striping will be needed to adequately park vehicles and provide safe egress through the site at an estimated cost of $20,000, to be borne by the LRA.

Fencing – New and replacement fencing is required on both sides of Building 4 to separate aviation and non-aviation uses, at an estimated cost of $75,000 including security gates. This cost will be included in the economic development grant package.

Signage – The LRA will be required to fund up to $15,000 over the first two years for site signage to attract potential tenants.

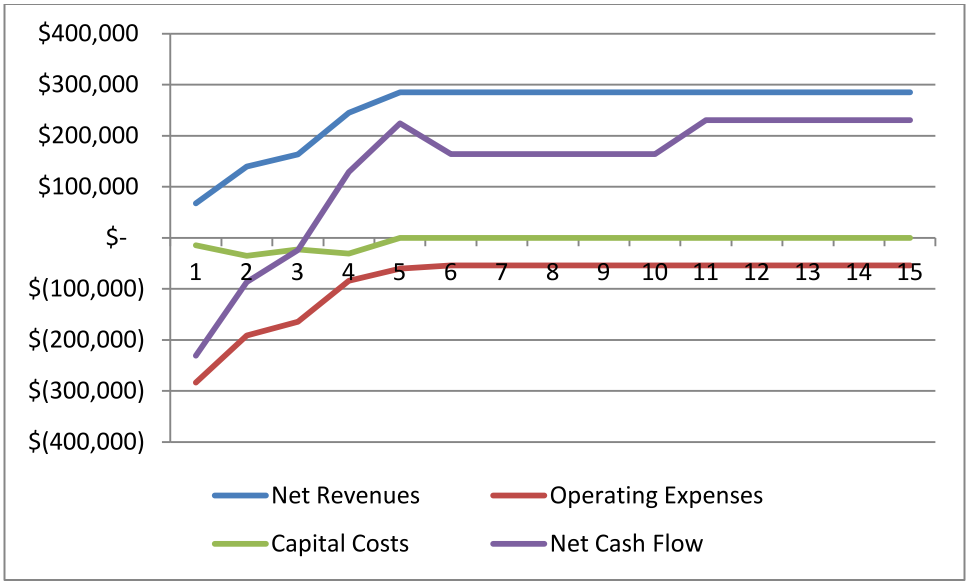
The EDC assumes that much of the needed capital improvements will be funded from grant sources or by tenants. These include replacement of the roof on the large hangar building (#4) as well as new hangar doors and demolition to prepare the site for new users. The LRA is confident that state and federal grants will be available for these projects. The redevelopment of the Army Reserve Center by the Town of Niagara was designated in November as a *Priority Project* by the New York State Regional Development Council, and a total of $2.5 million was earmarked for funding of needed projects from state and federal sources. Application for this grant funding will begin as soon as the LRA has control of the property, either through deed, interim lease or signed agreement. In the event that funding for these projects is delayed, the LRA anticipates delaying the implementation of the capital improvement program.

E. Development Timetable and Phasing Schedule

The proposed redevelopment of the NFARC is a project which will require a focused marketing effort, creative management and a commitment from the LRA and the Town of Niagara to support the project. The development cash flow analysis considers the initial fifteen year term of the project. As discussed in the revenue section, it is anticipated that the majority of reusable existing buildings will be leased within the initial five years of the project. The plan also relies upon an agreement with NFTA to provide through-the-fence access to make the hangar marketable from an aviation perspective. It is anticipated that either the LRA or the tenants requiring through-the-fence access will be required to pay the NFTA for that privilege. NFTA's rates for access have not yet been negotiated, but are anticipated to be on the order of \$0.60 to \$0.75 per square foot of building and/or ground space utilized for aviation purposes.

As discussed above, real estate activities are projected to generate approximately \$3.7 million in gross revenues over the next fifteen years, before payment of \$330,000 to the Army. However, the revenues from real estate activities will be offset by a variety of operating costs, including management, marketing, legal and insurance costs, along with the LRA's share of capital improvements.

The graphic below depicts the projected total revenues and total operating expenses on an annual basis. As shown in the figure, the redevelopment is projected to incur deficits in the first three years. By the end of Year 3, the cumulative operating deficit is projected to be more than \$342,000 before major capital improvements . Beyond Year 3, the redevelopment is expected to operate at a profit, which increases as building occupancy increases and the carrying cost for vacant facilities decreases. In order to overcome this operating deficit, two sources of funding are anticipated – continued grant funding from the Office of Economic Adjustment (OEA) totaling \$250,000 for LRA administration, management, maintenance and marketing, allocated over the first four years according to OEA's typical formula, as well as a \$150,000 investment by the Town of Niagara Industrial Development Authority. This latter investment will be repaid with interest from cash flows beginning in Year 3. This funding will help to ensure that the property is maintained in a condition which will allow it to be competitive in the regional marketplace for economic development opportunities.



If all capital costs are included in the analysis, including those anticipated to be funded from various grant sources, the total deficit is nearly $1.8 million, occurring in Year 4. However, major capital improvements will not be made until funding is available and tenants are in hand.

F. Cash Flow Analysis

As discussed throughout this report, the redevelopment of the NFARC is expected to require as much as five years to achieve reuse of the existing buildings. Carrying the vacant facilities until they are successfully reused will require the LRA to invest significant funds in maintenance and operating costs, in order to maintain the properties in marketable condition.

Real estate leasing activities are projected to generate more than $3.7 million in revenues for the LRA during the first fifteen years of the redevelopment. During the early years of the project, reuse of the hangar is a critical component of the LRA's potential for success. The marketability of the hangar is closely tied to reaching agreement with the NFTA for through-the-fence access for the users of the hangar. If no agreement can be reached with NFTA, the hangar will have to be marketed as warehouse space (at less than the anticipated $2 per square foot lease rate). It is important to note that although an above-market rent may be achievable for Building 4 with "through-the-fence" access to the airport, any overage will likely need to be passed through to the NFTA as a fee for such access rights. NFTA's currently quoted land lease rates are on the order of $0.60 to $0.75 per square foot per year for building footprint and active aviation areas. For just the hangar (not including the attached office buildings) and apron areas on either end, the cost could be as much as $150,000 per year, adding nearly $4 psf to the hangar tenant's total "rent". By FAA regulations, through-the-fence agreements must at least equal on-airport lease rates.

Significant operating costs will be incurred to operate, manage, market and maintain the facility. Personnel costs are the largest expense category, estimated to cost $513,000 combined over fifteen years. Carrying costs for vacant buildings, legal and insurance costs are also projected to cost almost $500,000 during the fifteen year forecast period.

G. Economic Viability

The market study includes detailed information regarding the anticipated market demand for the existing facilities at the NFARC. Some of the key market findings from the real estate market analysis include:

- With a few exceptions, the buildings, utilities, and features of the Reserve Center are relatively old, with many buildings built 40-50 years ago. Buildings of this age are typically considered to be functionally obsolete, particularly as they relate to compliance with the Americans with Disabilities Act (ADA).
- The site is fully served by adequate utilities (water, sewer, electric, telecom, natural gas) which enter the site in one location and primarily distributed underground to the various buildings and facilities. Future multi-tenancy of the facilities will require sub-metering of these utilities or replacement with individual services.
- The site is directly adjacent and accessible to the taxiways and runways of Niagara Falls International Airport (KIAG). Future users seeking access to the airport will require an agreement with the owner/operator of the airport, Niagara Falls Transportation Authority (NFTA), in conjunction with the LRA, for access to these facilities.
- The condition of the Reserve Center's buildings is similar to the area's stock of industrial and commercial real estate, which is also older in nature and relatively large. The similarity of the Army's facilities to typical industrial and commercial space may make it difficult to compete against a large supply of comparable space. In addition, given the relatively low rent levels in the area, renovations to the site's buildings (on a speculative basis) may be cost-prohibitive. The value of the buildings under a public sale scenario would be very low, and even if sold, it is likely that they would be used for warehouse-type activities which do not create significant employment opportunities.
- Local demographics indicate a declining population and household income levels, which has put downward pressure on real estate demand.
- The area is also experiencing a shift from industrial employment to service and knowledge-based employment, further depressing demand for older industrial and commercial space and making the potential for a successful public sale and private redevelopment less likely..
- The local industrial and commercial real estate market is in a state of general equilibrium, with relatively low and stable rents, vacancy rates, and generally minimal net absorption. This means that while local demand is supporting *existing* space, it would likely have a difficult time supporting *new* space over a generally acceptable amount of time. New development would most likely come in the form of build-to-suit space that is designed with a predetermined tenant in mind.
- KIAG is a relatively competitive airport within the region, in terms of its physical characteristics and services. However, the demand for additional hangar and fixed base

operations space, as well as specialty aviation-dependent activity, is expected to be limited in the short to mid-term.

Based on the findings of the market study, creating new, well-paying jobs at NFARC will require the resources that only the LRA and the Town of Niagara can bring, including expertise in redevelopment, access to capital funding from state and national grant sources, and local support for entrepreneurs and businesses through the Industrial Development Authority.

Absorption of the existing buildings is projected to be somewhat steady over the initial five years of the project. The lease-up period of five years equates to just under 30,000 square feet annually. Some additional revenues are possible from land leasing activities, primarily as outdoor storage and lay-down area, however, these are not included in the financial analysis due to the inability to forecast them with accuracy.

Operating and maintenance expenses are projected to total nearly $1.4 million during the first fifteen years of the redevelopment. The cumulate deficit, before internal and external funding for operations, but before major capital improvements, is projected to be more than $340,000 by the end of Year 3.

As summarized in other portions of this document, the operating revenues are expected to be sufficient to cover operating costs for the desired level of maintenance for the property, after an initial startup period of three years. Included in the estimated costs are some capital improvements to the site, notably demolition of less than 10,000 square feet or space, as well as repaving and striping. However, the LRA will have to closely monitor revenues, in order to ensure fiscal soundness of the project. If revenues fall short of projections, the LRA will have to proactively seek to reduce operating and maintenance costs, until cash flows are sufficient to operate, manage, maintain and market the property.

As shown in the pro-forma cash flow analysis, the total operating profit (cash flow) for the forecast period is projected to be almost $422,000, including payments to the Army of $330,000. Assuming that most major capital items (totaling $1.56 million) can be funded through grants or by tenants, the total profit to the LRA over the 15 year period is nearly $2.2 million.

More detailed information is included in the business plan spreadsheets, which appear in Appendix G of this report.

H. Market Value

The Army has indicated that this will be a "less than fair market value" EDC. Although it is believed that the Army has had the property appraised, the results of that appraisal were not shared with the LRA. The LRA has not had the property appraised. However, an estimate of the property's value can be ascertained by analyzing the anticipated cash flow from the redevelopment. As shown in Appendix G, the Net Cash Flow, before extraordinary capital improvement costs or LRA/grant funding, ranges from -$230,871 in the first year and stabilizes at $164,235 in Year 6. The net present value (NPV) of this 15 year cash flow stream, discounted at 15% to account for the excessive risk associated with the redevelopment, is $367,420. Thus, the $330,000 price for the property, as specified in the 4 Oct 2011 EDC Deal Points memorandum, would be considered below fair market value. It should be noted that if the major capital improvements are included in the cash flow, the NPV is substantially negative.

I. Necessary Capital Improvements

As part of the development of the Business Plan for the redevelopment of the NFARC, capital improvement costs were prepared.

Demolition - It is anticipated that a number of facilities will have to be demolished in order for the redevelopment of the site to be implemented. In particular, facilities which are considered unmarketable and/or uninhabitable (due to lack of heat or other infrastructure) are expected to be demolished. Facilities expected to be demolished include:

Capital Costs	Bldg#	SF	Total
Demo	19	1,600	$ 11,200
Demo	20	2,550	$ 17,850
Demo	23	2,000	$ 14,000
Demo	25	1,750	$ 12,250
Demo	26	2,000	$ 14,000
Total	**5**	**9,900**	**$ 69,300**

Repaving, Striping and Signage – As discussed in the baseline analysis of conditions, the existing pavement at the NFARC is in only fair condition. Since this is a site-wide issue, the LRA plans to address the need for repaving and striping over a multi-year period. Overall, these projects are budgeted at $470,000, and are expected to be completed as funds are available. For planning purposes, the expenditures are budgeted over a four year period, with the largest expenditure occurring when the East Apron is reconstructed. Signage expenditures of $15,000 are anticipated during the first two years of the redevelopment.

The Table below provides a summary of the anticipated capital improvement needs for the project. As shown in the Table, the overall capital improvement program calls for more than $1,660,000 in expenditures, not including costs for building fit-out or ADA compliance, which may add another $1.5 to $2.0 million. Improvements to Building 4 account for more than 50% of capital expenditures. The capital improvement cost estimates summarized in the Table below are all stated in 2011 dollars. These costs do not include any extraordinary expenditures for mitigation of Asbestos Containing Materials or Lead Based Paint found within the buildings.

Capital Costs		1	2	3	4	5	
LRA Funded	unit						**Total**
Demo #19	1,600	$ -	$ 11,200	$ -	$ -	$ -	$ 11,200
Demo #20	2,550	$ -	$ -	$ 17,850	$ -	$ -	$ 17,850
Demo #23	2,000	$ -	$ 14,000	$ -	$ -	$ -	$ 14,000
Demo #25	1,750	$ -	$ -	$ -	$ 12,250	$ -	$ 12,250
Demo #26	2,000	$ -	$ -	$ -	$ 14,000	$ -	$ 14,000
Pavement Striping	20,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ -	$ 14,000
Signage		$ 10,000	$ 5,000	$ -	$ -	$ -	$ 14,000
Tenant Funded							
Bldg Refurbishment		tenant cost					$ 14,000
ADA compliance		tenant cost					$ 14,000
Grant Funded							
Utility Meters		$ -	$ 25,000	$ 25,000	$ -	$ -	$ 50,000
Bldg 4 Roof	60,750	$ -	$ 486,000				$ 486,000
East Hangar Door replacem	1	$ -	$ -	$ -	$ 250,000	$ -	$ 250,000
West Hangar Door replacer	1	$ -	$ -	$ 250,000	$ -	$ -	$ 250,000
Fencing - west apron	250	$ -	$ -	$ 25,000	$ -	$ -	$ 25,000
Fencing - east hangar	250	$ -	$ -	$ -	$ 50,000	$ -	$ 50,000
Repaving - East Apron	100,000	$ -	$ -	$ -	$ 350,000	$ -	$ 350,000
Repaving - parking areas	50,000	$ -	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 100,000
Total Capital Costs		**$ 15,000**	**$ 571,200**	**$ 347,850**	**$ 706,250**	**$ 25,000**	**$ 1,665,300**

As noted in the Reuse Plan and in the Baseline Conditions Analysis (see Appendix), the age and condition of the buildings will require prospective tenants and/or the LRA to make certain improvements prior to occupancy. This may range from minor painting and repairs to more substantial renovation work involving lighting, plumbing, HVAC and partitioning. Until specific tenant requirements are known, accurately estimating these costs is not possible. Therefore, the LRA approach in this Business Plan is to lease the facilities on an "as-is" basis at low lease rates, with the tenants responsible for any required fit-up, including meeting ADA and life safety code issues, unless grant funding is found to complete this work prior to tenancy.

It is the intention of the LRA to work closely with prospective tenants to assist in obtaining funding for the building renovation costs, including the Town's ability to acquire/support grant funding to individual companies, or its ability to borrow project specific funds with repayment from lease terms.

For example, a $1.00 increase in a new employer's lease rate earmarked for debt service on a loan from the Town of Niagara IDA or other state or local economic development agency, could support up to $8.00 in building renovations or upgrades (as well as working capital support or worker training). Flexibility and the ability to leverage federal, state and local funding sources will be key to the successful redevelopment of the Army Reserve Center by the Town of Niagara. As discussed elsewhere, the NFARC project has been identified as a high priority for economic development funding from the State of New York. The availability of grant funding for capital improvements (as well as potential funding for company operations and workforce training) will allow the LRA to offer attractive space and lease rates to firms that will create high-wage and sustainable employment opportunities for residents of the Town and region.

J. Local Investment and Proposed Financing Strategies

As discussed elsewhere in this Application, the redevelopment of the NFARC is expected to be largely self-financed through internally generated real estate leasing revenues, along with external grant funding for capital improvements. However, the business plan anticipates a deficit of more than $340,000 during the first three years of the project (not including grant-funded items). This level of funding is expected to be provided through the Town's Industrial Development Agency (IDA), along with additional DoD grants from the Office of Economic Adjustment. The LRA and the IDA both support the redevelopment of the NFARC property for job creation purposes, and are willing to invest the necessary funds to ensure that the project is competitive within the regional marketplace.

The IDA has an established track record of supporting job creation activities in the community. In addition, the agency has strong financial statements and borrowing capacity which could support the redevelopment of the NFARC. The IDA had more than $189,000 in cash on hand at the end of 2010. OEA has traditionally continued to help fund other BRAC LRA's through the key post-transfer implementation process.

As necessary, the LRA will also prioritize expenditures, in order to aggressively manage deficits from operations. For example, some capital projects can be postponed and the quality of marketing materials can be adjusted to reflect available funds.

K. Proposed Consideration

The LRA proposes to pay the Army a total of $330,000 in cash to acquire the entirety of the NFARC property. The conveyance is envisioned to occur in two parts: the first is the transfer of the known clean property, estimated to be approximately 18 acres; and the second parcel, estimated to be approximately 1.8 acres, to be transferred within ninety days after the Army has completed all site remediation efforts and obtained all approvals from cognizant federal and state agencies. Consistent with the agreement previously negotiated with the Army (14Oct2011 Deal Points), the LRA proposes to pay the Army $66,000 annually beginning five years after the initial property transfer, and continuing for a total of five annual payments. The agreed-upon payment schedule, memorialized in a Promissory Note made by the LRA and/or the Town of Niagara Industrial Development Agency, will help the LRA to stabilize its cash flow as a result of lease-up activities during the initial five years of the project.

Further, this approach will help to limit the economic risk to the community and the LRA, by postponing the need to pay the Army with up-front funds. Specifically, the Army will participate in the success of the redevelopment effort, being paid from cash flows of the project. Should the LRA be successful in accelerating lease-up of the site and net revenues exceed those shown in the financial analysis, the LRA at its option, may be able to pay any outstanding balance of the purchase price ahead of schedule.

Consistent with EDC requirements as specific in the Base Redevelopment and Realignment Manual (BRRM) and 32 CFR, Part 174.9 (D)(8)(k), the LRA anticipates using net proceeds from real estate activities for a variety of functions to support economic redevelopment of the property for a period of seven (7) years from deed transfer. Among the uses envisioned for the funds are:

- Road construction and public buildings.
- Transportation management facilities.
- Storm and sanitary sewer construction.
- Police and fire protection facilities and other public facilities.
- Utility construction.
- Building rehabilitation.
- Historic property preservation.
- Pollution prevention equipment or facilities.
- Demolition.
- Disposal of hazardous materials generated by demolition.
- Landscaping, grading, and other site or public improvements.
- Planning for or the marketing of the development and reuse of the installation.
- Debt service on bonded debt or other loans taken by the LRA to fund capital improvements and operating costs.

The financial statements of the LRA will be audited annually by a Certified Public Accounting firm with the resulting report shared with the Army, as required under 32 CFR, Part 174.10 and the Army will recoup from the LRA any proceeds that are not used for economic development within, at a minimum, the 7-year period following initial EDC conveyance. The independent audit will identify all sources and uses of funding for the project during the previous year. The financial analysis shown in Appendix G shows a total of approximately $500,000 reinvested in the property over the mandatory seven year period, in addition to the Army payment of $330,000

The LRA will accept title to the property within 30 days of the Army's presentation of the deed for those portions of the property that are covered by a Finding of Suitability for Transfer (FOST).

IV. LRA'S LEGAL AUTHORITY

The Town of Niagara was recognized as the Local Reuse Authority by the Department of Defense's Office of Economic Adjustment, in a letter issued by Patrick O'Brien, Director of the Office of Economic Adjustment on March 31, 2011. A copy of the letter is included in Appendix A. The LRA (which includes the entire Town Council) authorized the request to acquire the subject property via Economic Development Conveyance by a unanimous vote on October 25, 2011.

A. Proof of Financial Capacity and Capability

The Town of Niagara has a track record of fiscal responsibility under the direction of Supervisor Steve Richards. This is reflected in the Town's bond rating, which was recently increased from BAA1 to A1. This is significant, given the difficult economic climate of the region and the country as a whole. More importantly, the Town of Niagara is the only community in the County which has received a credit rating increase in the recent past. A ratings increase, during a time of national recession and fiscal uncertainty, is considered recognition of the Town's outstanding financial management practices and strong commitment to fiscal prudence.

The Business Plan demonstrates that the redevelopment of the NFARC can be accomplished using primarily cash flows generated through on-site real estate revenues from leasing of buildings and land. Though the project is expected to incur a deficit during the early years of the project, the deficit of approximately $342,000, will be covered by continued OEA grant funding for LRA operations along with a $150,000 bridge loan from the Town Industrial Development Agency until the project achieves breakeven in Year 4.

The LRA's plan for the property includes capital improvements in the form of demolition of some unmarketable structures, site signage, repaving and restriping. The LRA has the ability to delay these projects if cash flow is insufficient to support the capital improvement plans.

B. Why an EDC is the Appropriate Transfer Authority

The LRA has explored a variety of transfer options for the excess property at the NFARC. When first declared excess by the Army, the federal screening process was completed by the Army to solicit interest in the property from other federal agencies. It is the LRA's understanding that no other agency, including the Federal Aviation Administration, indicated an interest acquisition of the NFARC property. The LRA conducted a thorough public reuse planning process in 2008, as required under BRAC regulations, which included outreach to homeless providers and other public agencies and organizations interested in obtaining property through a Public Benefit Conveyance. No agencies submitted a Notice of Interest and HUD approved the Reuse Plan on April 1, 2009.

This EDC Application is a result of consultation with the Army, evaluation by the LRA and its consulting team, and consideration of appropriate transfer mechanisms for the property. The following sections discuss other applicable conveyance mechanisms.

Conservation Conveyances. The majority of the site is covered with pavement. In addition, there are no known environmentally sensitive areas on the property which might be suitable for a conservation conveyance. As such, the LRA determined that this approach was not appropriate for any portions of the site.

Public Benefit Conveyances. As discussed above, the Town of Niagara engaged in an open reuse planning process, which included outreach to homeless providers and other entities eligible for Public Benefit Conveyance of the NFARC property. In addition, the property underwent screening to other Defense agencies and other Federal departments, as part of the Army's required process before the property could be declared surplus. No expressions of interest (NOI) were received by the Town or LRA for transfer of the property (in whole or in part) via any available public benefit conveyance mechanism.

Public Sales. As discussed elsewhere in this Application, the community is committed to using the NFARC property to create jobs in order to provide increased economic activity and economic benefits to the larger region. Disposal of the property via public sale could limit the community's ability to influence job creation on the site, as control of the reuse of the property would pass to a third party. The LRA plans to support the reuse of the property, in part, by bringing needed economic development grant funding for capital improvements. For the multiple reasons pointed out in the market assessment section above, disposal through public sale would likely result in a low value for the property, with potential buyers unable to invest the large sums necessary to improve the property, resulting in either land-banking the property for an indeterminate period of time or use of the buildings for warehouse storage, resulting in little or no job creation for the community. The long-term absorption of the property (5 years+) would likely deter typical private developers. Even with the full support of the Town, private parties would not be able to access all of the necessary grant funding to undertake the capital improvements for the property. The redevelopment of NFARC ***by the Town of*** Niagara has been designated as a high priority project in the new Western New York Economic Development Strategy, thereby making it eligible for funding from state and federal sources. The availability of these funds is considered critically important in making the NFARC property competitive from a market perspective.

FINDING OF SUITABILITY TO LEASE
(FOSL)

Niagara Falls U.S. Army Reserve Center (NY046)
9400 Porter Road
Niagara Falls, New York, 14304

January 2013

FINDING OF SUITABILITY TO LEASE
(FOSL)
Niagara Falls U.S. Army Reserve Center (NY046)
Niagara Falls, New York

1.0 PURPOSE

The purpose of this Finding Of Suitability to Lease (FOSL) is to document the environmental suitability of the Niagara Falls United States Army Reserve (USAR) Center, Niagara Falls, New York (hereafter the Property) for lease to the Town of Niagara Falls consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h) and DOD/Army policy. In addition, the FOSL identifies use restrictions as specified in the attached Environmental Protection Provisions (EPPs) necessary to protect human health or the environment during such lease.

2.0 PROPERTY DESCRIPTION

The property to be leased consists of approximately 19.5 acres of land, which includes eleven permanent structures briefly listed below:

- Building 4. 85,800 square foot (SF), metal framed, hangar building located in the northern portion of the Property.
- Building 17. A concrete block, petroleum, oil, lubricants (POL) shed.
- Building18. A single-story, 9,720 SF Organizational Maintenance Shop.
- Building 19. A single-story, 1,600 SF storage building.
- Building 20. A single-story, 2,133 SF structure utilized for storage.
- Building 21. A single-story 13,055 SF maintenance building.
- Building 22. A two-story, 20,703 SF structure used for storage, classroom training, and administrative tasks.
- Building 23. A single-story, 2,058 SF storage building.
- Building 24. A single-story 2,400 SF storage building.
- Building 25. A single-story 1,504 SF equipment storage building.
- Building 26. A single-story 2,150 SF equipment storage building

The property was previously used for administrative, training and logistical purposes, helicopter, airplane, and vehicle and equipment maintenance. The U.S. Navy utilized the property from 1955 to 1962 to service and maintain helicopters and airplanes. The U.S. Army acquired the property in 1962. From about 1970 to 1975, Nike missiles were serviced in Building 4. All USAR units vacated the Property in September 2011. The Property is intended to be leased to the Town of Niagara Falls for sublease as office spaces, light industrial use, and other like-use. A site map of the property to be leased is attached (Enclosure 1).

3.0 ENVIRONMENTAL DOCUMENTATION

A determination of the environmental condition of the Property has been made based on the following documents:

- Environmental Condition of Property (ECP) Report, July 2007
- Spill Notification Form, June 2008
- PCB Spill Delineation Report, May 2009
- Supplemental Phase I Assessment, August 2009
- Remedial Action Report, March 2010
- Site Inspection Report, June 2011
- Radiological Assessment Report, 2011
- Radiological Release Memorandum, December 2011
- Remedial Investigation/Interim Remedial Action Report & Human Health Risk Assessment, April 2012
- ECP Update Report, November 2012
- Asbestos Visual Inspection Report, July 2012

The information provided is a result of a complete search of agency files during the development of these environmental surveys. A complete list of documents that provide information on environmental conditions of the Property is attached (Enclosure 2).

4.0 ENVIRONMENTAL CONDITION OF THE PROPERTY

The Department of Defense (DOD) Environmental Condition of Property (ECP) Categories for the Property is as follows:

ECP Category 5: Niagara Falls USAR Center (NY046); entire parcel.

A summary of the ECP Categories for specific buildings, parcels, or study areas/operable units is provided in Table 1 – Description of Property along with a definition of each ECP Category (Enclosure 3).

4.1 Storage, Release, and Disposal of Hazardous Substances

There is no evidence that hazardous substances were stored on the property in excess of the 40 CFR Part 373 reportable quantities. Hazardous substances may have been released in excess of the 40 CFR 373 reportable quantities at the following sites:

- 1991 PCB Oil Spill
- Spill No 0803478 - PCB Release from onsite 24 in stormwater pipe into offsite stormwater Outfall 5.

The potential release or disposal of these hazardous substances was investigated as part of the Installation Restoration Program (IRP). See Section 4.2.2 Environmental

Investigation/Remediation Sites for additional information. A summary of the areas in which hazardous substance activities occurred is provided in Table 2 – Notification of Hazardous Substance Storage, Release, or Disposal (Enclosure 4).

4.2 Environmental Remediation Sites

There were five (5) remediation sites were located on the property: A summary of the remediation/investigation sites on the property is as follows:

1). 1991 PCB Oil Spill. A transformer fell and broke over a storm sewer drain, east of Building 22. PCB containing oil spilled on the pavement and into the drain. Surface paving materials, soils, and storm drain materials were remediated after the spill. On October 31, 1991, the New York State Department of Environmental Conservation (NYSDEC) indicated that the spill had been adequately remediated and granted the spill a "Closed" status.

2). 1,000-Gallon Waste Oil UST. A 1,000-gallon waste oil UST, associated with an oil/water separator (OWS) was removed on September 14, 1999. Soil and water samples collected from the excavation indicated the presence of poly aromatic hydrocarbons (PAHs) at concentrations exceeding NYSDEC guidance values. However, all detections of PAHs were significantly less than the recommended soil cleanup objective. NYSDEC granted this spill a "Closed" status on February 22, 2000.

3). 550-Gallon Waste Oil UST. A 550-gallon waste oil UST, located adjacent to the washrack, was removed on September 20, 1999. Soil sampling indicated trichloroethene (TCE) exceeding the NYSDEC allowable soil concentration, but less than the Soil Cleanup Objective. NYSDEC granted the spill a "Closed" status on February 22, 2000.

4). Stormwater Outfall 5 (located off site and south of the Property).A Spill Notification Form dated June 24, 2008 detailed the release of what was suspected to be diesel with low concentrations of PCBs from an onsite 24 inch stormwater pipe into stormwater Outfall 5, located offsite. A *PCB Spill Delineation Report* and *Remedial Action Report* were prepared in May 2009 and March 2010, respectively, which detailed the soil delineation and soil removal efforts at Outfall 5. Approximately 134 tons of PCB impacted soil was excavated. The NYSDEC Spill Incident Database, Spill No. 0803478 (PCB release from onsite 24 inch stormwater pipe to offsite stormwater Outfall 5) was granted a "Closed" status on May 17, 2012. A "Closed" designation indicates that a site does not exhibit levels of contamination warranting clean-up, or the site has been remediated to the satisfaction of the NYSDEC and no longer poses a threat to human health or the environment.

5.) Southeast portion of Property including former Building 2, former fire protection main and reservoir area, and 24 inch stormwater pipe. A *Site Inspection Report* was finalized in June 2011. The purpose of the site inspection was to determine the source of the PCBs observed in 2008 flowing from the 24 inch onsite stormwater pipe into stormwater Outfall 5, located offsite. The Site Inspection (SI) evaluated if the PCB release was associated with historic USTs at former Building 2 and at the former fire protection main and reservoir area. The SI activities included a geophysical survey, exploratory excavations, and soil and groundwater sampling in the southeastern portion of the property. No anomalies consistent with USTs were identified during the geophysical survey. Several contaminants, including PCBs were detected in soil samples exceeding the Residential and Commercial Restricted Use Soil Cleanup Objectives. However based on the low concentrations of PCBs in the areas investigated, it is not suspected that the PCBs found in the offsite Outfall 5, were due to a release associated with the investigated areas described above. A small area located near the 24 inch stormwater pipe (former exploratory excavation, TP-12) was discovered to contain free petroleum product. The report concluded that an Interim Remedial Action (IRA) in the form of contaminated soil and groundwater removal was recommended near TP-12, as well as further investigation of soil and groundwater.

A *Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment* was finalized in April 2012. As part of the Remedial Investigation (RI) addition soil and groundwater samples were taken over a larger area than originally sampled during the SI in order to define the nature and extent of PCB contamination. The resulting concentrations of PCBs and other contaminants were consistent with the SI results. Forty tons of soil and approximately 2,000-gallons of groundwater were removed from TP-12 as part of the IRA. A Human Health Risk Assessment was conducted and the only exposure scenario identified as containing an unacceptable risk to human health was exposure to contaminated groundwater by construction workers. The report recommended that a Site Management Plan (to be developed and implemented by the future landowner) should be prepared to limit exposure of groundwater to construction workers.

On April 23, 2012 the NYSDEC approved the RI report for public release since all technical comments had been adequately addressed. Subsequently, the NYSDEC Spill Incident Database, Spill No. 0803478 (PCB release from onsite 24 inch stormwater pipe to offsite stormwater Outfall 5) was granted a “Closed” status on May 17, 2012. A “Closed” designation indicates that a site does not exhibit levels of contamination warranting clean-up, or the site has been remediated to the satisfaction of the NYSDEC and no longer poses a threat to human health or the environment.

The Army is further investigating groundwater in order to gain sufficient information to properly delineate the extent of the contamination which is necessary for remedy selection. After the results of the final delineation event, the Army will present their proposed remedial action for groundwater to the public in a Proposed Plan. The Army’s final decision will be captured in the Decision Document.

A summary of the environmental remediation sites is provided in both Table 2 – Notification of Hazardous Substance Storage, Release, or Disposal (Enclosure 4) and Table 3 – Notification of Petroleum Products Storage, Release, or Disposal (Enclosure 5).

4.3 Petroleum and Petroleum Products

4.3.1 Underground and Above-Ground Storage Tanks (UST/AST)

- **Current UST/AST Sites** - There are no current UST sites at the Property. An empty 528-gallon used oil tank is located at Building 17; there is no evidence of petroleum releases from this site.

- **Former UST/AST Sites** - There were several former UST/AST sites at the Property. The following USTs/ASTs have been removed or closed in place:

Tank No.	Tank Description	Date Removed/ Regulatory Status
1	3,000-gallon unleaded gasoline UST	Removed July 1, 1990; Closed
2	10-000-gallon No. 1, 2, or 4 fuel oil vaulted UST	Removed October 1, 1991; Closed
3	20,000-gallon No. 1, 2, or 4 fuel oil vaulted UST	Removed October 1, 1991; Closed
4	One 550-gallon waste oil UST located beneath concrete pad, adjacent to wash rack	Removed September 20, 1999; Closed
5	One 1,000-gallon waste oil UST near OWS	Removed September 22, 1999; Closed
6	One large gasoline UST near former building near Building 21	Removed 1984 or 1985; Closure documentation not available.
7	One 250- or 400- gallon waste oil holding tank (UST) near washrack	Removed mid-1990s; Closed
8	One 600-gallon waste oil UST near OWS by Building 4	Removed 1984 or 1985; Closed
9	One 250-gallon fuel oil AST outside Building 19	Removed 1989 or 1990; no evidence of release associated with this former AST site.
10	One 250-gallon fuel oil AST outside Building 23	Removed 1989 or 1990; no evidence of release associated with this former AST site.
11	One 250-gallon fuel oil AST outside Building 26	Removed 1989 or 1990; no evidence of release associated with this former AST site.
12	Two 20,000-gallon USTs associated with former hangars and reservoir	Removed 1987 or 1988; Closed
13	Two 25,000-gallon heating oil USTs, south and east of Building 25	Removed/closed 1987 or 1988; Closure documentation not available.

A summary of the UST/AST petroleum product activities is provided in Table 3 – Notification of Petroleum Products Storage, Release, or Disposal (Enclosure 5).

4.3.2 Non-UST/AST Storage, Release, or Disposal of Petroleum Products

There is no evidence that non-UST/AST petroleum products in excess of 55 gallons were stored for one year or more on the property.

4.4 Polychlorinated Biphenyls (PCB) Equipment

The following electrical equipment is located on the property that may contain PCBs: Six pole mounted electrical transformers, a set of three behind Building 20 and a set of three in the southwest corner of the Property. This equipment is operational and does not appear to be leaking.

4.5 Asbestos

Asbestos-containing building materials (ACBMs) were identified in 95 materials in twelve structures on the Property. Friable ACMs included ceiling tiles, grey mud fittings (TSI), pipe aircell (TSI), sheetrock joint compound, and cork insulation. See Asbestos Visual Reinspection Survey (SBG Inc., 2012) for additional information (Enclosure 8).

Any remaining friable asbestos that has not been removed or encapsulated will not present an unacceptable risk to human health because the lessee assumes responsibility for abatement or management of any ACM in accordance with applicable federal, state, and local requirements. The lease will include an asbestos notice and covenant (Enclosure 5).

4.6 Lead-Based Paint (LBP)

The following buildings are known or presumed to contain lead-based paint (LBP): Buildings 4, 18 through 23, 25, and 26. See Section 6.7 of the 2007 ECP Report for additional information. The property was not used for residential purposes and the lessee does not intend to use the property for residential purposes in the future. The lease will include the lead-based paint warning and covenant provided in the Environmental Protection Provisions (Enclosure 6).

4.7 Radiological Materials

Radioactive materials were potentially present in equipment used in Building 20 where meters used to detect NBC hazards were stored. See Section 6.10 of the 2007 ECP Report for additional information. A radiological field survey was conducted at those sites having radiological activities, and the survey concluded these areas are suitable for unrestricted use. See Radiological Assessment Report and Radiological Release Memorandum, both dated December 2011 (Enclosure 7).

4.8 Radon

A radon survey was conducted at the Property (specific building locations not provided in survey) from August 5 to August 11, 1998. Radon was not detected at above the EPA residential action level of 4 picocuries per liter (pCi/L) at the USAR Center. See Section 6.7 of the 2007 ECP Report for additional information.

4.9 Munitions and Explosives of Concern

Based on a review of existing records and available information, none of the buildings or land proposed for lease are known to contain unexploded ordnance. Furthermore, there is no evidence that Munitions and Explosives of Concern (MEC) are present on the property. From 1975 until closing in September 2011, the property was used as an administrative and vehicle maintenance facility. The term “MEC” means military munitions that may pose unique explosives safety risks, including: (A) unexploded ordnance (UXO), as defined in 10 U.S.C. §101(e)(5); (B) discarded military munitions (DMM), as defined in 10 U.S.C. §2710(e)(2); or (C) munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. §2710(e)(3), present in high enough concentrations to pose an explosive hazard.

4.10 Other Hazardous Conditions

There are no other hazardous conditions on the Property that present an unacceptable risk to human health and the environment.

5. ADJACENT PROPERTY CONDITIONS

There are no conditions adjacent to the property that present an unacceptable risk to human health and the environment.

6. ENVIRONMENTAL REMEDIATION AGREEMENTS

The following environmental orders/agreements are applicable to the property: The Army has completed some remedial actions regarding the PCB Release from onsite 24 in stormwater pipe into offsite stormwater Outfall 5, however all remedial actions have not yet been taken. Investigations to determine the full extent of groundwater contamination at the Site are still underway, in which the results will further define the extent of the future remedial action. The lease will include a provision reserving the Army’s right to conduct remediation activities (Enclosure 6).

7. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

The environmental impacts associated with proposed lease of the Property have been analyzed in accordance with the National Environmental Policy Act (NEPA). The results of this analysis have been documented in the Record of Environmental Consideration, October, 2012. Any encumbrances or condition identified in such analysis as necessary to protect human health or the environmental have been incorporated into the FOSL.

8. REGULATORY/PUBLIC COORDINATION

The U.S. EPA Region 2, the New York State Department of Environmental Conservation (NYSDEC), and the public were notified of the initiation of the FOSL. No regulatory/public comments were received (Enclosure 9).

9. FINDING OF SUITABILITY TO LEASE

Based on the above information and restrictions, I have concluded that all DoD requirements to reach a finding of suitability to lease the Property to the Town of Niagara Falls for the purpose of commercial leasing, have been met for the Property, subject to terms and conditions set forth in the attached Lease Environmental Protection Provisions (Enclosure 6). I have determined that the Property is suitable for the described use pursuant to the proposed lease, with the specified restrictions in the lease, with acceptable risk to human health and the environment and without interference with the adjacent environmental restoration process.

As required under the DoD FOSL guidance, hazardous substance storage, release, or disposal notice and a petroleum product storage, release, or disposal notice shall be provided in the lease documents.

Thomas E. Lederle

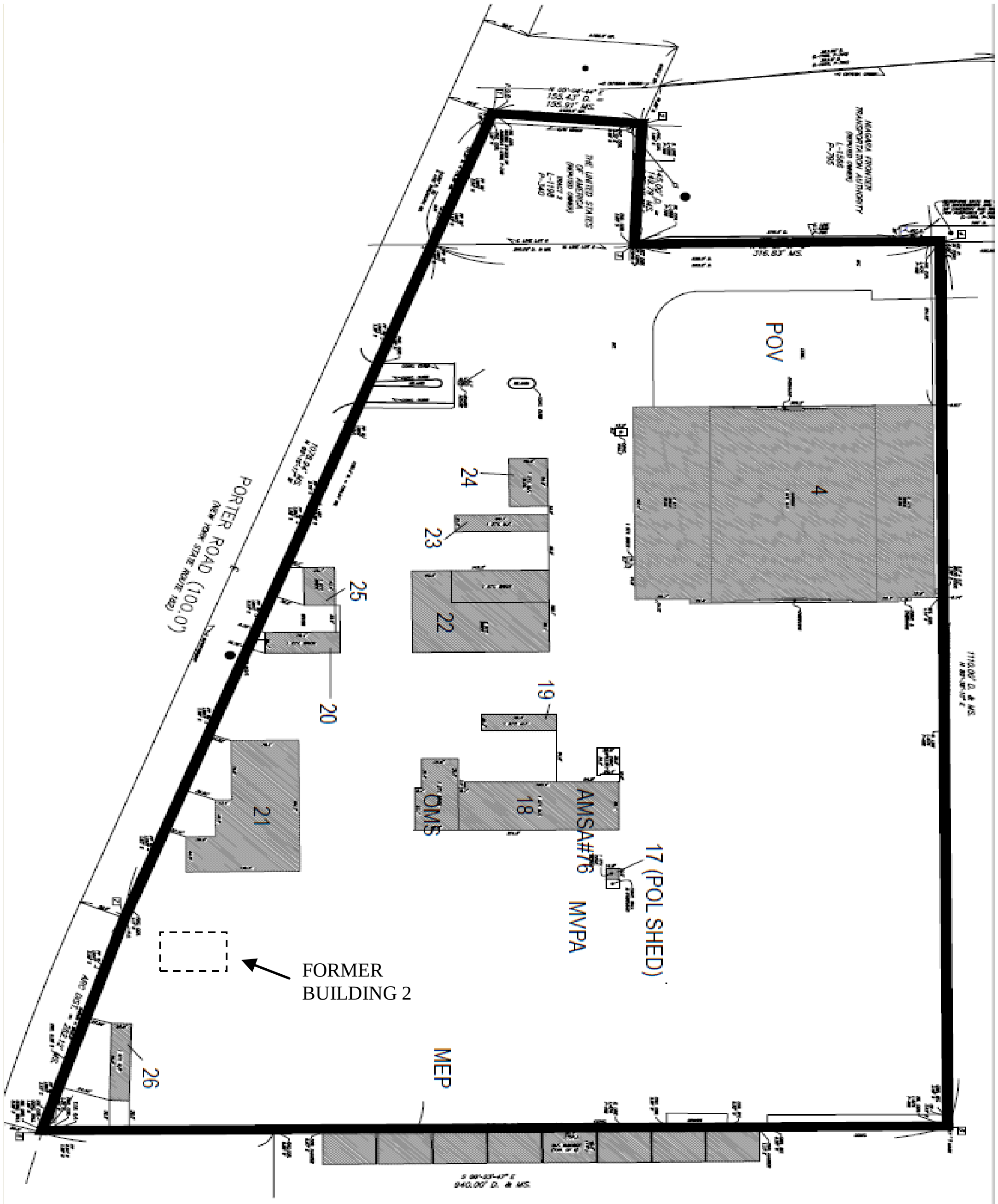
Tom Lederle
ACSIM-ODB Chief

7 JAN 2013
Date

Enclosures

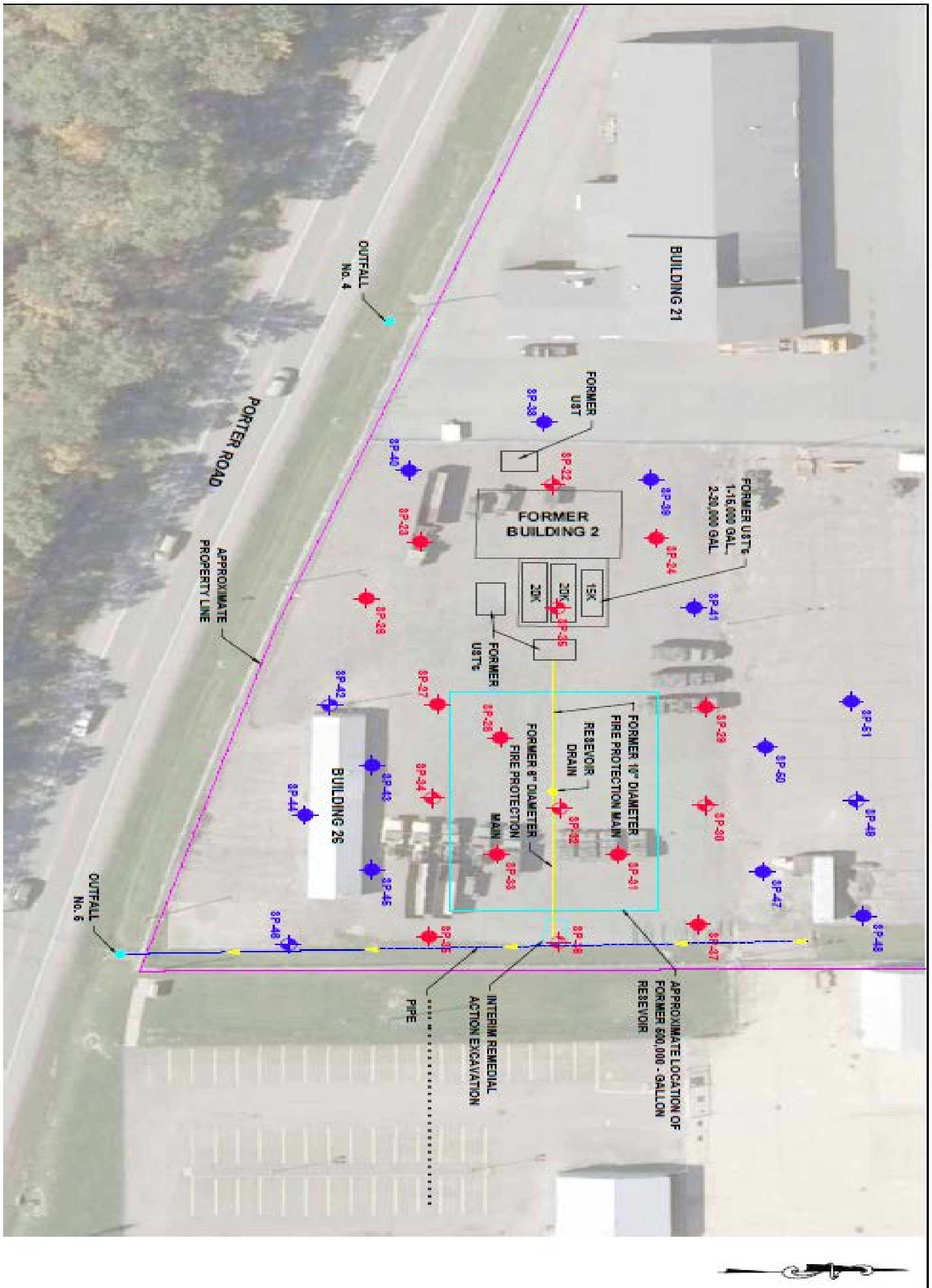
Encl 1 -- Site Map of Property
Encl 2 -- Environmental Documentation
Encl 3 -- Table 1 -- Description of Property
Encl 4 -- Table 2 -- Notification of Hazardous Substance Storage, Release, or Disposal
Encl 5 -- Table 3 -- Notification of Petroleum Product Storage, Release, or Disposal
Encl 6 -- Environmental Protection Provisions
Encl 7 -- Radiological Survey
Encl 8 -- Asbestos Visual Re-Inspection Report
Encl 9 -- Regulatory/Public Comments and Army Response

ENCLOSURE 1
SITE MAP(s) OF PROPERTY



***Source: 2007 ECP Report**

ENCLOSURE 1 (cont'd)
FORMER BUILDING 2 LOCATION



ENCLOSURE 2

ENVIRONMENTAL DOCUMENTATION

Document	Source
Environmental Condition of Property Report, Niagara Falls U.S. Army Reserve Center (NY046), 9400 Porter Road, Niagara Falls, NY, CH2M Hill, July 2007	USACE
Spill Notification Form, June 2008	99th RSC
Environmental Condition of Property Update Report, Niagara Falls U.S. Army Reserve Center (NY046), 9400 Porter Road, Niagara Falls, NY, XCEL Engineering, October 2012	USACE
PCB Spill Delineation Report, Outfall 5 Storm Water Culvert, Cleanup and Ditch Remediation, May 2009	99th RSC
Supplemental Phase 1 Assessment, Niagara Falls US Army Reserve Center (NY046), Niagara Falls, NY, August 2009	99th RSC
Remedial Action Report, Niagara Falls US Armed Forces Reserve Center, 9400 Porter Road, Niagara Falls, NY, Spill # 0803478, March 2010	99th RSC
Site Inspection Report, Niagara Falls Armed Forces Reserve Center, Building 2 and Former Fire Protection Main, 9400 Porter Road, Niagara Falls, Niagara County, NY, June 2011	99th RSC
Radiological Assessment Report, Niagara Falls US Army Reserve Center, 9400 Porter Road, Niagara Falls, NY, December 2011	99th RSC
Radiological Release Memorandum, December 2011	99th RSC
Final – Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment, April 2012	99th RSC
Asbestos Visual Inspection Report, July 2012	99th RSC

ENCLOSURE 3

TABLE 1 – DESCRIPTION OF PROPERTY

Building Number and/or Property Description	Condition Category	Remedial Actions
Storm Drain, Building 22		Complete. A transformer fell and broke over a storm sewer drain, east of Building 22. PCB containing oil spilled on the pavement and into the drain. Surface paving materials, soils, and storm drain materials were remediated after the spill. On October 31, 1991, the New York State Department of Environmental Conservation (NYSDEC) indicated that the spill had been adequately remediated and granted the spill a "Closed" status.
Washrack/OWS		A 1,000-gallon waste oil UST, associated with an oil/water separator (OWS) was removed on September 14, 1999. Soil and water samples collected from the excavation indicated the presence of poly aromatic hydrocarbons (PAHs) at concentrations exceeding NYSDEC guidance values. However, all detections of PAHs were significantly less than the recommended soil cleanup objective. NYSDEC granted this spill a "Closed" status on February 22, 2000.
Washrack/OWS		A 550-gallon waste oil UST, located adjacent to the washrack, was removed on September 20, 1999. Soil sampling indicated trichloroethene (TCE) exceeding the NYSDEC allowable soil concentration, but less than the Soil Cleanup Objective. NYSDEC granted the spill a "Closed" status on February 22, 2000.
Entire Property		A *Supplemental Phase 1 Assessment, Niagara Falls U.S. Army Reserve Center (NY046), Niagara Falls, New York*, dated August 2009, was prepared by CH2M Hill on behalf of the 99th RSC and USACE – Louisville District. The assessment was conducted to further investigate reports of the presence of a suspected landfill at the Property, documented in the 2007 ECP Report. A chain-of-title review and several interviews with city and state officials were conducted. The Report concluded that "no definitive evidence was obtained that confirms the presence of a landfill on the Property.

Building Number and/or Property Description	Condition Category	Remedial Actions
Southeast portion of Property including; former Building 2, former fire protection main and reservoir area, and 24 inch stormwater pipe		Underway. A *Site Inspection Report* was finalized in June 2011. The purpose of the site inspection was to determine the source of the PCBs observed in 2008 flowing from the 24 inch onsite stormwater pipe into Outfall 5, located offsite. The Site Inspection (SI) evaluated if the PCB release was associated with historic USTs at former Building 2 and at the former fire protection main and reservoir area. The SI activities included a geophysical survey, exploratory excavations, and soil and groundwater sampling in the southeastern portion of the property. No anomalies consistent with USTs were identified during the geophysical survey. Several contaminants, including PCBs were detected in soil samples exceeding the Residential and Commercial Restricted Use Soil Cleanup Objectives. However based on the low concentrations of PCBs in the areas investigated, it is not suspected that the PCBs found in the offsite Outfall 5, were due to a release associated with the investigated areas described above. A small area located near the 24 inch stormwater pipe (exploratory excavation, TP-12) was discovered to contain free petroleum product. The report concluded that an Interim Remedial Action (IRA) in the form of contaminated soil and groundwater removal was recommended near TP-12, as well as further investigation of soil and groundwater. A *Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment* was finalized in April 2012. As part of the Remedial Investigation (RI) addition soil and groundwater samples were taken over a larger area than originally sampled during the SI in order to define the nature and extent of PCB contamination. The resulting concentrations of PCBs and other contaminants were consistent with the SI results. Forty tons of soil and approximately 2,000-gallons of groundwater were removed from TP-12 as part of the IRA. A Human Health Risk Assessment was conducted and the only exposure scenario identified as containing an unacceptable risk to human health was exposure to

Building Number and/or Property Description	Condition Category	Remedial Actions
		contaminated groundwater by construction workers. The report recommended that a Site Management Plan (to be developed and implemented by the future landowner) should be prepared to limit exposure of groundwater to construction workers. On April 23, 2012 the NYSDEC approved the RI report for public release since all technical comments had been adequately addressed. Subsequently, the NYSDEC Spill Incident Database, Spill No. 0803478 (PCB release from onsite 24 inch stormwater pipe to offsite stormwater Outfall 5) was granted a “Closed” status on May 17, 2012. A “Closed” designation indicates that a site does not exhibit levels of contamination warranting clean-up, or the site has been remediated to the satisfaction of the NYSDEC and no longer poses a threat to human health or the environment. The Army is further investigating groundwater in order to gain sufficient information to properly delineate the extent of the contamination which is necessary for remedy selection. After the results of the final delineation event, the Army will present their proposed remedial action for groundwater to the public in a Proposed Plan. The Army’s final decision will be captured in the Decision Document.
3,000-gallon gasoline UST, location not documented		Closed. Tank removed July 1, 1990.
10,000-gallon fuel oil vaulted UST, location not documented		Closed. Removed October 1, 1991
20,000-gallon fuel oil vaulted UST		Closed. Removed October 1, 1991
550-gallon waste oil UST, washrack area		Closed. Removed September 20, 1999
1,000-gallon waste oil UST, near OWS		Closed. Removed September 22, 1999
“Large” gasoline UST near building		Closure documents not available. Tanks reportedly removed in 1984 or 1985

Building Number and/or Property Description	Condition Category	Remedial Actions
21		
250- or 400-gallon waste oil UST near washrack		Closed. Removed in mid-1990s.
600-gallon waste oil UST at Building 4		Closed. Removed in 1984 or 1985
250-gallon fuel oil AST at Building 19		Removed 1989 or 1990; no evidence of release associated with this former AST site.
250-gallon fuel oil AST at Building 23		Removed 1989 or 1990; no evidence of release associated with this former AST site.
250-gallon fuel oil AST at Building 26		Removed 1989 or 1990; no evidence of release associated with this former AST site.
Two 20,000-gallon USTs, Building 4		Closed. Removed 1987 or 1988
Two 25,000-gallon heating oil USTs, Building 25		Closure documents not available. Tanks reportedly removed/closed 1987 or 1988.

ENCLOSURE 4

TABLE 2 – NOTIFICATION OF HAZARDOUS SUBSTANCE STORAGE, RELEASE, AND DISPOSAL*

Building Number	Name of Hazardous Substance(s)	Date of Storage, Release, or Disposal	Remedial Actions
Building 22	PCBs	1991	Complete. A transformer fell and broke over a storm sewer drain, east of Building 22. Oil containing PCB spilled on the pavement and into the drain. Surface paving materials, soils, and storm drain materials were remediated after the spill. On October 31, 1991, the New York State Department of Environmental Conservation (NYSDEC) indicated that the spill had been adequately remediated and granted the spill a "Closed" status. See Section 4.1 Environmental Investigation Sites for additional information.
Stormwater Outfall 5 (located off site and south of the Property)	PCBs	2008	Complete. A Spill Notification Form dated June 24, 2008 detailed the release of what was suspected to be diesel with low concentrations of PCBs from an onsite 24 inch stormwater pipe into stormwater Outfall 5, located offsite. A *PCB Spill Delineation Report* and *Remedial Action Report* were prepared in May 2009 and March 2010, respectively, which detailed the soil delineation and soil removal efforts at Outfall 5. Approximately 134 tons of PCB impacted soil was excavated. The NYSDEC Spill Incident Database, Spill No. 0803478 (PCB release from onsite 24 inch stormwater pipe to offsite stormwater Outfall 5) was granted a "Closed" status on May 17, 2012. A "Closed" designation indicates that a site does not exhibit levels of contamination warranting clean-up, or the site has been remediated to the satisfaction of the NYSDEC and no longer poses a threat to human health or the environment.

Building Number	Name of Hazardous Substance(s)	Date of Storage, Release, or Disposal	Remedial Actions
Southeast portion of Property including; former Building 2, former fire protection main and reservoir area, and 24 inch stormwater pipe	PCBs	2008	Underway. A *Site Inspection Report* was finalized in June 2011. The purpose of the site inspection was to determine the source of the PCBs observed in 2008 flowing from the 24 inch onsite stormwater pipe into Outfall 5, located offsite. The Site Inspection (SI) evaluated if the PCB release was associated with historic USTs at former Building 2 and at the former fire protection main and reservoir area. The SI activities included a geophysical survey, exploratory excavations, and soil and groundwater sampling in the southeastern portion of the property. No anomalies consistent with USTs were identified during the geophysical survey. Several contaminants, including PCBs were detected in soil samples exceeding the Residential and Commercial Restricted Use Soil Cleanup Objectives. However based on the low concentrations of PCBs in the areas investigated, it is not suspected that the PCBs found in the offsite Outfall 5, were due to a release associated with the investigated areas described above. A small area located near the 24 inch stormwater pipe (former exploratory excavation, TP-12) was discovered to contain free petroleum product. The report concluded that an Interim Remedial Action (IRA) in the form of contaminated soil and groundwater removal was recommended near TP-12, as well as further investigation of soil and groundwater. A *Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment* was finalized in April 2012. As part of the Remedial Investigation (RI) addition soil and groundwater samples were taken over a larger area than originally sampled during the SI in order to define the nature and extent of PCB contamination.

Building Number	Name of Hazardous Substance(s)	Date of Storage, Release, or Disposal	Remedial Actions
			The resulting concentrations of PCBs and other contaminants were consistent with the SI results. Forty tons of soil and approximately 2,000-gallons of groundwater were removed from TP-12 as part of the IRA. A Human Health Risk Assessment was conducted and the only exposure scenario identified as containing an unacceptable risk to human health was exposure to contaminated groundwater by construction workers. The report recommended that a Site Management Plan (to be developed and implemented by the future landowner) should be prepared to limit exposure of groundwater to construction workers. On April 23, 2012 the NYSDEC approved the RI report for public release since all technical comments had been adequately addressed. Subsequently, the NYSDEC Spill Incident Database, Spill No. 0803478 (PCB release from onsite 24 inch stormwater pipe to offsite stormwater Outfall 5) was granted a “Closed” status on May 17, 2012. A “Closed” designation indicates that a site does not exhibit levels of contamination warranting clean-up, or the site has been remediated to the satisfaction of the NYSDEC and no longer poses a threat to human health or the environment. The Army is further investigating groundwater in order to gain sufficient information to properly delineate the extent of the contamination which is necessary for remedy selection. After the results of the final delineation event, the Army will present their proposed remedial action for groundwater to the public in a Proposed Plan. The Army’s final decision will be captured in the Decision Document.

Building Number	Name of Hazardous Substance(s)	Date of Storage, Release, or Disposal	Remedial Actions
* The information contained in this notice is required under the authority of regulations promulgated under section 120(h) of the Comprehensive Environmental Response, Liability, and Compensation Act (CERCLA or 'Superfund') 42 U.S.C. §9620(h). This table provides information on the storage of hazardous substances for one year or more in quantities greater than or equal to 1,000 kilograms or the hazardous substance's CERCLA reportable quantity (which ever is greater). In addition, it provides information on the known release of hazardous substances in quantities greater than or equal to the substances CERCLA reportable quantity. See 40 CFR Part 373.			

ENCLOSURE 5

TABLE 3 - NOTIFICATION OF PETROLEUM PRODUCT STORAGE, RELEASE, AND DISPOSAL

Building Number	Name of Petroleum Product(s)	Date of Storage, Release, or Disposal	Remedial Actions
3,000-gallon gasoline UST, location not documented	Gasoline	~1950s - 1990	Closed. Tank removed July 1, 1990.
10,000-gallon fuel oil vaulted UST, location not documented	Fuel Oil	~1950s - 1991	Closed. Removed October 1, 1991
20,000-gallon fuel oil vaulted UST	Fuel Oil	~1950s - 1991	Closed. Removed October 1, 1991
550-gallon waste oil UST, washrack area	Waste Oil	~1950s - 1999	Closed. A 550-gallon waste oil UST, located adjacent to the washrack, was removed on September 20, 1999. Soil sampling indicated trichloroethene (TCE) exceeding the NYSDEC allowable soil concentration, but less than the Soil Cleanup Objective. NYSDEC granted the spill a "Closed" status on February 22, 2000.
1,000-gallon waste oil UST, near OWS	Waste Oil	~1950s - 1999	Closed. A 1,000-gallon waste oil UST, associated with an oil/water separator (OWS) was removed on September 14, 1999. Soil and water samples collected from the excavation indicated the presence of poly aromatic hydrocarbons (PAHs) at concentrations exceeding NYSDEC guidance values. However, all detections of PAHs were significantly less than the recommended soil cleanup objective. NYSDEC granted this spill a "Closed" status on February 22, 2000.
"Large" gasoline UST near building 21	Gasoline	~1950s – 1984/1985	Closure documents not available. Tanks reportedly removed in 1984 or 1985

Building Number	Name of Petroleum Product(s)	Date of Storage, Release, or Disposal	Remedial Actions
250- or 400-gallon waste oil UST near washrack	Waste Oil	~1950s – mid 1990s	Closed. Removed in mid-1990s.
600-gallon waste oil UST at Building 4	Waste Oil	~1950s – 1984/85	Closed. Removed in 1984 or 1985
250-gallon fuel oil AST at Building 19	Fuel Oil	~1950s – 1989/1990	Removed 1989 or 1990; no evidence of release associated with this former AST site.
250-gallon fuel oil AST at Building 23	Fuel Oil	~1950s – 1989/1990	Removed 1989 or 1990; no evidence of release associated with this former AST site.
250-gallon fuel oil AST at Building 26	Fuel Oil	~1950s – 1989/1990	Removed 1989 or 1990; no evidence of release associated with this former AST site.
Two 20,000-gallon USTs, Building 4	Unknown	~1950s – 1987/88	Closed. Removed 1987 or 1988
Two 25,000-gallon heating oil USTs, Building 25	Heating Oil	~1950s – 1987/88	Closure documents not available. Tanks reportedly removed/closed 1987 or 1988.

ENCLOSURE 6
LEASE ENVIRONMENTAL PROTECTION PROVISIONS

The following conditions will be placed in the lease to ensure there will be no unacceptable risk to human health or the environment.

1. The sole purpose(s) for which the leased premises and any improvements thereon may be used, in the absence of prior written approval of the Government for any other use, is for office spaces, light industrial use, and other like-use.

2. The Lessee shall neither transfer nor assign this Lease or any interest therein or any property on the leased premises, nor sublet the leased premises or any part thereof or any property thereon, nor grant any interest, privilege, or license whatsoever in connection with this Lease without the prior written consent of the Government. Such consent shall not be unreasonably withheld or delayed. Every sublease shall contain the Environmental Protection Provisions herein.

3. The Lessee and any sublessee shall comply with the applicable Federal, state, and local laws, regulations, and standards that are or may become applicable to Lessee's or sublessee's activities on the Leased Premises.

4. The Lessee and any sublessee shall be solely responsible for obtaining at its cost and expense any environmental permits required for its operations under the Lease, independent of any existing permits.

5. The Government's rights under this Lease specifically include the right for Government officials to inspect upon reasonable notice the Leased Premises for compliance with environmental, safety, and occupational health laws and regulations, whether or not the Government is responsible for enforcing them. Such inspections are without prejudice to the right of duly constituted enforcement officials to make such inspections. The Government normally will give the Lessee or sublessee twenty-four (24) hours prior notice of its intention to enter the Leased Premises unless it determines the entry is required for safety, environmental, operations, or security purposes. The Lessee shall have no claim on account of any entries against the United States or any officer, agent, employee, or contractor thereof.

6. The Government and its officers, agents, employees, contractors, and subcontractors have the right, upon reasonable notice to the Lessee and any sublessee, to enter upon or pass through the Leased Premises for the purposes enumerated in this subparagraph:

   (a) to conduct investigations and surveys, including, where necessary, drilling, soil and water sampling, test-pitting, testing soil borings and other activities related to the Niagara Falls USAR Center Installation Restoration Program (IRP);

   (b) to inspect field activities of the Government and its contractors and subcontractors in implementing the Niagara Falls USAR Center IRP;

(c) to conduct any test or survey relating to the implementation of the IRP or environmental conditions at the Leased Premises or to verify any data submitted to the EPA or MADEP by the Government relating to such conditions;

(d) to construct, operate, maintain or undertake any other response or remedial action, as required or necessary under the Niagara Falls USAR Center IRP, including, but not limited to monitoring wells, pumping wells, and treatment facilities;

(e) to conduct Environmental Compliance Assessment System Surveys (ECAS)

7. The Lessee and any sublessee shall comply with the provisions of any health and safety plan in effect during the course of any of the above described response or remedial actions. Any inspection, survey, investigation, or other response or remedial action will, to the extent practicable, be coordinated with representative designated by the Lessee and any sublessee The Lessee and any sublessee shall have no claim on account of such entries against the United States or any office, agent, employee, contractor, or subcontractor thereof. In addition, the Lessee and any sublessee shall comply with all applicable Federal, state, and local occupational safety and health regulations.

8. The Lessee shall prepare and maintain a Government-approved plan for responding to hazardous waste, fuel, and other chemical spills prior to commencement of operations on the leased premises. Such a plan shall be independent of the Niagara Falls USAR Center and, except for initial fire response and/or spill containment, shall not rely on installation personnel or equipment. Should the Government provide any personnel or equipment, whether for initial fire response and/or spill containment, or otherwise on request of any Government officer conducting timely cleanup actions, the Lessee agrees to reimburse the Government for its costs.

9. LEAD-BASED PAINT WARNING AND COVENANT:

a. The Leased Premises do not contain residential dwellings and are not being leased for residential purposes. The Lessee is notified that the Leased Premises contains buildings built prior to 1978 that contain lead-based paint. Lead from paint, paint chips, and dust can pose health hazards if not managed properly. Such property may present exposure to lead from lead-based paint that may place young children at risk of developing lead poisoning. Lead poisoning in young children may produce permanent neurological damage, including learning disabilities, reduced intelligence quotient, behavioral problems and impaired memory. A risk assessment or inspection for possible lead-based paint hazards is recommended prior to lease.

b. Available information concerning known lead-based paint and/or lead-based paint hazards, the location of lead-based paint and/or lead-based paint hazards, and the condition of painted surfaces is contained in the Environmental Condition of Property, which has been provided to the Lessee. Additionally, the Lessee has been provided with a copy of the federally-approved pamphlet on lead poisoning prevention. The Lessee hereby acknowledges receipt of all of the information described in this subparagraph.

c. The Lessee acknowledges that it has received the opportunity to conduct an inspection for the presence of lead-based paint and/or lead-based paint hazards prior to execution of this Lease. The Lessee agrees to be responsible for any future remediation of lead-based paint found to be necessary on the Leased Premises.

d. The Lessee shall not permit use of any buildings or structures on the Leased Premises for residential habitation without first obtaining the written consent of the Army. As a condition of its consent, the Army may require the Lessee to: (i) inspect for the presence of lead-based paint and/or lead-based paint hazards in and around buildings and structures on the Leased Premises; (ii) abate and eliminate lead-based paint hazards in accordance with all applicable laws and regulations; and (3) comply with the notice and disclosure requirements under applicable Federal and state law.

e. The Army assumes no liability for remediation or damages for personal injury, illness, disability, or death, to the Lessee, its successors or assigns, sublessees or to any other person, including members of the general public, arising from or incident to possession and/or use of any portion of the Leased Premises containing lead-based paint as residential housing. The Lessee further agrees to indemnify and hold harmless the Army, its officers, agents and employees, from and against all suits, claims, demands or actions, liabilities, judgments, costs and attorneys' fees arising out of, or in any manner predicated upon, personal injury, death or property damage resulting from, related to, caused by or arising out of the possession and/or use of any portion of the Leased Premises containing lead-based paint as residential housing. This section and the obligations of the Lessee hereunder shall survive the expiration or termination of this Lease and any conveyance of the Leased Premises to the Lessee. The Lessee’s obligation hereunder shall apply whenever the United States of America incurs costs or liabilities for actions giving rise to liability under this section.

10. NOTICE OF THE PRESENCE OF ASBESTOS AND COVENANT:

a. The Lessee is hereby informed and does acknowledge that friable and non-friable asbestos or asbestos-containing materials ("ACM") has been found on the Leased Premises, as described in the *Asbestos Visual Inspection Report*, July 2012 of which the Lessee acknowledges receipt.

b. In addition to the Lessee's general indemnity contained in the condition on INDEMNITY AND HOLD HARMLESS, the Lessee specifically covenants and agrees that its use and occupancy of the Leased Premises will be in compliance with all applicable laws relating to asbestos; and that the Grantor assumes no liability for future remediation of asbestos or damages for personal injury, illness, disability, or death, to the Lessee, its successors or assigns, sublessees, or to any other person, including members of the general public, arising from or incident to the purchase, transportation, removal, handling, use, disposition, or other activity causing or leading to contact of any kind whatsoever with asbestos on the Leased Premises described in this Lease, whether the Lessee, its successors or assigns have properly warned or failed to properly to warn the individual(s) injured. The Lessee agrees to be responsible for any future remediation of asbestos found to be necessary on or in the buildings, improvements, and/or structures during the Lease Term.

11. PCB NOTIFICATION AND COVENANT

a. The Lessee is hereby informed and does acknowledge that equipment containing polychlorinated biphenyls (PCBs) may exist on the Property to be conveyed, described as follows: three transformers behind Building 20 and three transformers in the southwest corner of the Property.

b. The Lessee acknowledges that it has inspected or has had the opportunity to inspect the Property as to the presence of PCBs and PCB-containing equipment and any hazardous or environmental conditions relating thereto. The Grantee shall be deemed to have relied solely on its own judgment in assessing the overall condition of all or any portion of the Property, including, without limitation, any PCB hazards or concerns.

12. The Lessee shall not use the Leased Premises for the storage or disposal of non-Department of Defense owned hazardous or toxic materials, as defined in 10 U.S.C. 2692, unless authorized under 10 U.S.C. 2692 and properly approved by the Government.

13. The Army may impose any additional environmental protection conditions and restrictions during the terms of this lease that it deems necessary by providing written notice of such conditions or restrictions to the Lessee.

ENCLOSURE 7
RADIOLOGICAL RELEASE MEMO

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY JOINT MUNITIONS COMMAND
1 ROCK ISLAND ARSENAL
ROCK ISLAND, IL 61299-6000

REPLY TO
ATTENTION OF:

AMSJM-SF

MEMORANDUM FOR HQDA, ACSIM, BRAC Division (Ms. Lynne Anderson),
600 Army Pentagon, Washington, DC 20310-0600

SUBJECT: Results from the Radiological Survey at the Niagara Falls U.S. Army Reserve Center, Niagara Falls, NY

1. On 12 December 2011, we completed the final status survey work for the radiological release at the Niagara Falls, NY U.S. Army Reserve Center in compliance with the accepted federal government protocol (MARSSIM Class 3). The enclosed Radiological Survey Report provides an evaluation of radiological materials used and the summary of findings and results. The report concludes that no further action is required with respect to the radioactive devices or materials identified. We conclude the site is free of radiological concerns.

2. Our point of contact for questions or comments is Mr. Michael Kurth, AMSJM-SF, (309) 782-8423, electronic mail michael.f.kurth.civ@mail.mil.

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Encl

STEPHANIE A. CHRISTIE
Director, Safety/Rad Waste Directorate

ENCLOSURE 8

ASBESTOS REPORT

ASBESTOS VISUAL INSPECTION REPORT

99TH REGIONAL SUPPORT COMMAND
UNITED STATES ARMY RESERVE
FORT DIX, NEW JERSEY

NIAGARA FALLS ARMED FORCES RESERVE CENTER

NIAGARA FALLS, NEW YORK

(USAR FACID: NY046 - SITE CODE: 36555)

July 2012

ASBESTOS VISUAL INSPECTION REPORT

NIAGARA FALLS US ARMED FORCES RESERVE CENTER

(NY046) - (36555)

9400 PORTER ROAD

NIAGARA FALLS, NEW YORK

Prepared By

Small Business Group, Inc.
10179 Highway 78
Ladson, South Carolina 29456

Submitted to

United States Army Corps of Engineers
Savannah District

Prepared for

99TH REGIONAL SUPPORT COMMAND
UNITED STATES ARMY RESERVE
FORT DIX, NEW JERSEY

1. SUMMARY:

Asbestos Building Inspector from the Small Business Group (SBG) of Ladson, SC conducted a visual inspection to identify suspect asbestos containing material (ACM) located at the Niagara Falls Army Reserve Center located at 9400 Porter Road in Niagara, NY. The inspection was conducted on July 25-30, 2012 utilizing modified Asbestos Hazard Emergency Response Act (AHERA) guidelines. The results of the inspections provide an inventory of assumed and/or confirmed suspect ACM in the buildings at this site. No sampling was conducted during this visual inspection.

Inspector is certified by an EPA accredited training center under AHERA guidelines as a Building Inspector and licensed as required by the state of New York. A copy of the inspector license is located in the back of this report.

2. FINDINGS:

Ninety-five suspect materials were identified in the twelve structures located at this site. Information on each structure is listed below. The assumed and/or confirmed ACM located at this site is listed in the Summary Table as Appendix A. Appendix B contains a drawing showing the floor plan of each building that contained suspect materials.

3. STRUCTURES:

- Building GS-1: Guard shack is a 60 square foot wood with a shingled roof constructed in 1980's.
- Building 4: Hanger is an 85,500 square-foot building, with a large metal framed hanger with 2-story brick buildings attached on the north and south sides. All roofs are rubber coated. Constructed in 1956.
- Building 17: Storage Building is an approximately 30 square-foot concrete- block structure with a corrugated fiberglass panel roof constructed in 1980's.
- Building 18: AMSA 76 / Motor pool is a 9,720 square-foot metal framed and concrete block structure with metal and brick exterior constructed in 1980's.
- Building 19: Storage Quonset Hut is a 1,600 square foot metal-framed structure with metal roof constructed in 1956.
- Building 20: Electronics Storage is a 2,133 square-foot concrete block structure with brick exterior, constructed in 1956.

- Building 21: 277th Quartermasters HQ is a 13,055 square foot building concrete block structure with brick exterior and shingled roofing constructed in 1956.
- Building 22: Dining Hall / Storage Building is an approximately 20,703 square foot concrete block structure with brick exterior and shingles and rubber coated roofing, constructed in 1956.
- Building 23: Storage Building is an approximately 2,058 square foot metal framed structure with metal siding and roof, constructed in 1956.
- Building 24: Storage building is an approximately 2,400 square foot metal framed structure with metal siding and roof constructed in 1993.
- Building 25: Former Power Plant Building is an approximately 1,504 square foot concrete block structure with brick exterior, an assumed inaccessible roof, constructed in 1956.
- Building 26: Storage Building is an approximately 2,150 square foot metal framed structure with metal siding and roof, constructed in 1960.

4. OBSERVATIONS:

Fibrous vent duct insulation (H-11) located in Room 216C of Building 4S is damaged and needs to be repaired/removed when possible. Inspector sprayed encapsulant on material during the inspection as a temporary measure. All ACM identified in 2004 EEG report remains in buildings, although some materials are in different quantities.. Building room numbers were either assigned by the inspector during the inspection or taken from actual rooms and are shown on the attached drawing (Appendix B). A thorough and diligent inspection was conducted of this structure but some unidentified or inaccessible materials may still be present (i.e. wall voids, pipe chases, etc.). If previously unidentified suspect materials are found during renovation/demolition activities, samples should be taken to verify asbestos content prior to disturbance. Material quantities in this report are estimated and should be verified prior to any abatement activities.

5. SITE BUILDING PHOTOS:

Building 4: Hanger & Admin
4N on left - 4S on right of hanger

Building 17: Storage Building

Building 18: Motor Pool

Building 19: Storage Building

Building 20: Electrical Storage

Building 21: Admin Building

Building 22: Mess Hall / Storage

Building 23: Storage Building (left)
Building 24: Storage Building (right)

Building 25: Former Power Plant

Building 26: Storage Building

Building GS-1: Guard Shack

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MATERIAL SUMMARY TABLE

Building 4N - Hanger/North Administrative Offices

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Dark brown coving mastic	NA	3,090 LF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
2	Gray fittings (TSI) cloth wrapped	NA	300 Ea	Good	NA	Rooms 102B, 103, 103B, 104, 104A, 105, 107, 108A, 108B. 109, 109A, 109C, 111, 112, 117, 118, 118A, 118B, 119, 120, 121, 219, 221, 223, 225, H100, H102, S001, S002, Hanger	**Confirmed non-ACM*** * 2004 EEG Inspection
3	Sheetrock/joint compound	NA	19,071 SF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
4	Piping aircell (TSI)	F	1,650 LF	Good	High	Rooms 102, 102A, 102B, 103, 103A, 105, 107, 109A, 111, 112, 117, 118, 118A, 118B, 119, 120, 121, 203, 208, 214, 219, 221, 223, 225, H100, H101, H103	**Confirmed ACM*** *2004 EEG Inspection
5	9" Dark brown floor tile /mastic	NF	3,900 SF	Good	High	Rooms 102, 102A, 103, 103A, 103B, 104, 104A, 105, 107, 108A, 109, 109A, 109B, 109C, 117, 118B, 201, 202, 202A, 204, 204A, 205, 207, 208, 212, 216, 216B, 219, 223	**Assumed ACM**
7	Acoustical tiles/smooth & pin holes	NA	13,78 SF	Good	NA	Rooms 104, 104A, 105	**Confirmed non ACM*** * 2004 EEG Inspection
8	White fibrous pipe (TSI)	F	250 LF	Good	High	Room 102A, 102B, 103, 103B, 121, H100, H101, H103	**Confirmed ACM*** * 2004 EEG Inspection
10	12" Tan floor tile with brown and white marbling/ mastic	NA	9750 SF	Good	NA	Rooms 103B, 109A, 118A, 117, 117A, 120, 206, 214, 221,225, H100, H101, H102, H200, H201, H202, S001, S002	**Confirmed Non-ACM*** * 2004 EEG Inspection

HA = Homogeneous Area   N F= Non-friable
F= Friable   SF = Square Feet   LF = linear Feet

APPENDIX A

MATERIAL SUMMARY TABLE

Building 4N - Hanger/North Administrative Offices

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
12	Spray on insulation (TSI) on Hanger doors	NA	9,000 SF	Good	NA	Hanger	**Confirmed Non-ACM*** * 2004 EEG Inspection
13	Spray on insulation (TSI) on Hanger end walls	NA	6,500 SF	Good	NA	Hanger	**Confirmed Non-ACM*** * 2004 EEG Inspection
14	Fire Doors	NF	19 EA	Good	Low	Rooms 115, S001, S002 & throughout the Hanger	**Assumed ACM**
15	9" Green with white striped floor tile / mastic	NF	84 SF	Good	High	Room 115	**Assumed ACM**
16	Stair tread/ tan mastic	NF	260 SF	Good	High	Rooms S001, S002	**Assumed ACM**
17	Gray coving / mastic	NF	120 LF	Good	Moderate	Room 221	**Assumed ACM**
18	Ceiling Tiles with short irregular grooves and pin holes	F	9246 SF	Good	Moderate	Rooms 102, 104, 104A, 105, 109, 117, 202, 202A, 201, 203, 204, 204A, 206, 207, 208, 212, 216, 216A, 216B, 221	**Assumed ACM**
19	Vault door	NF	1 EA	Good	Low	Room 103C	**Assumed ACM**
20	Black coving / mastic	NF	632 LF	Good	Moderate	Rooms 103, 118A, 118B, 203, 219, 223	**Assumed ACM**
21	Green coving / mastic	NF	676 LF	Good	Moderate	Rooms 102, 102A, 205, 208, 212	**Assumed ACM**
22	Tan carpet mastic	NF	2218 SF	Good	Low	Rooms 104, 104A, 105, 216, 216A, 216B	**Assumed ACM**
23	Brown exterior window caulking	NF	1,675 LF	Good	Moderate	Exterior	**Assumed ACM**

HA = Homogeneous Area N F= Non-friable
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APPENDIX A

MATERIAL SUMMARY TABLE

Building 4S - Hanger/South Administrative Offices

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Dark brown coving mastic	NA	4,870 LF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
2	Gray fittings (TSI) cloth wrapped	NF	555 EA	Good	NA	Room 100, 101, 102, 102A, 102B, 103, 103A, 104, 105, 106, 107, 110, 110A, 110B, 111, 121, 121A, 122, 122A, 122B, 122C. 122D, 124, 124A, 216, 216A, 216C, 216D, 216E, E001, E002, S001, S002, H101	**Confirmed Non-ACM*** * 2004 EEG Inspection
3	Sheetrock/joint compound	NA	37,780 SF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
4	Pipe aircell (TSI)	F	2,450 LF	Good	Low	Rooms 100, 101, 102, 102A, 102B, 103, 104, 105, 106, 107, 110A, 110B, 111, 121, 121A, 124, 124A, 122, 122A, 122B, 122C, 122D, 216, 216B, 216C, 216D, 216F, E001, E002, H101,	**Confirmed ACM*** * 2004 EEG Inspection
5	9" Dark brown floor tile /mastic	NF	9,500 SF	Good	High	Rooms 102, 103, 106, 107, 121, 124, 124A, 130, 144, 206, 210, 211, 214, 216B, 216B, 216C, 228, 228A, 229, 244, 250, 251, 252, 253, 253A, 255, 257, 257A, 258, 259, 260, 261, 262, 263, 264, 272, 273A, 274, 275, 281, 282	**Assumed ACM**
6	Acoustical tiles/grooves & pin holes	NA	584 SF	Good	NA	Rooms 128, 129, 144	**Confirmed non-ACM*** * 2004 EEG Inspection
7	Acoustical tiles/smooth & pin holes	NA	2,405 SF	Good	NA	Room 102A, 242, 243, 244, 246, 265	**Confirmed non-ACM*** * 2004 EEG Inspection
8	White fibrous pipe (TSI)	F	200 LF	Good	Moderate	Rooms 102, 102B, 103, 104, 105, 106, 111, H101, E002	**Confirmed ACM*** * 2004 EEG Inspection

HA = Homogeneous Area N F= Non-friable
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APPENDIX A

MATERIAL SUMMARY TABLE

Building 4S - Hanger/South Administrative Offices

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
9	Black mastic under 12" Lt. brown floor tile w/brown & white marbling	NF	11,446 SF	Good	High	Rooms 102B, 104, 111, 121A, 122, 122A, 122B, 122C, 212, 216, 216A, 216C, 216E, 224, 230, 231, 232, 232A, 232B, 235, 236, 237, 237A, 238, 239, 240, 241, 242, 243, 244, 246, 247, 248, E001, H200, H201, H204, S001, S002	**Confirmed ACM*** **(Floor tile mastic only)** (Floor tile is non-ACM) * 2004 EEG Inspection
10	12" Tan floor tile with brown and white marbling/ mastic	NA	3,490 SF	Good	NA	Rooms 103, 202, 265, 266, 268, 270, H101	**Confirmed Non-ACM*** * 2004 EEG Inspection
11	Fibrous vent duct insulation	F	200 SF	Damaged (10%)	Moderate	Room 216C	**Confirmed ACM*** * 2004 EEG Inspection
14	Fire doors	NF	3 EA	Good	Low	Room E001	**Assumed ACM**
16	Stair tread/ tan mastic	NF	300 SF	Good	Moderate	Room S001, S002	**Assumed ACM**
17	Gray coving / mastic	NF	117 LF	Good	Moderate	Rooms 121A, 122B, 122C	**Assumed ACM**
18	Ceiling tiles w/short irregular grooves & pinholes	F	17,059 SF	Good	Moderate	Room 121, 122, 122A, 122B, 122C, 122D,202, 209, 210, 211, 212, 228, 230, 231, 232A, 235, 236, 237, 237A, 238, 243, 244, 246, 251, 252, 253, 257, 257A, 258, 259, 261, 262, 263, 264, 265, 266, 268, 270, 273, 273A, 275, 274, 281, 282, H200, H201, H204	**Assumed ACM**
19	Vault door	NF	1 EA	Good	Low	Room 255	**Assumed ACM**
20	Black coving / mastic	NF	288 LF	Good	Moderate	Rooms 107, 216B, 250, 253, 255	**Assumed ACM**
21	Green coving / mastic	NF	304 LF	Good	Moderate	Rooms 211, 261, 262, 282	**Assumed ACM**
22	Tan carpet mastic	NF	1,148 SF	Good	Low	Rooms 243, 246, 247, 248	**Assumed ACM**

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APPENDIX A

MATERIAL SUMMARY TABLE

Building 4S - Hanger/South Administrative Offices

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
23	Brown exterior window caulking	NF	1,600 LF	Good	Moderate	Exterior	**Assumed ACM**
24	Tar and Gravel Roof	NF	345 SF	Good	Low	Room 109 Roof	**Assumed ACM**

Building 17 - Storage Building

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Interior door caulk	NF	17 LF	Good	Moderate	Room 100	**Assumed ACM**

Building 18 - AMSA 76 Motorpool

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Sheetrock / joint compound	NA	8,120 SF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
2	Window glazing	NA	290 LF	Damaged	NA	Rooms 100, 104, 107, 108	**Confirmed non-ACM*** * 2004 EEG Inspection
3	12" Beige floor tile w/tan & white heavy marbling/mastic	NF	512 SF	Good	High	Rooms 101, 103, 106	**Assumed ACM**
4	Tan coving / mastic	NF	215 LF	Good	Moderate	Rooms 100, 101, 105, 106	**Assumed ACM**
5	Dark brown coving/ mastic	NF	140 LF	Good	Moderate	Rooms 107, 108, 109	**Assumed ACM**
6	12" White floor tile with light brown marbling / mastic	NF	640 SF	Good	High	Rooms 107, 108, 109	**Assumed ACM**
7	White interior door caulk	NF	120 LF	Good	Moderate	Rooms 110, 114, 115, H100	**Assumed ACM**
8	12" white floor tile with gray streaks / mastic	NF	885 SF	Good	High	Rooms 112, 114, 115, H100	**Assumed ACM**
9	6" gray coving / mastic	NF	240 LF	Good	Moderate	Rooms 111, 112, 114, 115, H100	**Assumed ACM**

HA = Homogeneous Area N F= Non-friable
F= Friable SF = Square Feet LF = linear Feet

APPENDIX A

MATERIAL SUMMARY TABLE

Building 18 - AMSA 76 Motorpool

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
10	Dark brown caulk	NF	325 LF	Good	Moderate	Exterior windows	**Assumed ACM**
11	Gray caulk	NF	70 LF	Good	Moderate	Exterior Doors	**Assumed ACM**
12	Gray shingles / felt paper	NF	4,800	Good	Low	Roof	**Assumed ACM**

Building 19 - Quonset Hut Storage

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Sheetrock joint compound	F	1,575 SF	Damaged (10%)	High	Rooms 100, 101, 102, 103, 104, 105	**Confirmed ACM*** * 2004 EEG Inspection
2	Silver sealer mastic	NF	1,600 SF	Good	Moderate	Entire roof	**Confirmed ACM*** * 2004 EEG Inspection

Building 20 - Electronics Storage

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	12" White floor tile with gray streaks	NF	1,695 SF	Good	High	Rooms 100, 101, 105, E001	**Assumed ACM**
2	6" Gray coving mastic	NF	245 LF	Good	Moderate	Rooms 100, 101, 105, E001	**Assumed ACM**
3	Sheetrock / Joint Compound	F	2,360 SF	Good	High	Rooms 100, 101, 103, 104, 105, 106, E001	**Assumed ACM**
4	Ceiling tile	F	1,800 SF	Good	Moderate	Rooms 100, 101, 103, 104, 105, 106	**Assumed ACM**
5	Dark brown caulk	NF	124 LF	Good	Moderate	Exterior windows	**Assumed ACM**
6	White caulk	NF	70 LF	Good	Moderate	Exterior Doors	**Assumed ACM**
7	Gray shingles / tar paper	NF	3,200 SF	Good	Low	Roof	**Assumed ACM**

HA = Homogeneous Area   N F= Non-friable
F= Friable   SF = Square Feet   LF = linear Feet

APPENDIX A

MATERIAL SUMMARY TABLE

Building 21 - Administrative Building

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	12" Light brown floor tile with heavy black and white marbling /mastic	NA	6,506 SF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
2	12" Acoustical tiles	NA	1,204 SF	Good	NA	100, 103, L1, H100, E001,	**Confirmed non-ACM*** * 2004 EEG Inspection
3	9" dark brown floor tile w/red & white streaks	NF	210 SF	Good	High	Room 127	**Assumed ACM**
4	12" Tan floor tile w/brown, white & beige marbling	NA	920 SF	Good	NA	Room 117, H100	**Confirmed non-ACM*** * 2004 EEG Inspection
5	Sheetrock / Joint compound	NA	3960 SF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
6	12" Green floor tile w/green & white streaks	NF	440 SF	Good	High	Room 108	**Confirmed ACM*** **(tile is ACM -mastic is not)** * 2004 EEG Inspection
7	Dark brown coving /mastic	NF	1,100 LF	Good	Moderate	Rooms 100, 101, 104, 104A, 112, 115, 116, 117, 118, 120, 128, E001, H100, H101	**Confirmed ACM*** * 2004 EEG Inspection
8	Acoustical tile mastic	NA	547 SF	Good	NA	Rooms 100, 101, 103, L 1, E001, H100	**Confirmed non-ACM*** * 2004 EEG Inspection
9	Gray door caulk	NF	1,307	Good	Moderate	Rooms 100, 101, 103, 104, 104A, 108, 109, 109A, 109B, 112, 115, 117, 118, 119, 120, 121, 122, 123, 127, 128, L 1, L 3, E001, H100, H101, Exterior	**Assumed ACM**
10	Tan carpet mastic	NF	468 SF	Good	Low	Room 100, 103	**Assumed ACM**
11	Green coving / mastic	NF	120 LF	Good	Moderate	Room 100, 103, 109C	**Assumed ACM**
12	12" white floor tile w/gray streaks & mastic	NF	1637 SF	Good	High	Rooms 109, 109A, 109C, L 1	**Assumed ACM**

HA = Homogeneous Area N F= Non-friable
F= Friable SF = Square Feet LF = linear Feet

APPENDIX A

MATERIAL SUMMARY TABLE

Building 21 - Administrative Building

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
13	6" Gray coving/mastic	NF	100 LF	Good	Low	Rooms 109, 121	**Assumed ACM**
14	Ceiling tile short groves & pin holes	F	5,595 SF	Good	High	Rooms 100, 101, 103, 104, 104A, 109A, 118, 120, 128, L 1, E001, H100, H101	**Assumed ACM**
15	Dark green coving/mastic	NF	100 LF	Good	Moderate	Room 108	**Assumed ACM**
16	Ceiling tile with rough texture	F	525 SF	Good	High	Room 112	**Assumed ACM**
17	Black coving/mastic	NF	60 LF	Good	Moderate	Room 127	**Assumed ACM**
18	Brown window caulk	NF	880 LF	Good	Moderate	Exterior	**Assumed ACM**

Building 22 - Dining Hall / Storage

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Sheetrock / Joint compound	NA	5589 SF	Good	NA	Throughout building	**Confirmed non-ACM*** * 2004 EEG Inspection
2	Acoustical tile smooth with small uniformed holes	NA	2396 SF	Good	NA	Rooms 201, 202, 203, 204, 204A	**Confirmed non-ACM*** * 2004 EEG Inspection
3	Dark brown acoustical tile mastic	NA	599 SF	Good	NA	Rooms 201, 202, 203, 204, 204A	**Confirmed non-ACM*** * 2004 EEG Inspection
4	Acoustical tiles irregular grooves	NA	15 SF	Good	NA	Room 202	**Confirmed non -ACM*** * 2004 EEG Inspection
5	Acoustical tile with large and small pin holes	NA	NA	NA	NA	Removed	**Confirmed non-ACM*** * 2004 EEG Inspection
6	Acoustical tile with pin holes rough surfaces	NA	NA	NA	NA	Removed	**Confirmed non-ACM*** * 2004 EEG Inspection
7	Cork insulation	F	264 SF	Good	High	Room 210	**Confirmed ACM*** * 2004 EEG Inspection

HA = Homogeneous Area N F= Non-friable
F= Friable SF = Square Feet LF = linear Feet

APPENDIX A

MATERIAL SUMMARY TABLE

Building 22 - Dining Hall / Storage

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
8	Gray mud fittings (TSI)	F	11 SF (11 ea)	Good	Moderate	Room 103	**Confirmed ACM*** * 2004 EEG Inspection
9	12" Lt. brown floor tile w/black & white marbling/mastic	NA	2,592 SF	Good	NA	Rooms 103, 105, 106, 107, 108	**Confirmed non-ACM*** * 2004 EEG Inspection
10	12" white floor tile w/gray streaks & mastic	NF	4,650 SF	Good	High	Rooms 101, 102, 201, 202, 203, 203A, 204, 204A, 205, 206, 206A, 206B, H200	**Assumed ACM**
11	Ceiling tile with short grooves and pin holes	F	3,490 SF	Good	Moderate	Room 101, 102, 201, 202, 203, 204, 204A, 205, 206, 206A, 206B, 208, 212, H200	**Assumed ACM**
12	12" Tan floor tile with brown marbling/mastic	NF	45 SF	Good	High	Room 103	**Assumed ACM**
13	Dark brown coving /mastic	NF	425 LF	Good	Moderate	Room 103, 105, 106, 107, 108	**Assumed ACM**
14	Black stair tread/mastic	NF	140 SF	Good	Moderate	Stairways S001, S002	**Assumed ACM**
15	Gray coving / mastic	NF	1,015 LF	Good	Moderate	Room 201, 202, 203, 203A, 204, 204A, 205, 206, 206A, 208, 212, H200	**Assumed ACM**
16	Vault Door	NF	1 EA	Good	Low	Room 209	**Assumed ACM**
17	Shingles / Roofing	NF	10,060 SF	Good	Low	Roof	**Assumed ACM**
18	Brown window caulking	NF	1506 LF	Good	Moderate	Exterior side of windows	**Assumed ACM**
19	Green coving /mastic	NF	85 LF	Good	Moderate	Stairways S001, S002	**Assumed ACM**

HA = Homogeneous Area N F= Non-friable
F= Friable SF = Square Feet LF = linear Feet

APPENDIX A

MATERIAL SUMMARY TABLE

Building 23 - Storage Builing

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Sheetrock / joint compound	NA	505 SF	Good	NA	Rooms 100, 101	**Confirmed non-ACM*** * 2004 EEG Inspection
2	Silver/black mastic	NF	2,100 SF	Good	Low	Roof	**Confirmed ACM*** * 2004 EEG Inspection
3	Black coving / mastic	NF	20 LF	Good	Moderate	Rooms 100, 101	**Assumed ACM**

Building 25 - Former Power Plant Building

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Window glazing	NA	312 LF	Good	NA	Rooms 100, 101	**Confirmed non-ACM*** * 2004 EEG Inspection
2	Exterior White caulk	NF	90 LF	Good	Moderate	Exterior doors and windows	**Assumed ACM**
3	Roofing	NF	1,500 SF	Good	Low	Roof	**Assumed ACM**

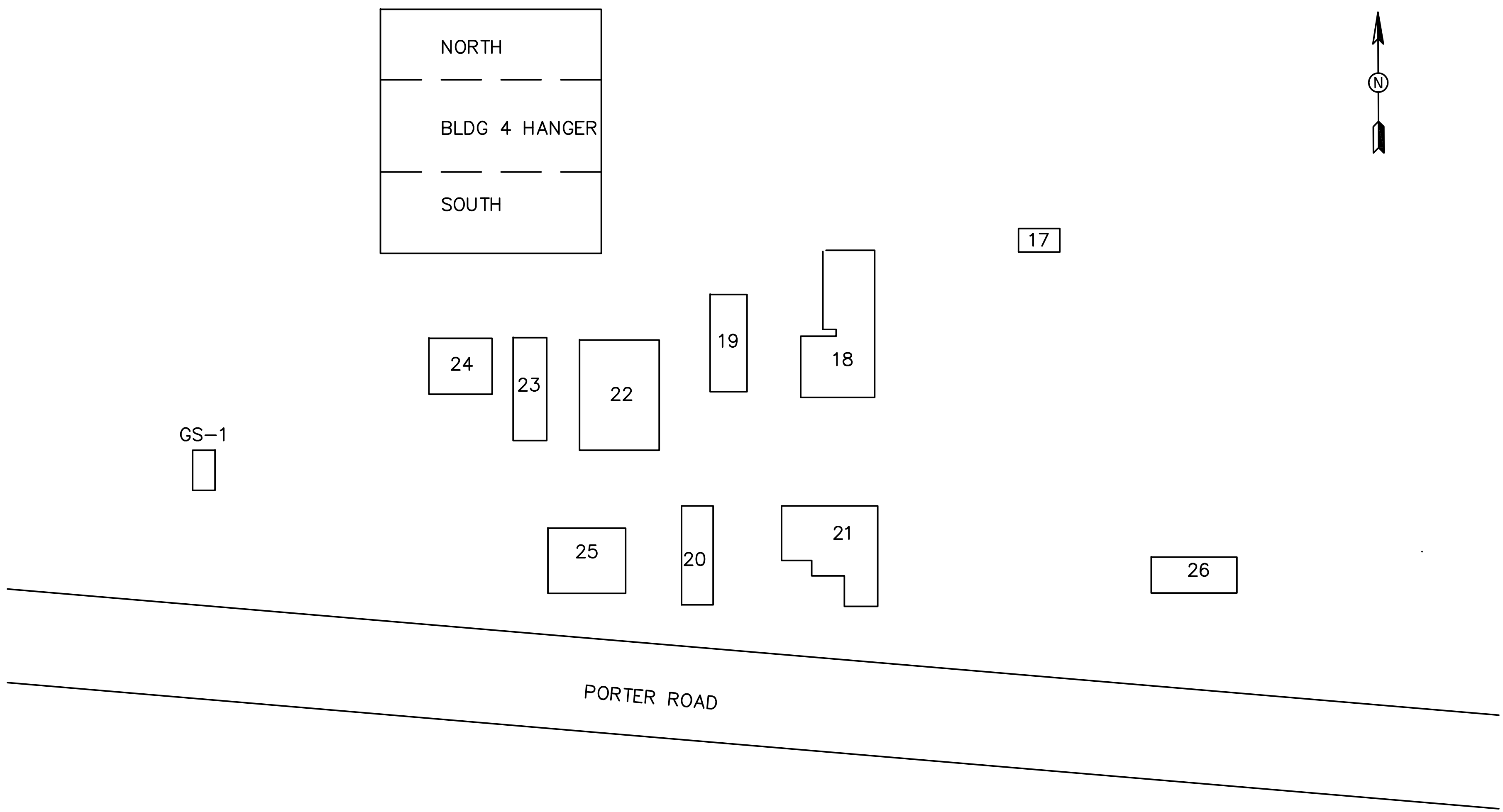
Building 26 - Storage Building

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	Silver roof sealer	NF	2,500 SF	Good	Low	Entire roof	**Confirmed ACM*** * 2004 EEG Inspection

Building GS1 - Guard Shack

HA#	Material Description	Friability	Total Quantity	Condition	Potential for Contact	Locations	Status
1	White interior door caulking	NF	24 LF	Good	Moderate	Room 100	**Assumed ACM**
2	Gray interior window caulking	NF	34 LF	Good	Moderate	Room 100	**Assumed ACM**
3	RoofingTar & gravel	NF	96 SF	Good	Low	Roof	**Assumed ACM**
4	White window glazing	NF	37 LF	Good	Moderate	Exterior windows	**Assumed ACM**
5	White window putty	NF	9 LF	Good	Moderate	Exterior southside window	**Assumed ACM**

HA = Homogeneous Area   N F= Non-friable
F= Friable   SF = Square Feet   LF = linear Feet



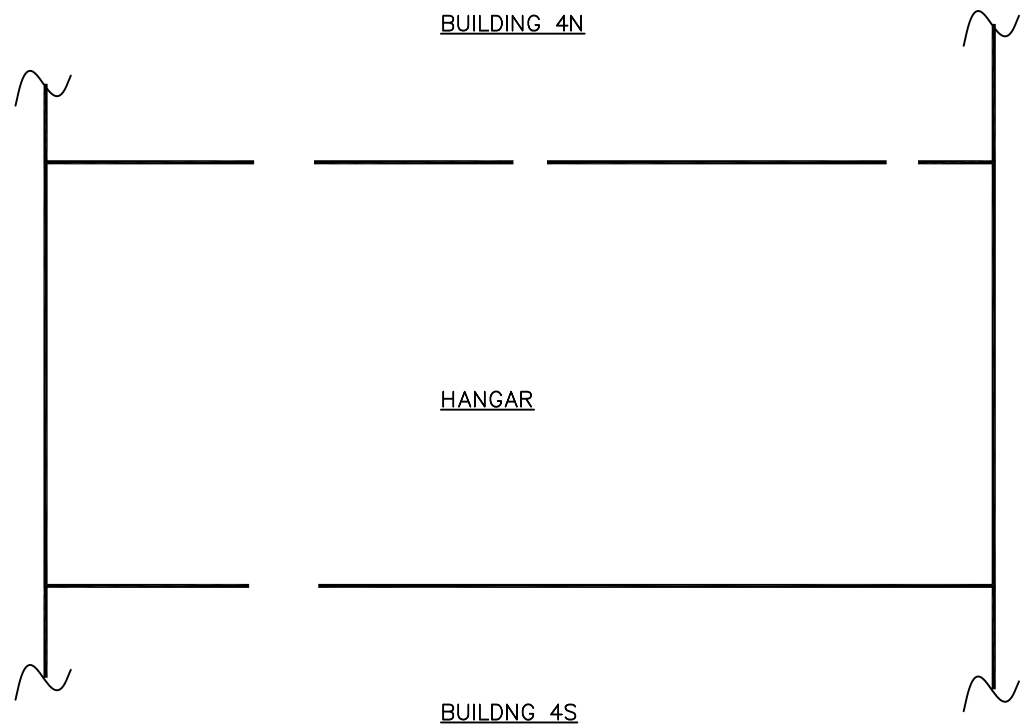
SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406–4643
(843) 573–7140

APPENDIX B
SITE MAP
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046–SM_07–2012	1 OF 17



LEGEND

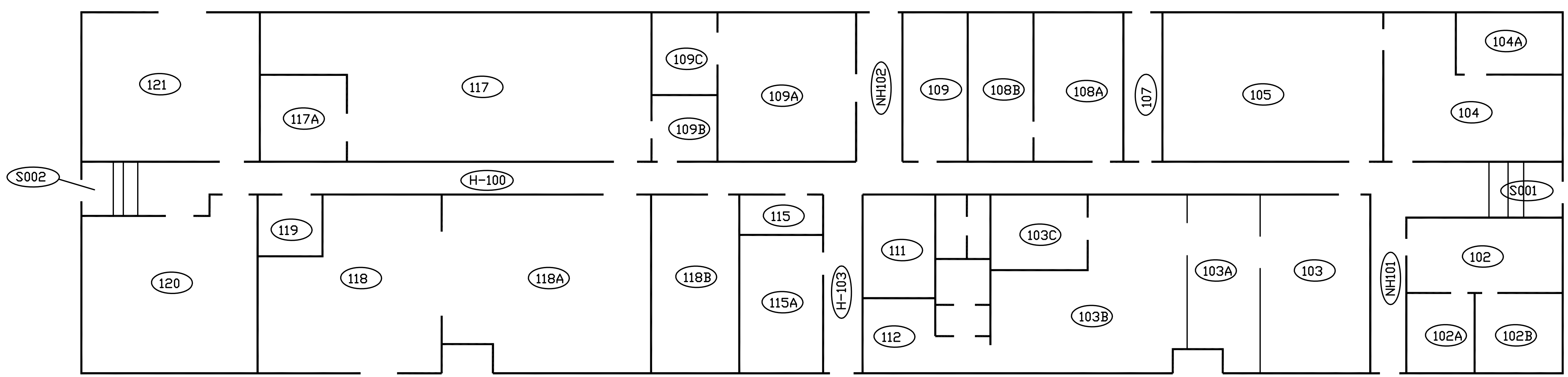
XXX -- Indicates unique room number assigned by inspector

SBG-EEG
7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
HANGAR
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-hangr_07-2012	2 OF 17



LEGEND

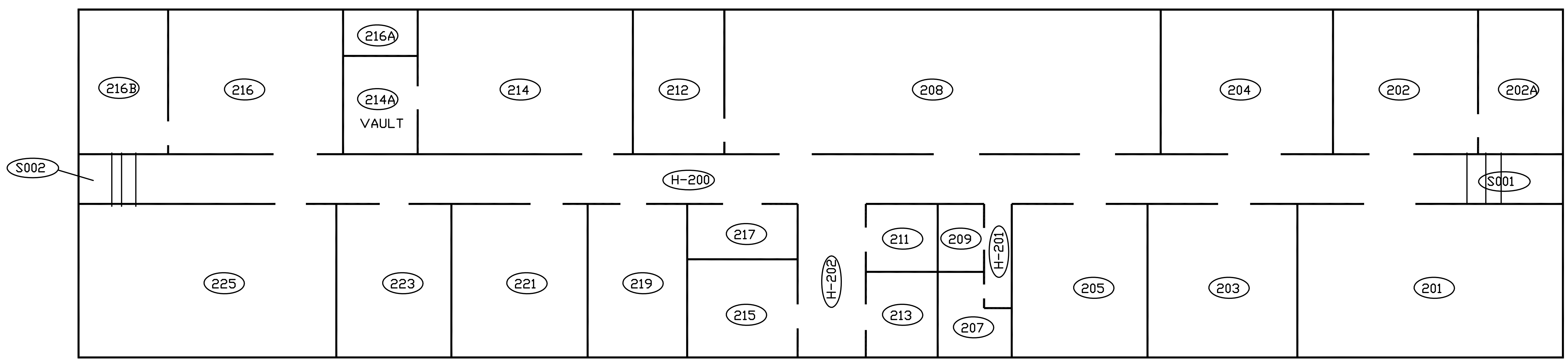
(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 4N, FIRST FLOOR
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-
SCALE NONE	DWG NUMBER SBG_NY046-B4N.FL1_07-2012	SHEET 3 OF 17	



LEGEND

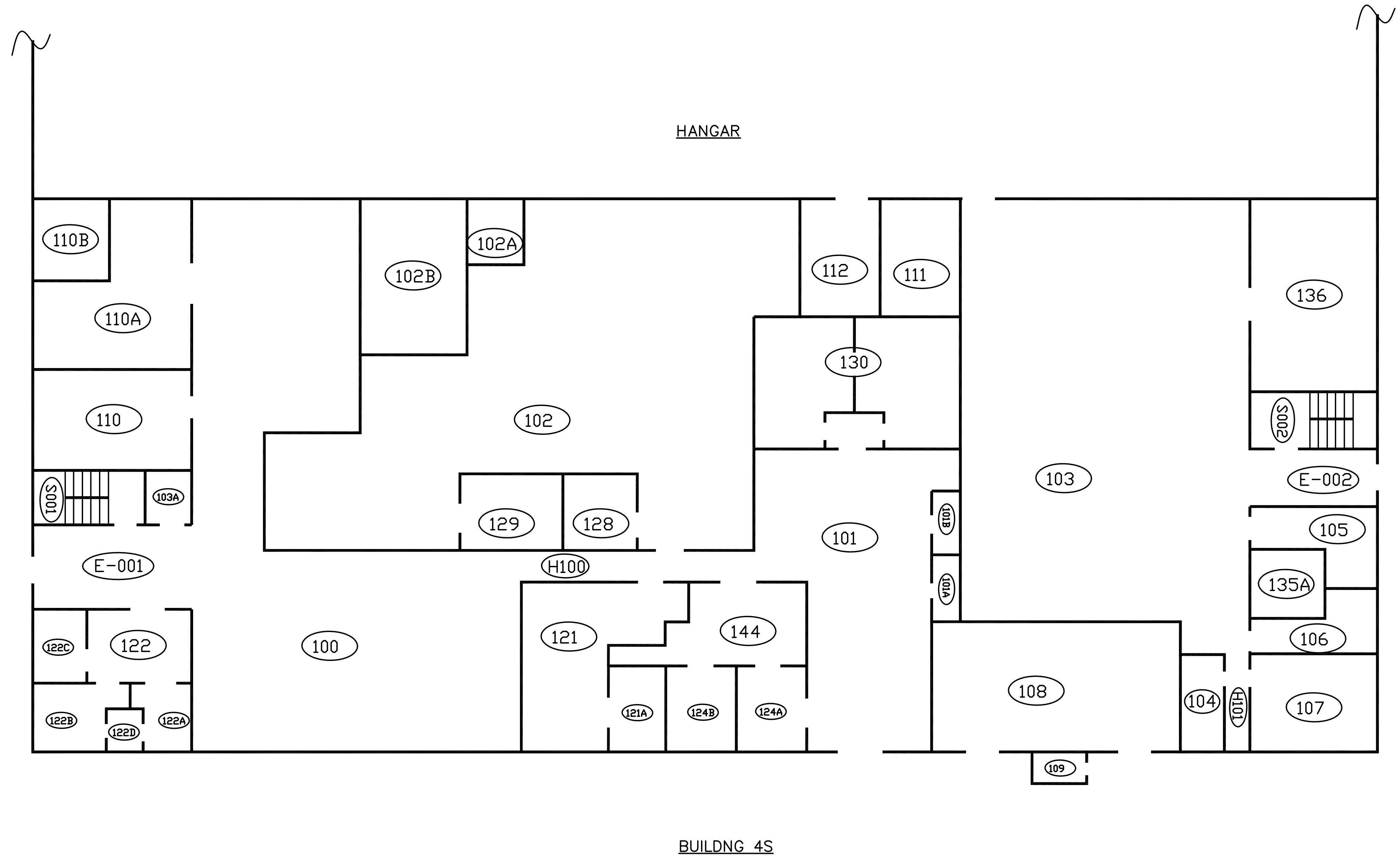
(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 4N, SECOND FLOOR
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–
SCALE NONE	DWG NUMBER SBG_NY046-B4N.FL2_07-2012	SHEET 4 OF 17	



LEGEND

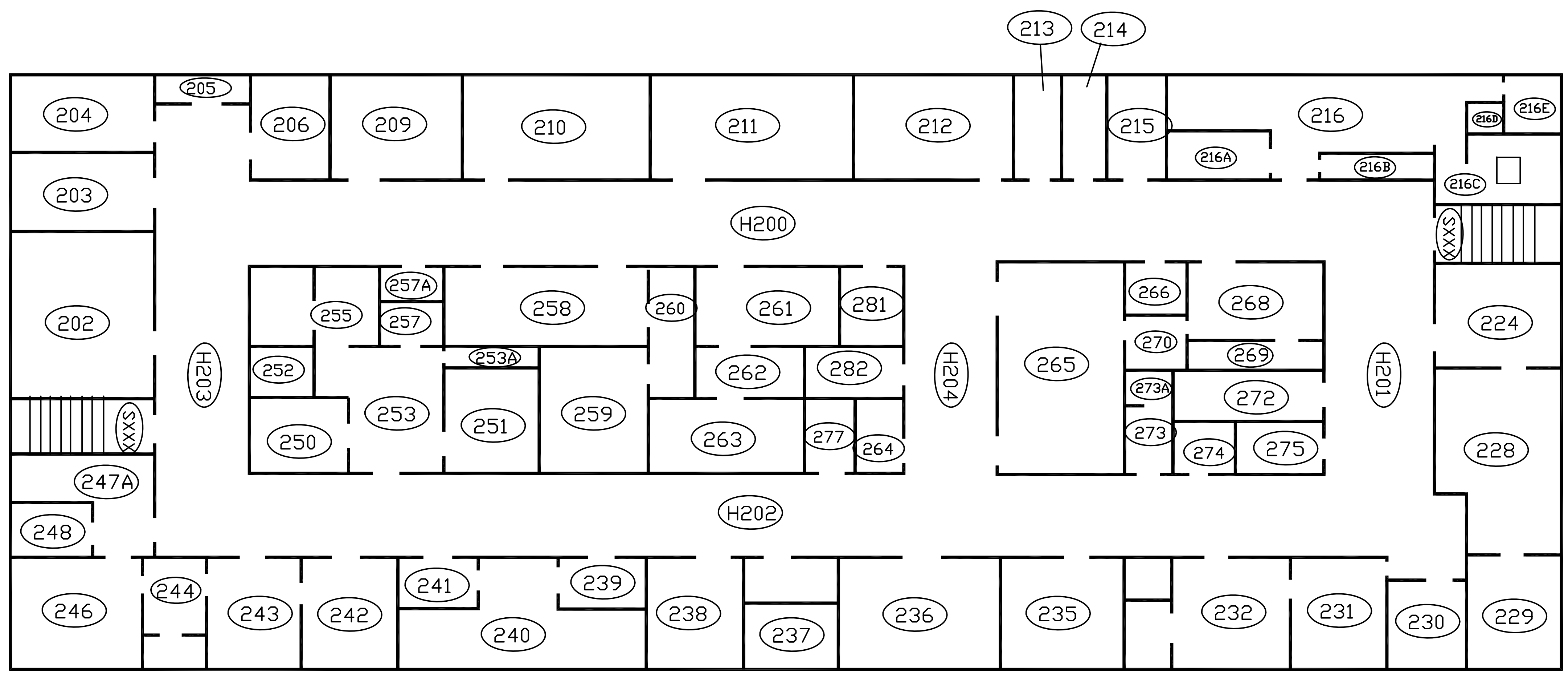
(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 4S, FIRST FLOOR
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

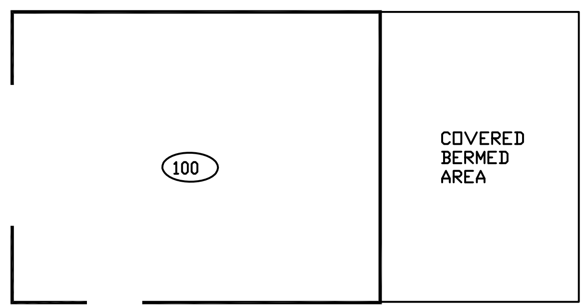
DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-
SCALE NONE	DWG NUMBER SBG_NY046-B4S.FL1_07-2012	SHEET 5 OF 17	



LEGEND

(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG 7301 RIVERS AVE., SUITE 245 N. CHARLESTON SC 29406-4643 (843) 573-7140	APPENDIX B ASBESTOS SAMPLE LOCATIONS BUILDING 4S, SECOND FLOOR ARC NIAGARA FALLS (NY046) NIAGARA FALLS, NEW YORK		
DATE AUG 2012	PREPARED BY M. MOLTZEN	DRAWN BY L. C. DIASIO	REV -
SCALE NONE	DWG NUMBER SBG_NY046-B4S.FL2_07-2012	SHEET 6 OF 17	



LEGEND

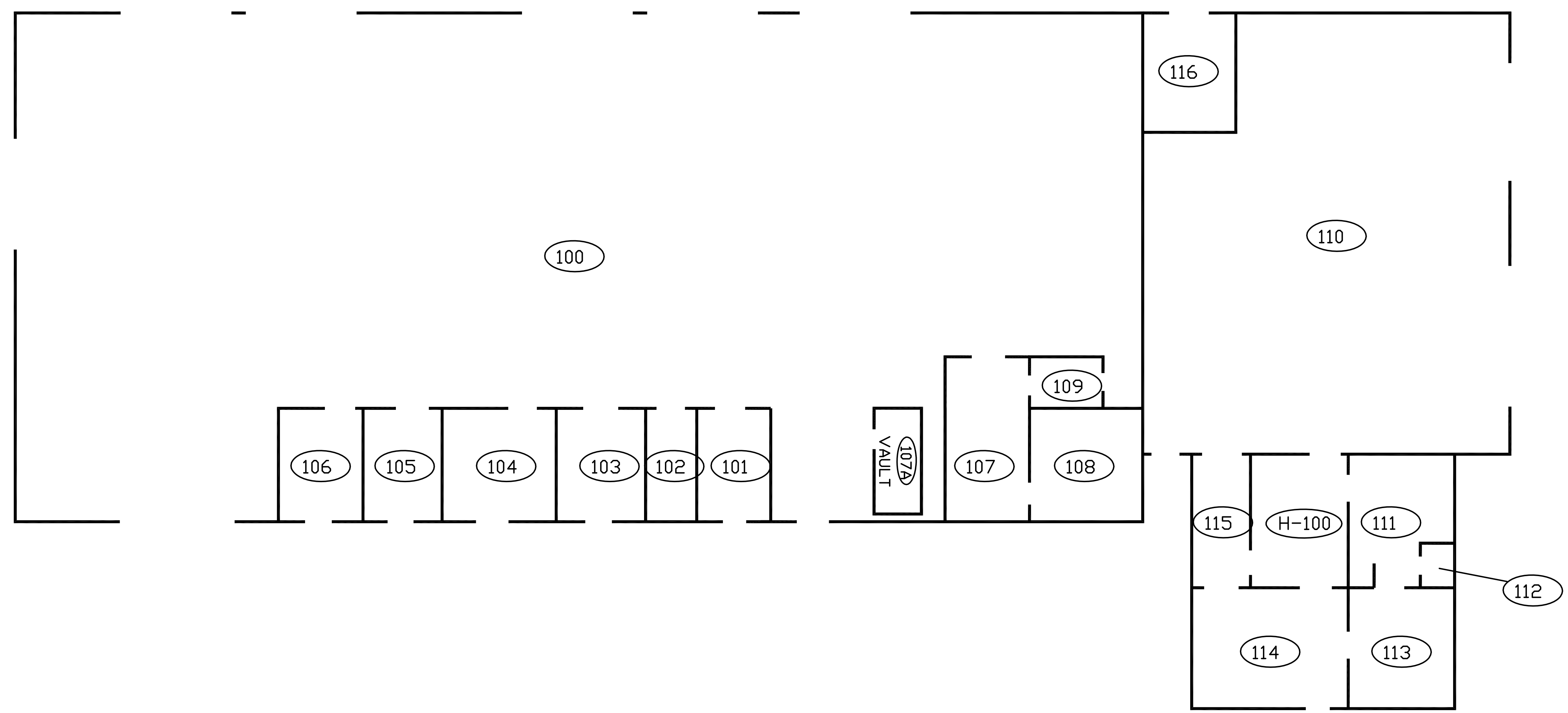
(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG
7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 17
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B17_07-2012	7 OF 17



LEGEND

(XXX) -- Indicates unique room number assigned by inspector

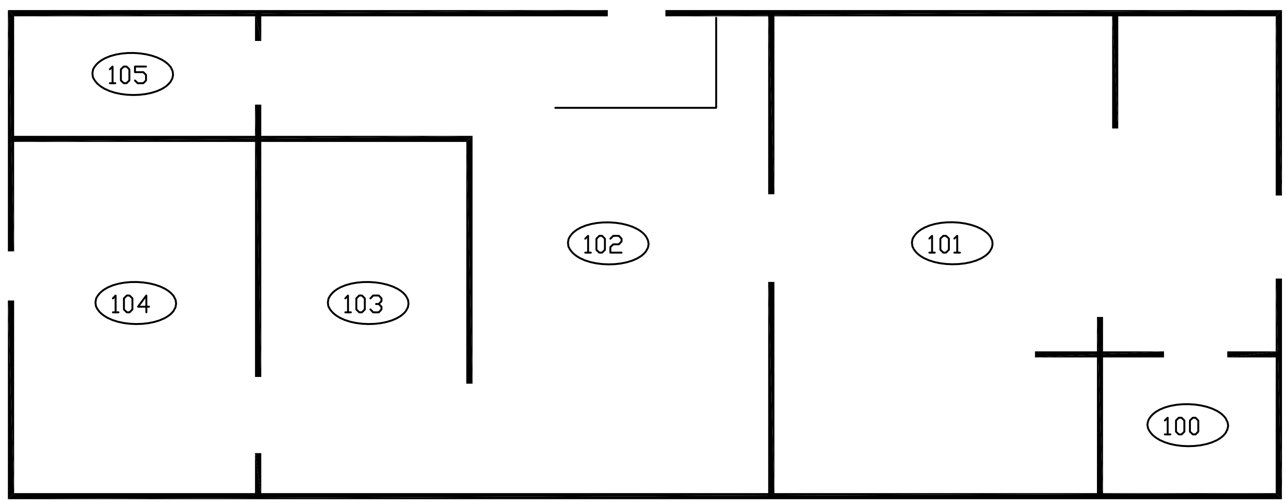
SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 18
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B18_07-2012	8 OF 17



LEGEND

(XXX) -- Indicates unique room number assigned by inspector

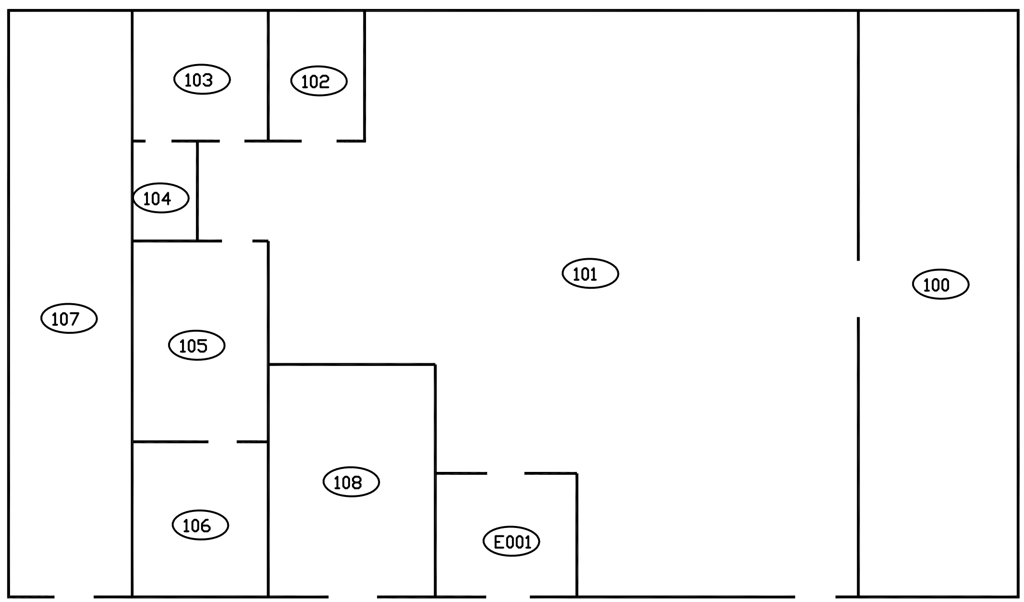
SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 19
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B19_07-2012	9 OF 17



LEGEND

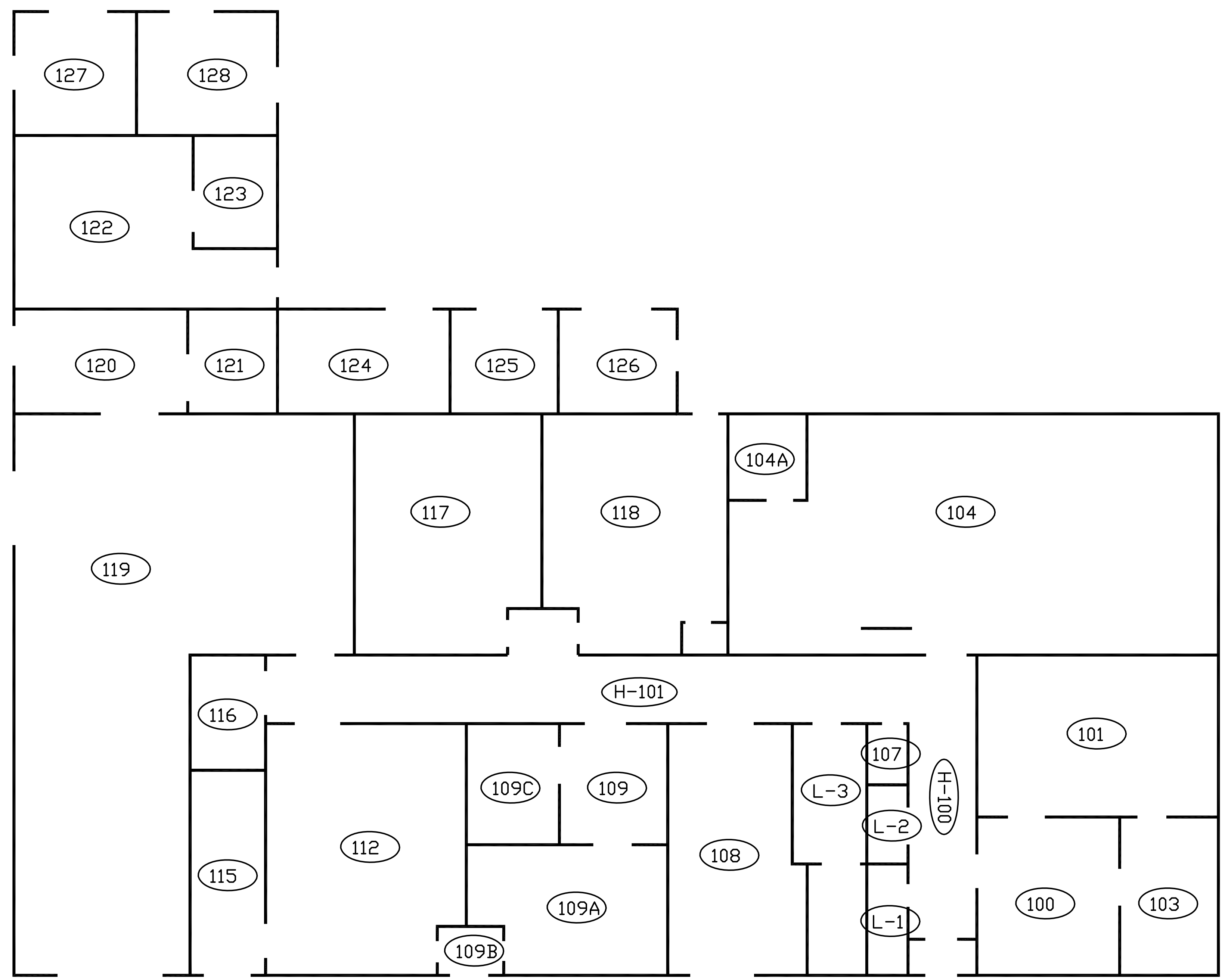
XXX -- Indicates unique room number assigned by inspector

SBG-EEG
7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 20
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B20_07-2012	10 OF 17



LEGEND

XXX -- Indicates unique room number assigned by inspector

SBG-EEG
7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
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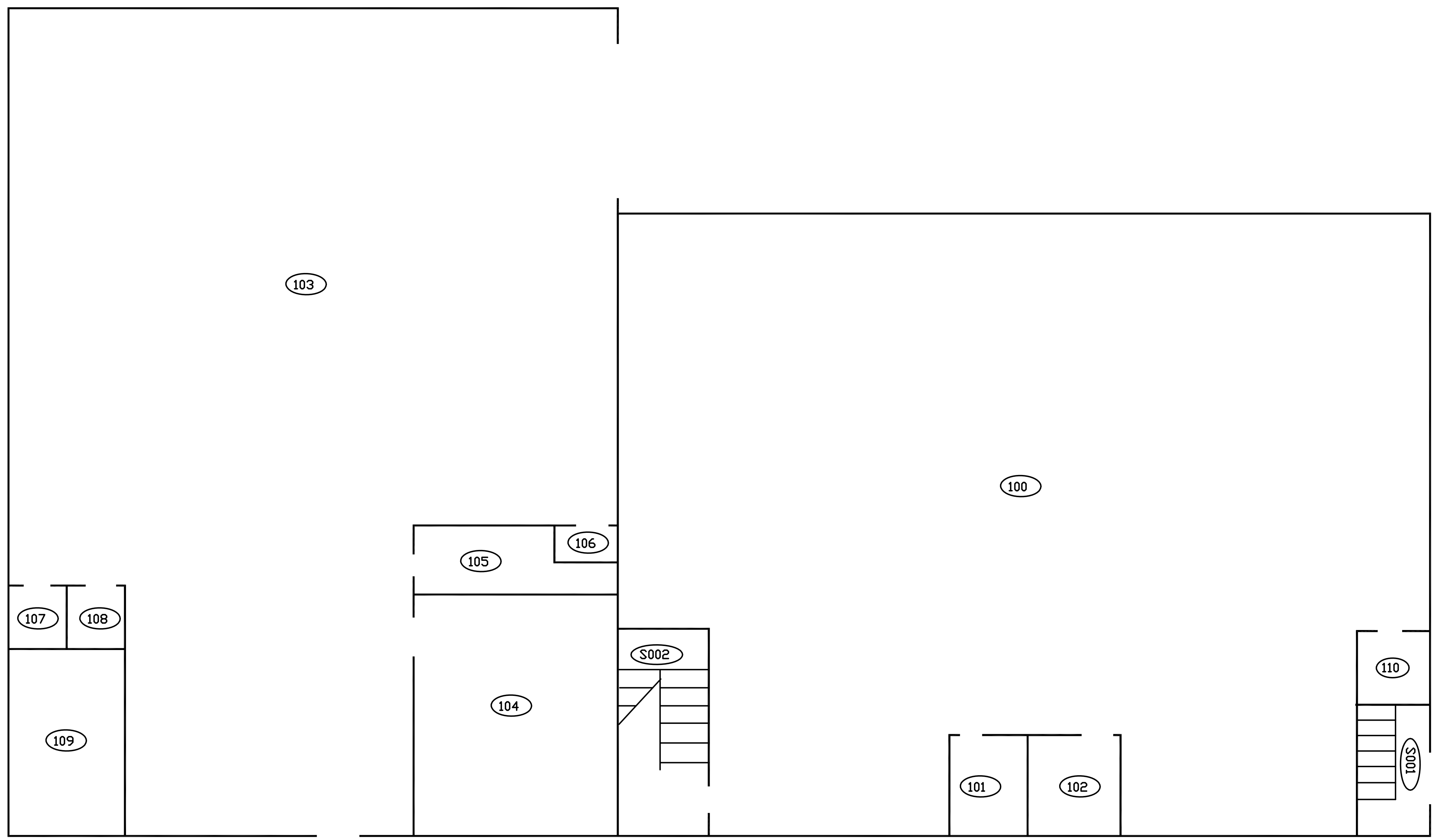
APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 21
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B21_07-2012	11 OF 17



LEGEND

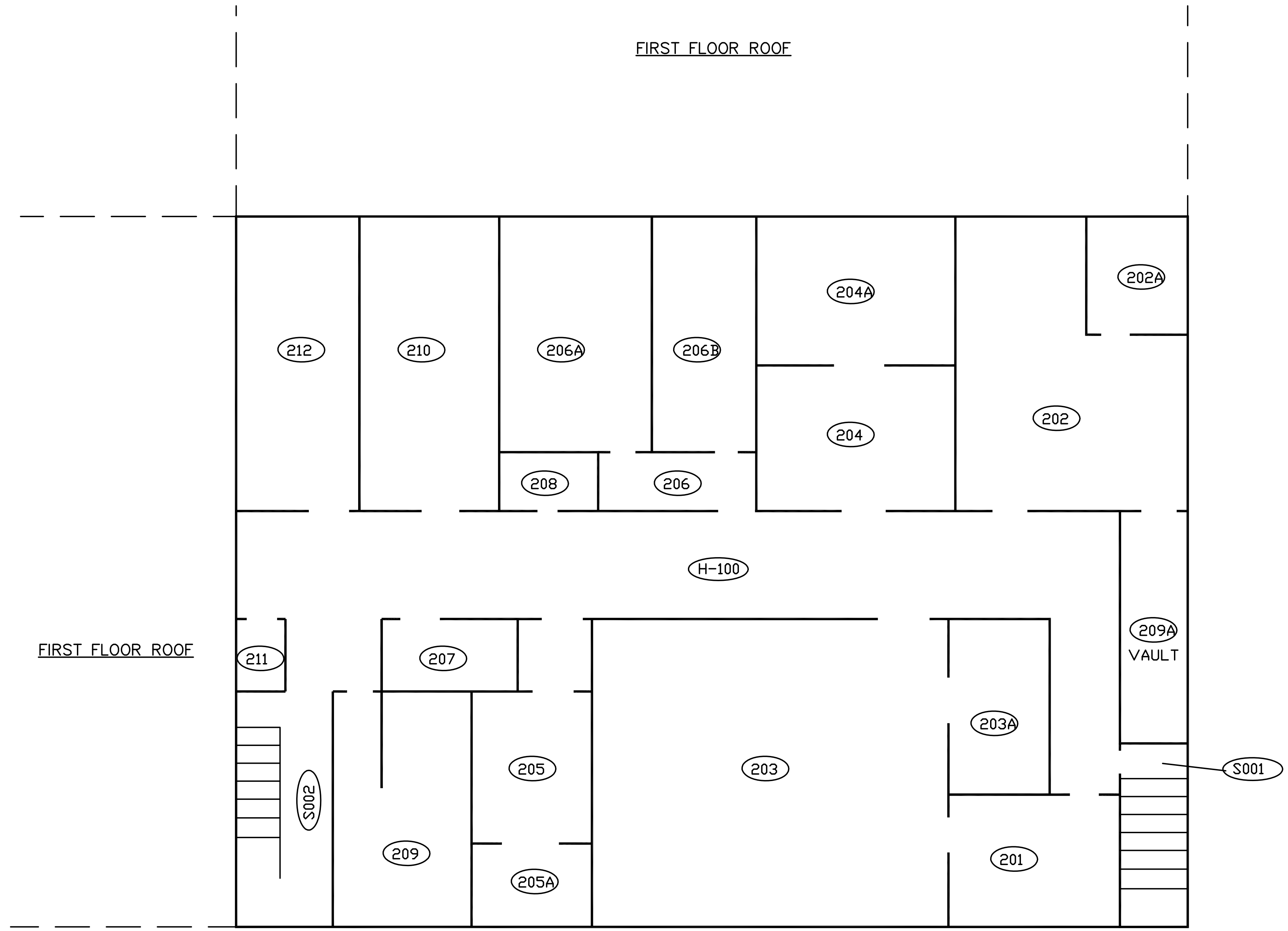
XXX -- Indicates unique room number assigned by inspector

SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 22, FIRST FLOOR
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-
SCALE NONE	DWG NUMBER SBG_NY046-B22.FL1_07-2012	SHEET 12 OF 17	



LEGEND

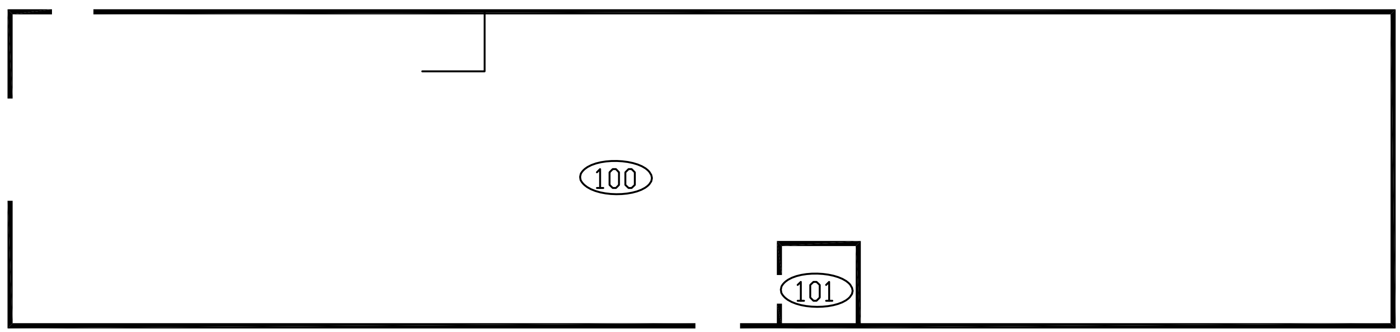
(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 22, SECOND FLOOR
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–
SCALE NONE	DWG NUMBER SBG_NY046-B22.FL2_07-2012	SHEET 13 OF 17	



LEGEND

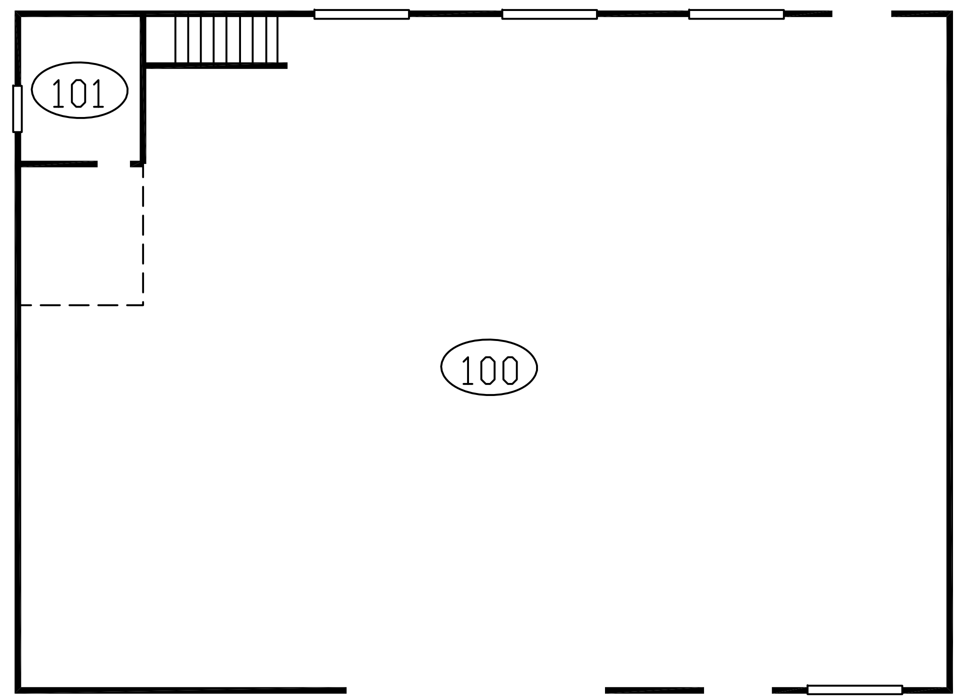
XXX -- Indicates unique room number assigned by inspector

SBG-EEG
7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 23
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B23_07-2012	14 OF 17



LEGEND

(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 25
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	-

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B25_07-2012	15 OF 17

LEGEND

(XXX) -- Indicates unique room number assigned by inspector

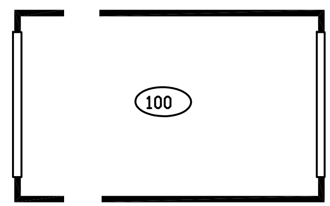
SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
BUILDING 26
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-B26_07-2012	16 OF 17



LEGEND

(XXX) -- Indicates unique room number assigned by inspector

SBG-EEG

7301 RIVERS AVE., SUITE 245
N. CHARLESTON SC 29406-4643
(843) 573-7140

APPENDIX B
ASBESTOS SAMPLE LOCATIONS
GUARDSHACK (GS-1)
ARC NIAGARA FALLS (NY046)
NIAGARA FALLS, NEW YORK

DATE	PREPARED BY	DRAWN BY	REV
AUG 2012	M. MOLTZEN	L. C. DIASIO	–

SCALE	DWG NUMBER	SHEET
NONE	SBG_NY046-GS1_07-2012	17 OF 17

NEW YORK STATE

Commissioner of Motor Vehicles

IDENTIFICATION CARD

ID: 658 606 823 CLASS ID

MOLTZEN
MARK,A
337 MUIRFIELD PKWY
CHARLESTON SC 29414
DOB: 12-18-53
SEX: M EYES: BL HT: 5-09
E: NONE
R: NONE
ISSUED: 09-29-08 EXPIRES: 12-18-12 HAEACPTQ05

EXCELSIOR

Mark A Moltzen

ENCLOSURE 9

REGULATORY/PUBLIC COMMENTS & ARMY RESPONSE

- The Notice of Availability was placed in the newspaper *Buffalo News* and the Draft FOSL was placed at the Niagara Falls Public Library, from December 8 – January 6, 2013 (Enclosure 9).

- The Draft FOST was sent to the New York State Department of Conservation on December 2012. No comments were received.

- The Draft FOST was sent to US EPA on December 8, 2012. No comments were received.

- No Army response required as no comments were received.

THE BUFFALO NEWS

-Affidavit-

Marcy Lombardo of the City of Buffalo, New York, being duly sworn, deposes and says that he/she is Principal Clerk of THE BUFFALO NEWS INC., Publisher of THE BUFFALO NEWS, a newspaper published in said city, that the notice of which the annexed printed slip taken from said newspaper is a copy, was inserted and published therein **2** times, the first insertion being on **12/07/2012** and the last insertion being on **12/08/2012**

Marcy Lombardo

Dates Ad Ran:

Buffalo News (P1) 12/07/12
Buffalo News (P1) 12/08/12

Sworn to before me this 10th day of, December 2012

Lori A. Nieves

Notary Public, Erie County, New York

LORI A. NIEVES
Notary Public, State of New York
Qualified in Erie County
My Commission Expires 05/24/15

Ad ID: 893970

DEPARTMENT OF THE ARMY
HEADQUARTERS, 99TH REGIONAL SUPPORT COMMAND
5231 SOUTH SCOTT PLAZA
FORT DIX, NEW JERSEY 08640-5000

REPLY TO
ATTENTION OF

DEC 0 8 2012

New York Department of Environmental Conservation
John B. Swartwout, P.E.
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7015
(518)402-9620

Mr. Swartwout,

The Department of the Army proposes to lease approximately 19.5 acres from the Niagara Falls United States Army Reserve Center, Niagara Falls, NY to the Town of Niagara Falls for use as office spaces, light industrial use, and other like-use. In compliance with Section 120(h) of the Comprehensive Environmental Response, Compensation and Liability Act, the Army has prepared a draft Finding of Suitability for Lease (FOSL) in support of this project. It is the intent of the Army to sign the FOSL in order to facilitate the property transfer.

The FOSL provides a description of the property to be transferred, identifies the property's suitability for the intended future use, and concludes the property is leasable under 42 U.S.C. Section 9620(h) (Enclosure 1). The FOSL also indentifies the requisite notification and restrictions to protect human health and the environment. An excerpt from the Environmental Conditional of Property Update Report has been included as support to the FOSL (Enclosure 2). All supporting documents are included in the cd provided (Enclosure 3).

Written comments on the FOSL shall be received and considered up to 30 days from the date of this letter and should be directed to: Ms. Laura Dell'Olio via e-mail, laura.dellolio@usar.army.mil or at the following address: 99th RSC, 5231 South Scott Plaza, Fort Dix, NJ, 08640. Hard copies of the draft FOST or supporting documents may also be requested.

Sincerely,

JEFFREY M. HRZIC
Chief, Environmental Division

Enclosures
1. Draft Finding of Suitability to Lease
2. Environmental Condition of Property excerpt
3. CD, supporting documentation

DEPARTMENT OF THE ARMY
HEADQUARTERS, 99TH REGIONAL SUPPORT COMMAND
5231 SOUTH SCOTT PLAZA
FORT DIX, NEW JERSEY 08640-5000

REPLY TO
ATTENTION OF

DEC 0 8 2012

EPA Region 2 Regional Office
John S. Malleck, Chief
Federal Facilities Section, ERRD/SPB
26 Federal Plaza, New York, NY 10278
212-637-4332

Mr. Malleck,

The Department of the Army proposes to lease approximately 19.5 acres from the Niagara Falls United States Army Reserve Center, Niagara Falls, NY to the Town of Niagara Falls for use as office spaces, light industrial use, and other like-use. In compliance with Section 120(h) of the Comprehensive Environmental Response, Compensation and Liability Act, the Army has prepared a draft Finding of Suitability for Lease (FOSL) in support of this project. It is the intent of the Army to sign the FOSL in order to facilitate the property transfer.

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Sincerely,

JEFFREY M. HRZIC
Chief, Environmental Division

Enclosures
1. Draft Finding of Suitability to Lease
2. Environmental Condition of Property excerpt
3. CD, supporting documentation

DEPARTMENT OF THE ARMY
HEADQUARTERS, 99TH REGIONAL SUPPORT COMMAND
5231 SOUTH SCOTT PLAZA
FORT DIX, NEW JERSEY 08640-5000

REPLY TO
ATTENTION OF

Niagara Falls Public Library
Lasalle Branch
8728 Buffalo Avenue
Niagara Falls, NY 14304,
(716) 283-8309

DEC 0 8 2012

To Whom It May Concern,

Thank you for allowing the US Army Reserve, 99th Regional Support Command the opportunity to place the following document in your library's legal notice section.

The Department of the Army proposes to lease approximately 19.5 acres from the Niagara Falls United States Army Reserve Center, Niagara Falls, NY to the Town of Niagara Falls for use as office spaces, light industrial use, and other like-use. In compliance with Section 120(h) of the Comprehensive Environmental Response, Compensation and Liability Act, the Army has prepared a draft Finding of Suitability for Lease (FOSL) in support of this project. It is the intent of the Army to sign the FOSL in order to facilitate the property transfer.

The FOSL provides a description of the property to be transferred, identifies the property's suitability for the intended future use, and concludes the property is leasable under 42 U.S.C. Section 9620(h) (Enclosure 1). The FOSL also indentifies the requisite notification and restrictions to protect human health and the environment. An excerpt from the Environmental Conditional of Property Update Report has been included as support to the FOSL (Enclosure 2). All supporting documents are included in the cd provided (Enclosure 3).

Written comments on the FOSL shall be received and considered up to 30 days from the date of this letter and should be directed to: Ms. Laura Dell'Olio via e-mail, laura.dellolio@usar.army.mil or at the following address: 99th RSC, 5231 South Scott Plaza, Fort Dix, NJ, 08640. Hard copies of the draft FOST or supporting documents may also be requested.

Sincerely,

JEFFREY M. HRZIC
Chief, Environmental Division

Enclosures
1. Draft Finding of Suitability to Lease
2. Environmental Condition of Property excerpt
3. CD, supporting documentation

PARS
Environmental
Inc.

FINAL SUPPLEMENTAL INVESTIGATION REPORT

Niagara Falls Armed Forces Reserve Center
9400 Porter Road
Niagara Falls, NY

Volume I of II

Contract No. GS-10F00094W
Delivery Order No. W912QR-12-F-0316

PREPARED FOR
U.S Army Corps of Engineers-Louisville District
600 Dr. Martin Luther King, Jr. Place
Louisville, KY 40202

PREPARED BY
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PARS PROJECT NO. 773-04D

MARCH 2013

TABLE OF CONTENTS

STATEMENT OF TECHNICAL REVIEW

PARS Environmental, Inc. has completed the Final Site Investigation/Interim Remedial Action Report for the Niagara Falls Armed Forces Reserve Center (AFRC).

Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy, principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures and materials used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results including whether the product meets the customer's needs consistent with the law and existing US Army Corp policy.

Significant concerns and explanation of the resolutions are documented within the project file. As noted above, all concerns resulting from the independent technical review of the project have been considered.

Michael D. Moore, P.G.
Senior Project Manager

3/19/13
Date

Independent Technical Review Team Leader
Thomas P. Dobinson, P.E.

3/19/13
Date

1.0 INTRODUCTION

The United States Corps of Engineers (USACE), Louisville District has retained the services of PARS Environmental, Inc. (PARS) to conduct a supplemental investigation at the Niagara Falls Armed Forces Reserve Center (AFRC).

The AFRC is located at 9400 Porter Road in Niagara Falls, New York, hereinafter the "Site." The Site is currently vacant and most recently was used by the military. Expected future use of the Site will be for commercial or industrial purposes. A Site Location Map and Site Plan are included as Figure 1 and Figure 2, respectively.

The supplemental investigation was performed in accordance with the *Quality Assurance Project Plan/Sampling Plan* (PARS, October 2012).

The purpose of the supplemental investigation was to further evaluate the horizontal extent of groundwater impacts on the eastern portion of the Site. Previous investigation and remediation activities performed at the Site are discussed in Section 2.6.

The following activities were performed as part of the supplemental investigation:

- Completed 13 soil borings and collected soil samples continuously in two-foot depth intervals from ground surface to a depth of about 16 feet below ground surface (bgs).

- Field screened soil samples using an organic vapor meter (OVM) equipped with a photoionization detector (PID).

- Selected two (2) soil samples from the 13 soil borings for laboratory analysis based on OVM readings. Sample analysis included Target Compound List (TCL) volatile organic compounds (VOCs) using USEPA Method 8260, TCL semi-volatile organic compounds (SVOCs) using USEPA Method 8270 and polychlorinated biphenyls (PCBs) using USEPA Method 8082.

- Installed seven (7) permanent monitoring wells and six (6) temporary well points at the soil boring locations.

- Collected groundwater samples from the permanent monitoring wells and temporary well points. Groundwater samples were analyzed for TCL VOCs using USEPA 8260, TLC SVOCs using USEPA Method 8270 and PCBs using USEPA Method 8082.

This report presents field observations, results and conclusions of the supplemental investigation based on the scope of work developed by the USACE, Louisville District as outlined in the *Quality Assurance Project Plan/Sampling Plan*.

2.0 BACKGROUND

2.1 SITE SETTING

The Site is an approximate 19.5 acre parcel located on the southern portion of Niagara Township, Niagara Falls, Niagara County, New York (see Figure 1).

The Site is bound to the south by Porter Road. South of Porter Road is undeveloped forested land. Niagara Falls International Airport is located immediately north and east of the Site; and Cayuga Creek is located adjacently to the west. Properties in the vicinity of the Site are used primarily for commercial purposes.

2.2 TOPOGRAPHY AND DRAINAGE

Site topography was based on the USGS 7.5-minute Tonawanda West (1980) topographic map. Topography at the Site is relatively flat with a slight gradient to the west/southwest. The elevation at the Site is approximately 575 feet above mean sea level.

Surface and storm water drainage is directed to Cayuga Creek located immediately west of the Site. Cayuga Creek is a tributary of the Niagara River, which is located south of the Site.

2.3 REGIONAL GEOLOGY

The Site is located in the Erie-Ontario Lowlands Physiographic Province. The region is characterized by relatively flat topography and dissected by the east-west trending Niagara Escarpment, which is located about five (5) miles north of the Site.

The Niagara Falls area is underlain by glacial deposits consisting mainly of till and lacustrine silt and clay, approximately 5 to 80 feet thick. The glacial deposits overlay weathered dolomite and limestone of the Lockport Group (Niagara Series of Middle Silurian age). The Lockport Group is underlain by approximately 100 feet of shale and limestone (Clinton Group), which is underlain by about 110 feet of sandstone and shale (Medina Group).

Soils encountered during the previous investigations consisted of non-cohesive fill from ground surface to approximately 4 feet below ground surface (bgs). Fill material at some locations extended to approximate depths ranging from 8 to 13 feet bgs. The fill material encountered was a mixture of sand and gravel with varying amounts of silt, clay, brick, slag, concrete, rebar, asphalt and wood. Native soils encountered below the fill are comprised of silty clay with trace amounts of fine sand. Investigations were not completed beyond 13 feet bgs during previous activities.

2.4 HYDROGEOLOGY

Below the fill material, the Site is underlain by the Lakemont silty clay loam and the Fonda mucky silt loam. Both soil types are fine to moderately fine-textured and have a low permeability. These soils are subject to ponding and the water table in the vicinity of the Site is at a depth of less than four feet bgs (*Environmental Condition of Property Report*, CH2MHill, June 2007).

The glacial deposits act as a confining unit for the weathered bedrock below. The hydraulic properties in the Lockport dolomite and limestone are related to secondary porosity and permeability due to the presence of fractures and solutioning. The main water-bearing zones in the Lockport Group are the weathered bedrock surface and horizontal fracture zones near stratigraphic contacts. The rock matrix transmits negligible amounts of groundwater because primary porosity is very low.

Data collected during previous investigations (see Section 2.6) indicates that apparent perched groundwater conditions exist at depths ranging from 2 to 6 feet bgs within the coarse-grained fill material overlying the less-permeable native fine-grained clay.

2.5 HISTORY OF OPERATIONS

The United States Government acquired the Site in 1955 and the United States Navy used it to service helicopters and airplanes. Most of the buildings were constructed by 1956. The Army obtained the Site from the Navy in 1962, and from 1970 to 1975, it was used to service Nike Missiles from missile batteries from around New York State.

The Site is currently vacant and was most recently occupied by the 277th Quartermaster Company, the 865th Combat Support Hospital, the 1982nd Forward Surgical Unit and Area Maintenance Support Activity 76. A small presence was also maintained by personnel of the Department of Public Works (DPW), Fort Drum, New York (*Environmental Condition of Property Report*, CH2MHill, June 2007).

2.6 PREVIOUS INVESTIGATIONS

June 2008 Investigation

A yellow substance was observed discharging from the 24-inch diameter corrugated storm sewer at outfall (Outfall No. 5) into the drainage swale at the southeast corner of the Site. An investigation was performed by United States Army Reserve (USAR) in 2008.

The New York State Department of Environmental Conservation (NYSDEC) was notified on June 24, 2008 and Spill # 0803478 was assigned for the discharge. Product was observed discharging from the 6-inch diameter cast iron fire protection main into the 24-inch diameter corrugated storm sewer and the 6-inch line was capped. The drain valve for the 6-inch line was uncovered and dislodged during the June 2008 investigation. After dislodging the valve, product was observed in the excavated hole. A sample was collected and the product was identified as diesel fuel. Low concentrations of PCBs were detected in the sample.

As part of the investigation, a sediment sample was collected from the 24-inch diameter storm sewer adjacent to the cast iron pipe and a sample of the yellow substance from the drainage swale. The sample results revealed that the sediment in the pipe and the yellow substance present in the swale contained detectable levels of PCBs.

Storm Sewer and Drainage Swale Investigation/Remediation August/September 2009

The USACE and the USAR 99th Regional Support Command (99th RSC) retained the services of PARS to investigate and remediate the drainage swale at Outfall No. 5. The 24-inch diameter storm sewer was cleaned and approximately 134 tons of PCB impacted soil was excavated from the drainage swale as part of the remedial action.

PCB concentrations in the post-excavation soil samples from the drainage swale were below the maximum contaminant level of 1 milligram per kilogram (mg/kg) that was established by the NYSDEC. Investigation and remediation activities are outlined in the *Remedial Action Report* (PARS, March 2010).

Site Inspection November/December 2010
Six underground storage tanks (USTs) were reportedly present along the eastern and western sides of former Building 2. A vehicle fueling area was also located immediately west of the building. No documentation was available regarding the closure of the USTs and fueling area.

In November and December 2010, PARS conducted a site inspection to evaluate potential impacts associated with the former USTs and fueling station at Building 2 and the fire protection main. Inspection activities consisted of a geophysical survey, exploratory excavations and soil and water sampling. The findings of the site inspection are outlined in the *Site Inspection Report* (PARS, June 2011).

The geophysical survey noted three anomalies that were identified as debris associated with former Building 2. An approximate 150-foot long linear anomaly was identified in the general vicinity of the fire protection main that terminates at the 24-inch diameter corrugated storm sewer line. No anomalies consistent with USTs were identified.

Twelve exploratory excavations (TP-1 through TP-12) were completed based on the geophysical survey, previous investigations and field observations. A soil sample collected from TP-1 identified several SVOCs at concentrations exceeding the NYSDEC Unrestricted and Restricted Use Soil Cleanup Objectives.

The 6-inch diameter cast iron fire protection water main was encountered in six exploratory excavations (TP-2, TP-3, TP-4, TP-11 and TP-12). At TP-11, the 6-inch diameter pipe terminated at a concrete catch basin which was uncovered and presumed to be the former 500,000-gallon reservoir drain. A sample collected from water flowing from the 6-inch diameter pipe into the concrete catch basin contained toluene, naphthalene, PCBs and chromium at concentrations exceeding the NYSDEC Class GA Objectives.

Petroleum product and a heavy sheen were observed within the fill material and on the groundwater surface at exploratory excavation, TP-12. Several SVOCs and PCBs, were detected in a water sample collected from TP-12 at concentrations exceeding the NYSDEC Class GA Objectives. A drum vacuum was used to remove impacted water. Six (6) 55-gallon drums of petroleum impacted water from the excavation were properly disposed of off-site.

Twenty-one (21) soil borings were completed as part of the site inspection. One soil sample was collected from each boring for laboratory analysis. Acetone, metals and PCBs were detected in several samples at concentrations exceeding the Unrestricted Use Soil Cleanup Objectives.

It was recommended that an investigation to further evaluate soil and groundwater impacts in the vicinity of the former USTs at Building 2 and fire protection main be completed. It was also recommended that the residual petroleum product observed within the fill material at TP-12 be removed as an interim remedial action (IRA) because of the close proximity of the product to the 24-inch corrugated metal storm sewer line.

Remedial Investigation/Interim Remedial Action, September 2011
In September 2011, PARS conducted a remedial investigation of soil and groundwater in the vicinity of the six (6) former USTs, former vehicle fueling area and the cast iron fire protection main that discharges to a 24-inch corrugated metal storm sewer line on the eastern boundary of the Site. As part of this work, 30 soil borings (16 primary and 14 secondary) were completed to collect soil and groundwater samples.

An IRA in the area of the fire protection main and former TP-12 involved the excavation and off-site disposal of approximately 20 tons of soil and removal of 1,600 gallons of groundwater to remediate residual product observed on the groundwater within the excavation area. An approximate 8-foot long section of the 6-inch diameter cast iron fire protection main was removed during excavation activities. Caps were placed on the pipe ends remaining in the ground prior to backfill.

Based on the findings of the remedial investigation, a human health risk assessment (HHRA) was performed. The objective of the HHRA was to evaluate potential risks to human health under current and reasonably foreseeable future conditions. The risk assessment was completed in accordance with the regulations and guidelines set forth by the USEPA and the USACE. Under current or future conditions, the commercial/industrial and construction worker exposures to the individual subsurface soil pathways do not pose an unacceptable risk for carcinogens. However, the construction workers total potential exposure to groundwater is slightly above the USEPA acceptable carcinogenic risk range of greater than 1.0E-4 to 1.0E-6.

A feasibility study/remedial action alternatives evaluation was also performed to evaluate remediation at the Site. Potential remedial alternatives were evaluated based on the remedial action objectivities (RAOs) for the Site and criteria set forth in the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (May 2010). It was determined that a Site Management Plan would satisfy the RAOs based on the findings of the HHRA and the feasibility study/remedial alternatives evaluation.

A final RI/IRA/HHRA/FS Report was submitted to NYSDEC in April 2012. NYSDEC approved the final report in a letter dated April 23, 2012.

3.0 SOIL INVESTIGATION

3.1 SOIL BORING/SAMPLING METHODS

Thirteen (13) soil borings (MW-1 through MW-7 and TW-1 through TW-6) were completed between November 5 and November 13, 2012 using a Diedrich D-50 track-mounted rotary drill rig equipped with 4 ¼ inch inside diameter hollow stem augers (HSAs). Prior to initiating the field activities, Dig Safe New York was contacted to locate the underground utilities in the public right-of-way.

Overburden soil samples were obtained by driving a 1-3/8 inch inside diameter by 24-inch long split spoon sampler 24-inches ahead of the lead cutting shoe of the HSAs. The HSAs were advanced to approximately 16 feet bgs or auger refusal, whichever occured first. Soil samples from the borings were collected from the split spoon sampler and opened at ground surface after retrieval. Auger spoils were containerized in 55-gallon drums for disposal.

The subsurface soil conditions generally consisted of various non-cohesive fill materials (sand and gravel with varying amounts of fine-grained silt, clay, and slag) overlying cohesive native soils (fine-grained clay soil with varying amounts of silt and sand). The fill materials were encountered from ground surface to depths ranging from about 0.5 feet to 3.5 feet bgs. Fill material was not encountered at three locations (TW-4, MW-2 and MW-4).

Material recovered in the split spoon sampler was field screened for total organic vapors using an OVM (MiniRAE 3000) equipped with a PID and a 10.6 eV ultraviolet lamp. The OVM was calibrated daily in accordance with manufacturer's recommendations using a gas standard of isobutylene at a concentration of 100 parts per million (ppm). Ambient air at the Site was used to establish background organic vapor concentrations.

Following field screening, representative portions of the recovered soils were placed in zip-lock bags for further classification and headspace analysis. The headspace in the bag above each collected soil sample was screened for total organic vapors. With the exception of headspace sample results at MW-5 (ranging from 0.8 to 37.5 ppm), total organic vapor concentrations were non-detect.

Soil boring logs were prepared summarizing the general subsurface conditions that were observed and encountered at each probe location. These logs are based on visual observations of the recovered soils and include a summary description of the soils using color and composition. Soil probe logs, including sample headspace results, are presented as Appendix A. Boring locations are depicted in Figure 3.

Two (2) soil samples were collected from MW-5 for laboratory analysis based on the recorded headspace readings. The samples were analyzed for TCL VOCs using USEPA Method 8260, TCL SVOCs using USEPA Method 8270 and PCBs using USEPA Method 8082. Due to insufficient recovery at 2 to 4 feet (10%) and 4 to 6 feet (10%), these intervals were combined into one sample for SVOCs and PCBs analysis. The majority of the recovered soil from the 4 to 6 foot depth interval was used for the collection of the sample for VOC analysis.

The samples were packed in ice-filled cooler and hand delivered to TestAmerica Laboratories in Amherst, New York using proper chain-of-custody procedures. Table 1 presents a summary of the samples collected and the analysis completed.

3.2 SOIL ANALYTICAL RESULTS

Soil analytical results were compared to NYSDEC, 6 NYCRR, Subpart 375-6, Unrestricted Soil Cleanup Objectives (USCOs), effective December 14, 2006.

No compounds were detected in the two soil samples at concentrations above the applicable USCO. Three VOCs (benzene, toluene, and total xylenes) were detected in soil sample MW-5, 4 to 6 feet bgs at concentrations above the laboratory method detection limits (MDLs).

Nine SVOCs were detected at concentrations above MDLs in soil sample MW-5, 2 to 6 feet bgs.

PCBs were not detected above MDLs in the two soil samples.

Soil analytical results are summarized in Table 2 and the corresponding laboratory reports are included in Volume II.

4.0 GROUNDWATER INVESTIGATION

4.1 PERMANENT MONITORING WELL INSTALLATION

Seven (7) soil boring locations were converted to permanent groundwater monitoring wells (MW-1 through MW-7). These permanent wells are located along the southern and eastern property lines. The locations of the wells are depicted in Figure 3.

The wells were constructed of 2-inch inner diameter flush coupled PVC riser and screen. The screen consisted of machine slot (10-slot) PVC that varied in length from 5 to 10 feet. A sand filter was placed in the boring around the annulus space of the well screen and extended a minimum of 1 foot above the top of the screen. An approximate 3-foot thick layer of bentonite was placed above the sand filter and was hydrated to provide a seal from the overburden conditions above the screened interval. A mixture of cement/bentonite grout extended from the bentonite seal to approximately 1-foot bgs. The monitoring wells were completed by placing a flush mounted road box over the riser. Concrete was placed in the boring around the box and sloped away from the monitoring well.

Groundwater was measured at depths ranging from approximately 7.4 feet bgs at MW-1 to 16 feet bgs at MW-4. Groundwater was not present in MW-5 following installation. All monitoring wells, with the exception of MW-5, were developed after installation. MW-7 had groundwater at 9.90 feet below the top of riser prior to development. The well was consequently developed and went dry. No groundwater was present in MW-7 on November 20, 2012.

4.2 TEMPORARY WELL POINT INSTALLATION

Three of the temporary monitoring wells were designated as “primary” locations (TW-1 through TW-3) and three were designated as “secondary” locations (TW-4 through TW-6). The temporary monitoring points are shown on Figure 3.

The temporary well points were constructed by placing 2-inch diameter (PVC) well riser and screen into the soil boring. The well screen (10-slot) lengths ranged from 5 to 10 feet. With the exception of TW-5, a sand pack and bentonite seal were not installed at the temporary well locations.

TW-5 was installed with a sand filter (9.5’ to 15.8’ bgs) and a bentonite seal (7.5’ to 9.5’ bgs). Perched groundwater from the gravel and sand fill material was observed flowing into the borehole during drilling at (0.5 to 3.5 feet bgs). The sand filter and bentonite seal were installed at this location to provide a seal from the overburden conditions above the screen interval.

Groundwater was not present in TW-6 after installation. All temporary well points, with the exception of TW-6, were developed.

The temporary well points were removed following groundwater sampling. The well points were removed and the boreholes were backfilled with auger spoils from that location. The ground surface was restored using asphalt-patch.

4.3 GROUNDWATER SAMPLING METHODS

Groundwater samples were collected in general accordance with USEPA *Low-Flow Groundwater Sampling Procedures* (April 1996). The static water level was measured from the top of the monitoring well riser prior to the start of the monitoring and purge event. Polyethylene tubing was lowered into the wells and positioned at the approximate center of the well screen intake zone and connected to the peristaltic pump.

The peristaltic pump, in conjunction with a water quality meter and flow-through cell, was started and operated at a flow rate that minimizes draw down of the water column within the well. Readings were recorded every two to three minutes using a water quality meter until water quality readings stabilize for three successive readings. Once the water quality readings had stabilized and at least one well volume was removed, groundwater analytical samples were collected for laboratory analysis. The polyethylene tubing from the peristaltic pump to the water quality meter was disconnected from the input to the water quality meter and used to fill the appropriate groundwater sample containers. Groundwater sampling logs are included in Appendix B.

Temporary well points were sampled on November 7 and 8, 2012. No groundwater was present in TP-6 and the monitoring point could not be sampled.

MW-1, -2, -3, -4 and -6 were sampled on November 19 and 20, 2012. MW-5 went dry during purging and was allowed to recharge prior to sampling. The sample for VOC analysis was collected from MW-5 on November 20, 2012. MW-5 went dry after the collection of this sample and was subsequently sampled for SVOCs and PCBs on November 20 and 26, 2012. MW-7 did not contain a sufficient volume of groundwater and could not be sampled.

Groundwater samples were analyzed for TCL VOCs using USEPA Method 8260, TCL SVOCs using USEPA Method 8270 and PCBs using USEPA Method 8082. The groundwater samples from the secondary temporary monitoring wells were submitted to the laboratory and placed on hold pending the results of the primary wells. The samples from the secondary temporary wells were than analyzed for TCL VOCs, TCL SVOCs, and PCBs based on the results of the primary locations.

The samples were packed in ice-filled cooler and delivered hand delivered to TestAmerica Laboratories in Amherst, New York using proper chain-of-custody procedures. Table 1 presents a summary of the samples collected and the analysis completed.

Water generated during purging was placed in 55-gallon drum for disposal.

4.4 GROUNDWATER ANALYTICAL RESULTS

Groundwater analytical results were compared to NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations dated October 1993; Revised June 1998; ERRATA Sheet dated January 1999; and Addendum dated April 2000 (Class GA criteria).

Benzene, was detected at a concentration of 1.6 microgram per liter (µg/l) in the sample from TW-1, which slightly exceeding its respective Class GA criteria of 1.0 µg/l. Trichloroethene (TCE) was detected at a concentration of 7.8 µg/l in the sample from TW-5, which slightly exceeded its respective Class GA criteria of 5.0 µg/l. No other VOCs were detected at concentrations above the applicable Class GA criteria.

No SVOCs were detected in the groundwater samples at concentrations above the applicable Class GA criteria and PCBs were not detected in any of the groundwater samples above the laboratory MDLs.

Groundwater analytical results are summarized in Table 3 and the corresponding laboratory reports are included in Volume II.

5.0 QUALITY CONTROL/QUALITY ASSURANCE

5.1 ANALYTICAL METHODS, PROCEDURES & CALIBRATION

Soil and groundwater samples were collected for laboratory analysis as part of the project.

Laboratory analyses were performed by Test America Laboratories in Amherst, New York (NY Certification # NY455). Samples were analyzed for TCL VOCs, TCL SVOCs and PCBs in accordance with USEPA methods. Analytical methods are summarized in Table 1.

Laboratory instruments and equipment were calibrated following SW-846 analytical method protocols. Initial calibrations and calibration checks were performed at a frequency specified in each analytical method.

Method blanks and instrument blanks were used by the laboratory to evaluate data quality. The purpose of the method blank is to assess contamination introduced during sample preparation. Method blanks are prepared and analyzed in the same manner as the field samples. Instrument blanks are analyzed with field samples to assess the presence or absence of instrument contamination. The frequency of instrument blanks is defined by the analytical method. The laboratory reports provided by Test America Laboratories are included in Volume II. The laboratory reports were prepared in accordance with the New York Analytical Services Protocol (Category B deliverable)

Data summaries, included in the laboratory reports, were reviewed to evaluate data quality. Based on a review of the summaries, it was concluded that laboratory data generated for the investigation is valid.

5.2 FIELD QUALITY CONTROL

Field quality control and quality assurance procedures outlined in the *Quality Assurance Project Plan/Sampling Plan* (PARS, October 2012) were implemented as part of the project. These procedures included field calibration of equipment, field decontamination of equipment and sample management.

An OVM was used to field screen soils for total organic vapors. The OVM was calibrated daily in accordance with manufacturer specifications using a gas standard of isobutylene at an equivalent concentration of 100 parts per million. Ambient air was used to establish background organic vapor concentrations.

Samples were collected in laboratory grade sample containers. The samples were immediately transferred to insulated coolers provided by the laboratory. A chain-of-custody form was used to trace the path of sample containers from the Site to the laboratory.

A quality control field blank (rinsate blank) was collected for soil and groundwater samples collected as part of the supplemental investigation. The field blanks were collected by passing analyte-free water through the sampling equipment into sample containers. The field blanks were analyzed for TCL VOCs, TCL SVOCs and PCBs. Field blanks were used to evaluate potential field contamination of the samples collected as part of the investigation. No compounds were detected in the field blanks at concentrations above the laboratory MDLs.

Quality control trip blanks were prepared by the laboratory and accompanied the sample coolers to and from the Site. The purpose of the trip blanks was to evaluate potential laboratory contamination of the samples. Trip blanks were analyzed for TCL VOCs and no compounds were detected at concentrations above the laboratory MDLs.

One field duplicate groundwater sample was collected to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. The field duplicate sample was collected by alternately filling the sample containers. The contaminants and contaminant concentrations were comparable for the split samples.

Field quality control analytical results are included in Volume II.

6.0 CONCLUSIONS

The USACE, Louisville District retained PARS to conduct a supplemental investigation at the AFRC located at 9400 Porter Road in Niagara Falls, New York. The purpose of the supplemental investigation was to further evaluate the horizontal extent of groundwater impacts on the eastern portion of the Site. Investigation activities were performed in accordance with the *Quality Assurance Project Plan/Sampling Plan* (PARS, October 2012).

The following is a summary of the findings of the investigation:

- Completed 13 soil borings and collect soil samples continuously in two-foot depth intervals from ground surface to a depth of about 16 feet bgs.
- Soil samples were screened using an OVM equipped with a PID. Total organic vapor concentrations were non-detect in the headspace screening of the soil samples collected during the investigation with the exception of MW-5. The headspace results at MW-5 were 0.9 ppm from 2 to 4 feet, 37.5 ppm from 4 to 6 feet and 0.8 ppm from 6 to 8 feet.
- Based on the OVM readings, two soil samples from MW-5 were selected for laboratory analysis. Sample analysis included TCL VOCs, TCL SVOCs and PCBs. No VOCs or SVOCs were detected above their respective USCOs and no PCBs were detected above the laboratory MDLs.
- Seven (7) permanent monitoring wells and six (6) temporary well points were installed at the soil boring locations.
- Groundwater samples from the permanent monitoring wells and temporary well points were collected and analyzed for TCL VOCs, TLC SVOCs and PCBs. Samples were not collected from TW-6 or MW-7 because of insufficient volumes of water.
- Benzene was detected in the groundwater sample from TW-1 and TCE was detected in the sample from TW-5 at concentration slightly above their respective Class GA criteria. No other compounds were detected above their respective Class GA criteria.

On January 18, 2013, the USAR provided the results of the supplemental investigation via email to Mr. Chek Beng Ng of the NYSDEC, Division of Environmental Remediation. Mr. Chek responded on January 25, 2013 stating that the newly defined boundary for the land use control (LUC) for the Site is acceptable. He also stated that because the TCE hit was slightly above the criteria, the LUC would be sufficient to provide health and environmental protection in the event of earthwork/construction. The LUC boundary was confirmed with Mr. Ng in an email dated March 11, 2013. Copies of the email correspondence between the USAR and NYSDEC are included in Appendix C. Additionally, a map depicting the proposed boundary of the land use control is included in Figure 4.

Based on the correspondence with the NYSDEC, the USAR proposes no additional investigation at the Site. As outlined in the RI/IRA/HHRA/FS Report approved by NYSDEC on April 23, 2012, a Site Management Plan is required to limit exposure to construction workers at the Site. Note that exposure to TCE in groundwater was not evaluated as part of the HHRA.

7.0 REFERENCES

NYSDEC Division of Water Technical and Operational Guidance Series 2000. *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.* Dated October 1993, Revised June 1998, ERRATA Sheet dated January 1999 and addendum dated April 2000

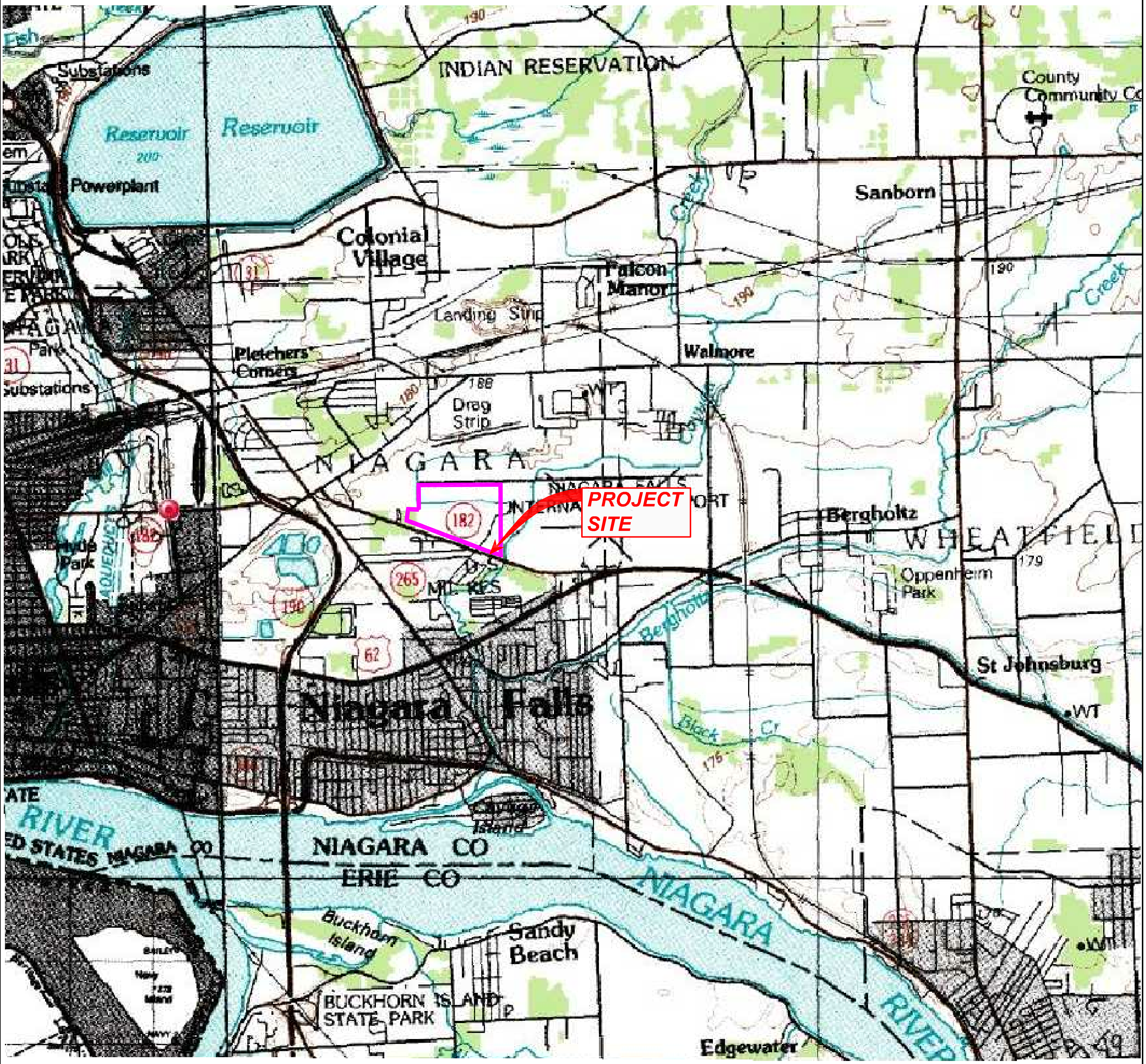
Quality Assurance Project Plan/Sampling Plan, Niagara Falls Armed Forces Reserve Center, Niagara Falls, New York. PARS Environmental, Inc., October 2012

Remedial Investigation/ Interim Remedial Action/Human Health Risk Assessment/ Feasibility Study, PARS Environmental, Inc., April 2012

Site Inspection Report, PARS Environmental, Inc., June 2011

Remedial Action Report, PARS Environmental, Inc. March 2010)

FIGURES



0 500 1000 2000

SCALE IN FEET

N

W E

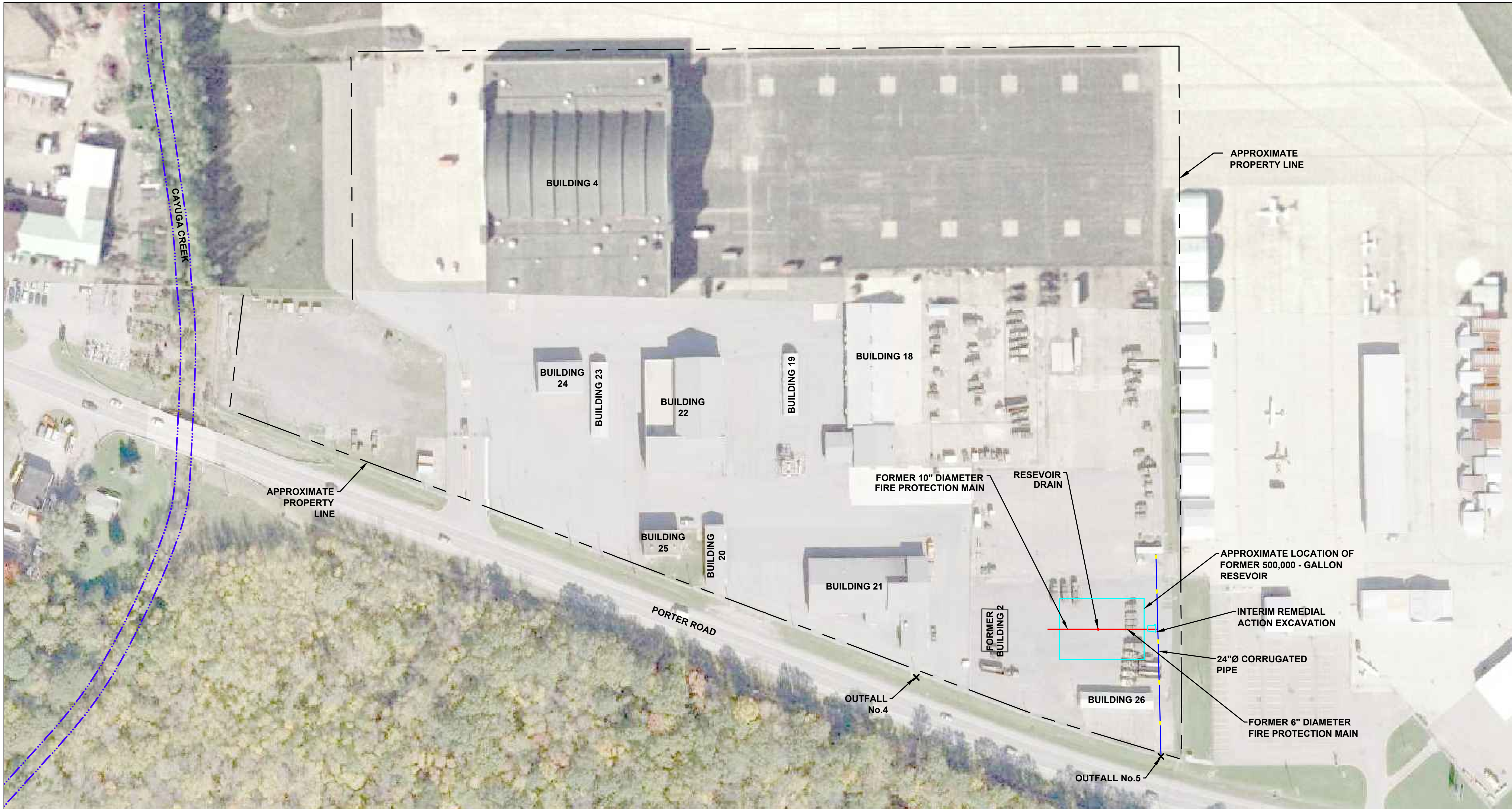
S

NOTE:
BASE MAP ADAPTED FROM U.S.G.S. TOPOGRAPHIC MAPS DOWNLOADED FROM TERRASERVER.MICROSOFT.COM

FIGURE 1
SITE LOCATION MAP
USAFRC
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: KN	SCALE: 1" = 2,000'	JOB No.: 773-04
CK'D. BY: MM	DATE: 1/10/10	FILE NO.: 773-04
REV. NO. -	REV. DATE: -	FIGURE NO.:1



LEGEND:

- MW-6 ● MONITORING WELL LOCATION
- TW-3 ● PRIMARY TEMPORARY WELL LOCATION
- TW-6 ● SECONDARY TEMPORARY WELL LOCATION
- SP-51 SOIL PROBE LOCATION (SEPT. 2011)
- SP-36 SOIL PROBE AND TEMPORARY WELL LOCATION (SEPT. 2011)

NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/l AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

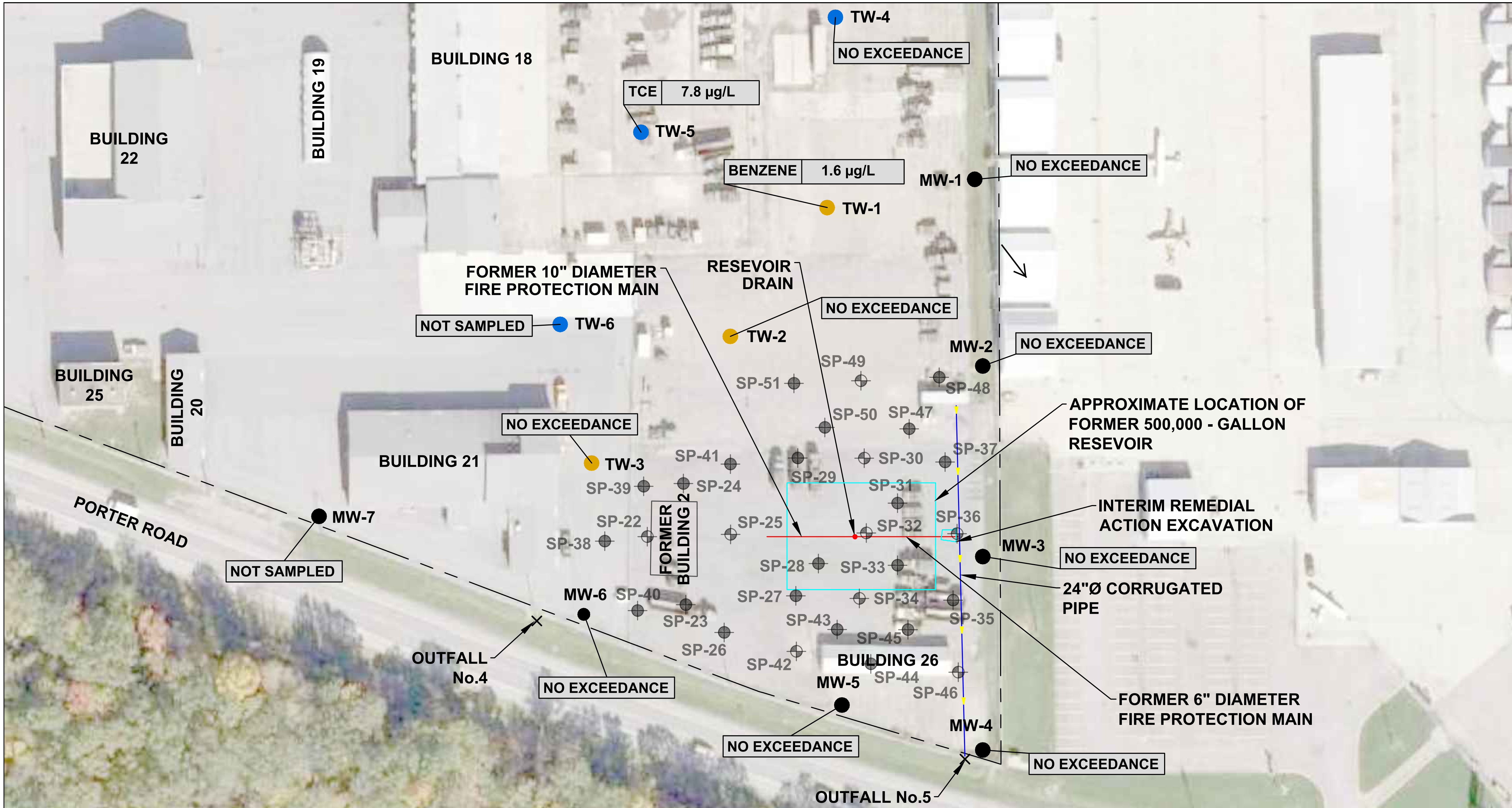
SCALE IN FEET

40 0 70 140

FIGURE 2
SITE PLAN
USAFRC
NIAGARA FALLS, NY

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: AS SHOWN	JOB No.: 773-04
CK'D. BY: MM	DATE: 1/9/13	FILE ID.: 773-04
REV. NO. --	REV. DATE: --	FIGURE NO.: 2



LEGEND:

MW-6 ●	MONITORING WELL LOCATION
TW-3 ●	PRIMARY TEMPORARY WELL LOCATION
TW-6 ●	SECONDARY TEMPORARY WELL LOCATION
SP-51 ⊕	SOIL PROBE LOCATION (SEPT. 2011)
SP-36 ⊕	SOIL PROBE AND TEMPORARY WELL LOCATION (SEPT. 2011)

NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/l AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

3. ONLY COMPOUNDS THAT EXCEED THE GROUNDWATER CLASS GA CRITERIA ARE SHOWN.

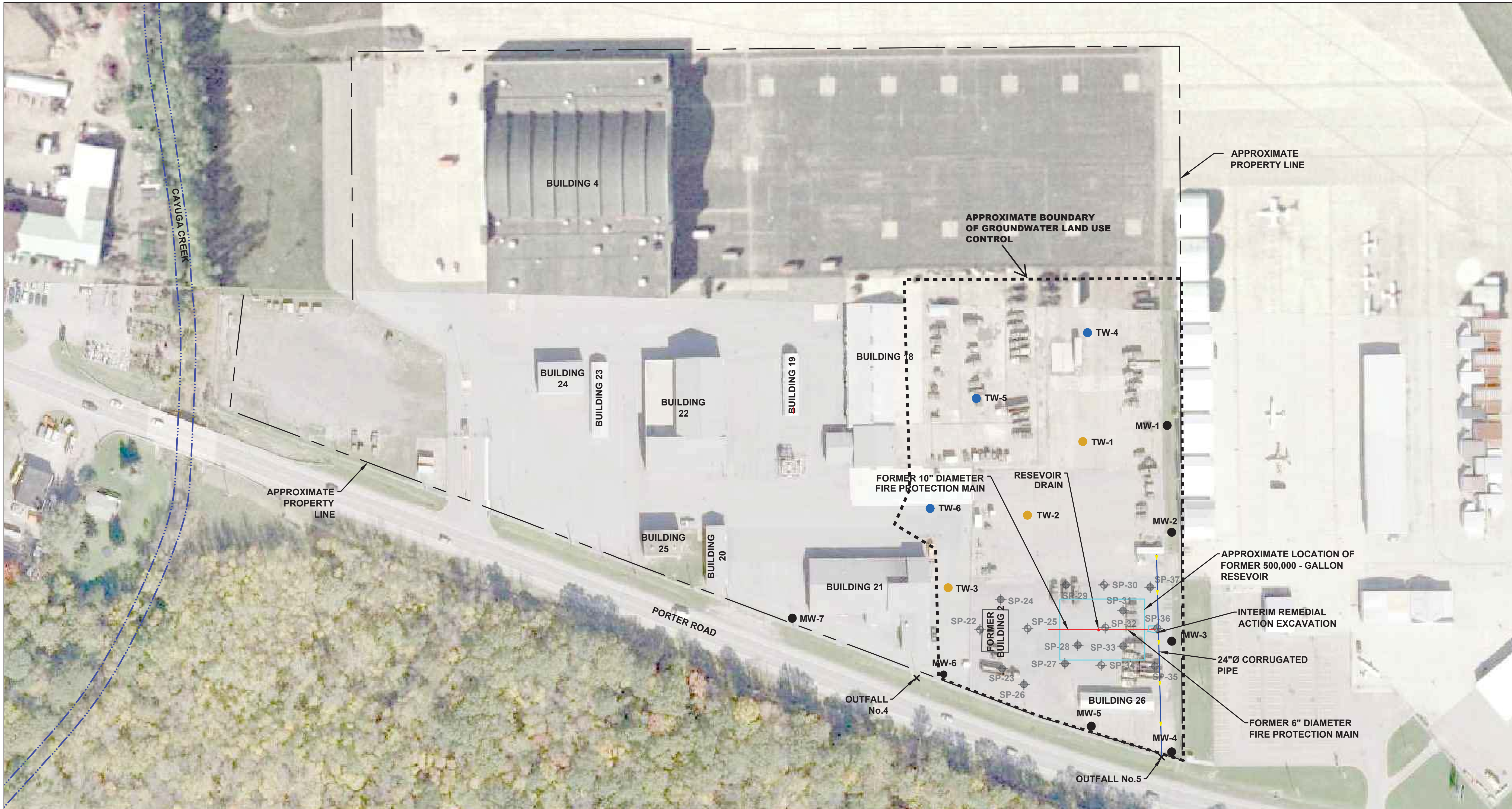
4. TW-6 AND MW-7 DID NOT CONTAIN A SUFFICIENT VOLUME OF WATER FOR SAMPLING.

SCALE IN FEET
20 0 40 80

FIGURE 3
SAMPLE LOCATION/GROUNDWATER CONCENTRATION MAP
USAFRC
NIAGARA FALLS, NY

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: AS SHOWN	JOB No.: 773-04
CK'D. BY: MM	DATE: 2/13/13	FILE ID.: 773-04
REV. NO. --	REV. DATE: --	FIGURE NO.: 3



LEGEND:

- MW-6 — MONITORING WELL LOCATION
- TW-3 — PRIMARY TEMPORARY WELL LOCATION
- TW-6 — SECONDARY TEMPORARY WELL LOCATION
- SP-51 — SOIL PROBE LOCATION (SEPT. 2011)
- SP-36 — SOIL PROBE AND TEMPORARY WELL LOCATION (SEPT. 2011)

NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/l AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

SCALE IN FEET

40 0 70 140

FIGURE 4
PROPOSED GROUNDWATER LAND USE CONTROL
USAFRC
NIAGARA FALLS, NY

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: AS SHOWN	JOB No.: 773-04
CK'D. BY: MM	DATE: 1/9/13	FILE ID.: 773-04
REV. NO. --	REV. DATE: --	FIGURE NO.: 4

TABLES

Table 1
Analytical Sample Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Sample Identification	Date Collected	VOCs EPA Method 8260-TCL	SVOCs EPA Method 8270 - TCL	PCBs EPA Method 8082	Waste Characterization Sample
Soil Samples					
MW-5-4-6	11/13/2012	X			
MW-5-2-6	11/13/2012		X	X	
Drum Characterization Sample	11/20/2012				X[6]
Groundwater Samples					
TW-1	11/7/2012	X	X	X	
TW-2	11/7/2012	X	X	X	
TW-3	11/7/2012	X	X	X	
TW-4	11/8/2012	X	X	X	
TW-5	11/8/2012	X	X	X	
MW-1	11/19/2012	X	X	X	
MW-2	11/19/2012	X	X	X	
MW-3	11/19/2012	X	X	X	
MW-4	11/19/2012; 11/20/2012	X	X	X	
MW-5	11/20/2012	X	X	X	
MW-6	11/20/2012; 11/21/2012; 11/26/2012	X	X	X	

Notes:
1. MW-5-4-6 = (MW-5), location of sample; (4-6) depth of sample below ground surface. MW = monitoring well.
2. VOCs = Volatile Organic Compounds
3. SVOCs = Semi-Volatile Organic Compounds
4. TCL = Target Compound List
5. PCBs = Polychlorinated Biphenyls
6. Waste characterization sample (Drum Characterization Sample) was analyzed for the following parameters:
   Toxicity Characteristic Leachate Procedure (TCLP) VOCs, SVOCs, RCRA Metals; and PCBs.

TABLE 2

Soil Analytical Testing Results Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Commmercial Soil Cleanup Objectives	MW-5-4-6 Result	MW-5-2-6 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)				
Benzene	**60**	44,000	8.9	NT
Toluene	**700**	500,000	2.0 J	NT
Xylenes, Total	**260**	500,000	1.1 J	NT
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)				
Phenanthrene	**100,000**	500,000	NT	6.1 J
Anthracene	**100,000**	500,000	NT	
Fluoranthene	**100,000**	500,000	NT	9.8 J
Pyrene	**100,000**	500,000	NT	9.8 J
Bis(2-ethylhexyl)phthalate	**50,000** [9]	NV	NT	110 J
Acetophenone	**NV**	NV	NT	130 J
Chrysene	**1,000**	56,000	NT	7.8 J
Benzo(a)pyrene	**1,000**	1,000	NT	110 J
Benzo(b)fluoranthene	**1,000**	5,600	NT	150 J
Benzo(k)fluoranthene	**800**	56,000	NT	9.8 J
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)				
Aroclor 1254	**NV**	NV	<	<
Aroclor 1260	**NV**	NV	<	<
Total PCBs	**100***	1,000*		

Notes:
1. Compounds detected in one or more samples are presented on this table. Refer to Attachment C for list of all compounds included in analysis.
2. Analytical testing completed by Test America Laboratories.
3. ug/kg = part per billion; mg/kg = parts per million
4. < indicates compound was not detected above method detection limits.
5. B = Compound was found in the blank and sample.
6. J = Result is less than the reporting limit but greater or equal to the method detection limit and the concentration is an approximate value.
7. NV = no value.
8. NT = not tested.
9. **Bold** indicates value exceeds Unrestricted Use Soil Cleanup Objectives.
10. Shading indicates value exceeds Restricted Commercial Use Soil Cleanup Objectives.
11. *Soil cleanup objective is for the sum of the Aroclor compound concentrations detected (Total PCBs).
12. Soil cleanup objectives (SCOs) are from NYSDEC Part 375, Subpart 375-6: Unrestricted Use Soil Cleanup Objectives and the Supplemetal Soil Cleanup Objectives (SSCOs) are from NYSDEC Final Commissioners Policy, CP-51, Dated October 21, 2010.

Table 3
Groundwater Analytical Testing Results Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Class GA Criteria	TW-1	TW-2	TW-3	TW-4	TW-5	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
Volatile Organic Compounds - EPA Method 8260 TCL (ug/L)												
2-Butanone (MEK)	50	<	<	<	<	1.6 J	<	<	<	3.7 J	5.5 J	<
Acetone	50	4.5 J	5.7 J	4.3 J	<	7.6 J	<	<	6.5 J	28	43	<
Benzene	1	1.6	<	<	<	0.51 J	<	<	<	<	<	<
Carbon disulfide	NV	<	<	<	<	0.88 J	<	1.6 J	2.2	4.7	<	<
Cyclohexane	NV	1.6	<	<	<	0.46 J	<	<	<	<	<	<
Dichlorodifluoromethane	5*	<	<	4.4	<	<	<	<	<	<	<	<
Methylcyclohexane	NV	1.2	0.59 J	<	<	0.5 J	0.42 J	<	<	<	<	<
Toluene	5	2.2	<	<	<	0.78 J	<	<	<	<	<	<
Trichloroethene	5	<	<	<	<	7.8	<	<	<	<	<	<
Xylenes (total)	5 [6]	0.75 J	<	<	<	<	<	<	<	<	<	<
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/L)												
Acetophenone	NV	<	<	<	<	<	<	<	0.60 J	1.8 J	<	<
Caprolactam	NV	34	4.3 J	4.2 J	6.6 H	<	<	3.6 J	21.0	12	67.0	<
Di-n-butyl-phthalate	NV	<	<	<	<	<	0.37 J	0.73 J	0.43 J	0.40 J	0.75 J	<
Phenanthrene	50 *	<	<	<	<	<	<	0.58 J	0.76 J	1.0 J	<	<
PCBs - EPA Method 8082 (ug/L)												
Aroclor 1254	NV	<	<	<	<	<	<	<	<	<	<	<
Aroclor 1260	NV	<	<	<	<	<	<	<	<	<	<	<
Total PCBs	0.09 [13]	<	<	<	<	<	<	<	<	<	<	<

Notes:
1. Compounds detected in one or more samples are presented on this table.
2. Analytical testing completed by Test America Laboratories.
3. NYSDEC Class GA criteria obtained from Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, dated October 1993, revised June 1998, January 1999 errata sheet and April 2000 addendum.
4. ug/L = part per billion (ppb); mg/L = part per million (ppm)
5. Shading indicates values exceeding NYSDEC Class GA groundwater criteria.
6. Class GA criteria shown is for total xylene concentration.
7. J = Result is less than the reporting limit but greater or equal to the method detection limit and the concentration is an approximate value.
8. H = Indicates sample was prepped or analyzed beyond the specified holding time.
9. < = compound was not detected.
10. * indicates a Guidance Value instead of a Standard Value.
11. NV = no value.
12. A duplicate sample (GW-Duplicate-110712) was collected at TW-3. Values shown are the higher of the two analytical results.
13. Groundwater criteria is for the sum of the Aroclor compound concentrations detected (Total PCBs).

APPENDIX A

Soil Boring and Well Installation Logs

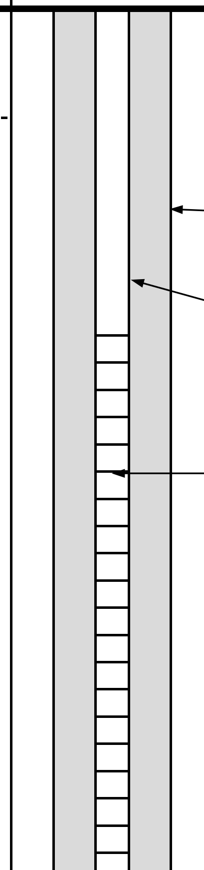
CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/5/2012	END DATE 11/5/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	NOTES
11/6/2012	8:17	10.99' TOR		
11/19/2012	9:10	11.20' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	1	S-1	0 - 2		0	Weathered Concrete (4") and	2" Diameter Temporary Monitoring	0
1	2					Subbase.	Well Installed.	
	6							
2	8							
	7	S-2	2 - 4		10	Brown Silty CLAY, trace Sand, moist		0
3	7					(native).		
	12							
4	15						10" Nominal diameter borehole	
	11	S-3	4 - 6		10		from 0 to 16 feet.	0
5	12							
	13						2-inch PVC flush coupled riser	
6	14						pipe to 2.36' above ground surface.	
	4	S-4	6 - 8		100			0
7	9							
	17							
8	19							
	2	S-5	8 - 10		100		2-inch PVC Screen SCH. 40,	0
9	6						10 slot, from 6 to 16 feet.	
	9							
10	10							
	3	S-6	10 - 12		100			0
11	4							
	7							
12	8							
	3	S-7	12 - 14		100			0
13	3							
	6					Grades to: wet.		
14	8							
	12	S-8	14 - 16		100			0
15	10							
	78							
16	50/3							
						Auger refusal/presumed top of		
17						bedrock at 16.0' bgs.		
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples.
Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes: 1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/5/2012	END DATE 11/5/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

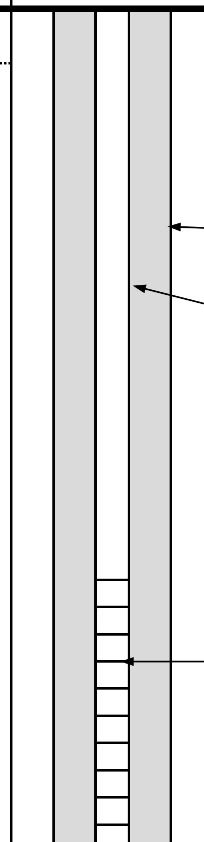
WATER LEVEL DATA

DATE	TIME	WATER	CASING	NOTES
11/6/2012	8:12	13.80' TOR		
11/19/2013	9:10	10.78' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		5	Asphalt (3") and Concrete (4").	2" Diameter Temporary Monitoring	0
1	-						Well Installed.	
	3					Brown and Gray mottled Silty CLAY,		
2	6					trace Sand, moist, (native).		
	3	S-2	2 - 4		45			0
3	5							
	10							
4	15						10" Nominal diameter borehole	
	3	S-3	4 - 6		50		from 0 to 15.5 feet.	0
5	4							
	14						2-inch PVC flush coupled riser	
6	17						pipe to 1.51' above ground surface.	
	4	S-4	6 - 8		60	Grades to: Brown.		0
7	11							
	17							
8	22							
	4	S-5	8 - 10		100			0
9	11							
	12							
10	14							
	4	S-6	10 - 12		100			0
11	4							
	7							
12	8						2-inch PVC Screen SCH. 40,	
	4	S-7	12 - 14		50	Grades to: moist/wet.	10 slot, from 10.5 to 15.5 feet.	0
13	4							
	7							
14	10							
	2	S-8	14 - 15.5		10			0
15	4							
	100/1							
16						Auger refusal/presumed top of		
						bedrock at 15.5' bgs.		
17								
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes: 1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/6/2012	END DATE 11/6/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

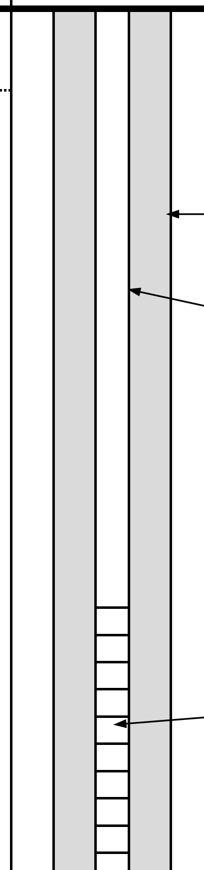
WATER LEVEL DATA

DATE	TIME	WATER	CASING	NOTES
11/6/2012	14:55	15.86' TOR		
11/19/2013	9:15	17.05' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
		S-1	0 - 2			Asphalt (4") and Subbase.	2" Diameter Temporary Monitoring	0
1							Well Installed.	
2						Brown and Gray mottled Silty CLAY,		
		S-2	2 - 4			trace Sand, moist, (native).		0
3						Hand augered to 4' due to utility		
						proximity.		
4							10" Nominal diameter borehole	
	7	S-3	4 - 6		50	Split spoon sampling from 4' to	from 0 to 15.9 feet.	0
5	9					15.9' bgs.		
	10						2-inch PVC flush coupled riser	
6	20						pipe to 2.16' above ground surface.	
	7	S-4	6 - 8		80			0
7	14							
	15							
8	20							
	4	S-5	8 - 10		100			0
9	6							
	6							
10	8							
	3	S-6	10 - 12		100			0
11	3							
	3							
12	4					Grades to: moist/wet.		
	1	S-7	12 - 14		40			0
13	2						2-inch PVC Screen SCH. 40,	
	3						10 slot, from 10.9 to 15.9 feet.	
14	4							
	1	S-8	14 - 15.9		20			0
15	2							
	50/5							
16	-							
						Auger refusal/presumed top of		
17						bedrock at 15.9' bgs.		
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

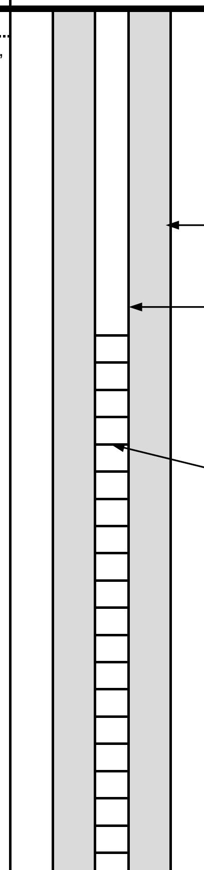
General Notes:
1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/5/2012	END DATE 11/5/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

WATER LEVEL DATA

DATE	TIME	WATER	CASING	NOTES
11/6/2012	8:20	8.25' TOR		
11/19/2012	9:20	9.46' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DIAGRAM	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		0	Concrete (5").		2" Diameter Temporary Monitoring	0
1	2					Brown Silty CLAY, trace Sand, moist,		Well Installed.	
	3					(native).			
2	4								
	6	S-2	2 - 4		100				0
3	6								
	11								
4	14							10" Nominal diameter borehole	
	22	S-3	4 - 6		45			from 0 to 16.0 feet.	0
5	9								
	12							2-inch PVC flush coupled riser	
6	13							pipe to 1.91' above ground surface.	
	5	S-4	6 - 8		70				0
7	8								
	10								
8	14								
	5	S-5	8 - 10		100			2-inch PVC Screen SCH. 40,	0
9	6							10 slot, from 6.0 to 16.0 feet.	
	7								
10	7								
	4	S-6	10 - 12		100				0
11	4								
	4					Grades to: moist/wet.			
12	4								
	2	S-7	12 - 14		45				0
13	2								
	8					Grades to: wet.			
14	15								
	10	S-8	14 - 16		30				0
15	10								
	17								
16	22								
						End of borehole at 16.0' bgs.			
17									
18									
19									

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes:
1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

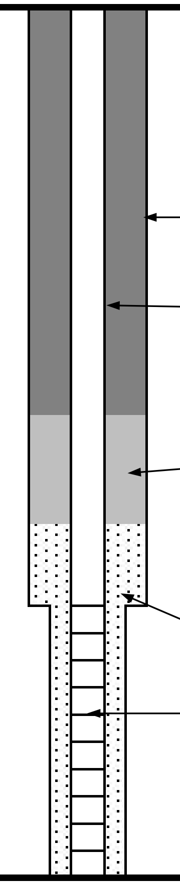
CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/6/2012	END DATE 11/6/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	NOTES
11/7/2012	14:15	10.25' bgs		
11/19/2013	9:25	13.56' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		50	Concrete (6").	2" Diameter Temporary Monitoring	0
1	10					Brown GRAVEL and SAND, trace	Well Installed.	
	20					Silt, trace Clay, moist (Fill).		
2	23						Significant water flowing into bore-	
	22	S-2	2 - 4		40	Grades to: Gray.	hole from Gravel and Sand fill.	0
3	28							
	14					Grades to: wet.		
4	9					Brown and Gray mottled Silty CLAY,	10" Nominal diameter borehole	
	5	S-3	4 - 6		70	trace Silt, moist, (native).	from 0 to 15.8 feet.	0
5	7							
	15						2-inch PVC flush coupled riser	
6	22						pipe to 2.25' above ground surface.	
	4	S-4	6 - 8		100			0
7	12							
	14							
8	28							
	5	S-5	8 - 10		100		Borehole bentonite grouted	0
9	6						from 7.5 to 9.5 feet.	
	9							
10	10							
	3	S-6	10 - 12		100			0
11	4							
	3						Sand pack from 9.5 to 15.8 feet	
12	5							
	2	S-7	12 - 14		100			0
13	2						2-inch PVC Screen SCH. 40,	
	2						10 slot, from 10.8 to 15.8 feet.	
14	4							
	1	S-8	14 - 15.8		40			0
15	2							
	3					Grades to: wet.		
16	50/1							
						Auger refusal/presumed top of		
17						bedrock at 15.8' bgs.		
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes:
1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Supplemental Investigation
Niagara Falls Armed Forces Reserve Center
9400 Porter Road
Niagara Falls, NY

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/6/2012	END DATE 11/6/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

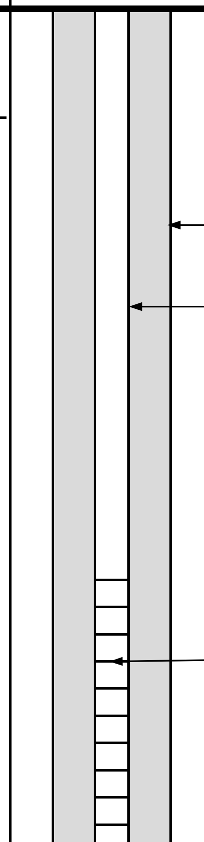
WATER LEVEL DATA

DATE	TIME	WATER	CASING	NOTES
11/7/2012	14:30	Dry		
11/19/2013	9:30	14.93' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		20	Asphalt (4") and Subbase.	2" Diameter Temporary Monitoring Well Installed.	0
1	4							
	27							
2	14							
	4	S-2	2 - 4		20	Brown and Gray mottled Silty CLAY, trace Sand, moist (native).		0
3	5							
	8							
4	11						10" Nominal diameter borehole from 0 to 15.5 feet.	
	9	S-3	4 - 6		50			0
5	10							
	11						2-inch PVC flush coupled riser pipe to 0.34' above ground surface.	
6	12							
	5	S-4	6 - 8		80			0
7	10							
	10							
8	15							
	3	S-5	8 - 10		100			0
9	6							
	7							
10	8							
	2	S-6	10 - 12		70			0
11	3							
	7							
12	9						2-inch PVC Screen SCH. 40, 10 slot, from 10.5 to 15.5 feet.	
	3	S-7	12 - 14		10			0
13	4							
	12							
14	26							
	4	S-8	14 - 15.5		10			0
15	13							
	31							
16	50/4					Auger refusal/presumed top of bedrock @ 15.5' bgs.		
17								
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes:
1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

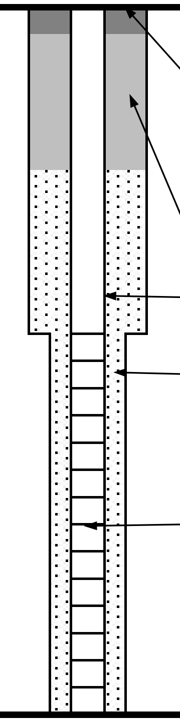
CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/7/2012	END DATE 11/7/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	NOTES
11/8/2012	10:10	4.35' TOR		
11/19/2013	9:35	6.5' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		10	Weathered Concrete (1").	2" Diameter Monitoring Well	0
1	6					Brown GRAVEL and SAND, trace	Re-installed (1st well had bad seal)	
	11					Silt, trace Clay, moist (Fill).	Concrete and Roadbox	
2	8					Grades to: wet.	10" Nominal diameter borehole	
	4	S-2	2 - 4		20	Brown Silty CLAY, trace Sand, moist	from 0 to 13.5 feet.	0
3	4					(native).	BOW at 12.7' (well "came up"	
	4						during installation).	
4	4						Borehole bentonite grouted	
	2	S-3	4 - 6		100		from 0.5 to 5.5 feet.	0
5	4							
	3						2-inch PVC flush coupled riser	
6	4						pipe to 5.7' bgs.	
	4	S-4	6 - 8		100			0
7	6						Sand pack from 5.5 to 12.7 feet	
	10							
8	13							
	8	S-5	8 - 10		40			0
9	13							
	14					Grades to: wet.	2-inch PVC Screen SCH. 40,	
10	8						10 slot, from 5.7 to 12.7 feet.	
	9	S-6	10 - 12		5			0
11	13							
	18							
12	20							
	7	S-7	12 - 13.5		70			0
13	13							
	50/4							
14						Auger refusal/presumed top of		
						bedrock at 13.5' bgs.		
15								
16								
17								
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes:
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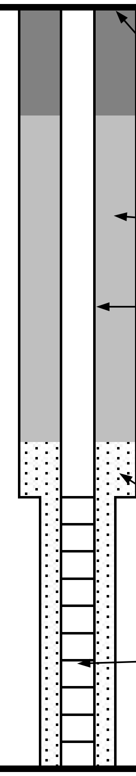
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Supplemental Investigation
Niagara Falls Armed Forces Reserve Center
9400 Porter Road
Niagara Falls, NY

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/7/2012	END DATE 11/7/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	NOTES
11/8/2012	10:15	7.31' TOR		
11/19/2013	9:40	7.42' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DIAGRAM	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		30	Asphalt (3") and Concrete (6").		2" Diameter Monitoring Well	0
1	4							Installed.	
	5					Brown and Gray mottled Silty CLAY,		Concrete and Roadbox	
2	6					trace Sand, moist (native).		10" Nominal diameter borehole	
	4	S-2	2 - 4		30			from 0 to 13.5 feet.	0
3	7								
	8								
4	9							Borehole bentonite grouted	
	14	S-3	4 - 6		70			from 2.0 to 8.0 feet.	0
5	13								
	14							2-inch PVC flush coupled riser	
6	11							pipe to 9.0' bgs.	
	3	S-4	6 - 8		95				0
7	4								
	7								
8	9								
	3	S-5	8 - 10		90				0
9	5								
	12							Sand pack from 8.0 to 14.0 feet	
10	12								
	7	S-6	10 - 12		50	Grades to: wet.			0
11	9								
	14								
12	9							2-inch PVC Screen SCH. 40,	
	6	S-7	12 - 14		70			10 slot, from 9.0 to 14.0 feet.	0
13	12								
	18								
14	17								
	50/4					Auger refusal/presumed top of			
15						bedrock at 14.0' bgs.			
16									
17									
18									
19									

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes: 1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
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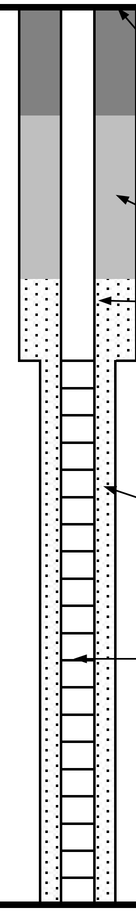
GZA GEOENVIRONMENTAL OF NEW YORK

Supplemental Investigation
Niagara Falls Armed Forces Reserve Center
9400 Porter Road
Niagara Falls, NY

BORING No. MW-3
SHEET 9 OF 13
FILE No. 21.0056522.30
CHECKED BY: CZB

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/9/2012	END DATE 11/9/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

WATER LEVEL DATA						
DATE	TIME	WATER	CASING	NOTES	TYPE OF DRILL RIG	Dietrich D-50
11/9/2012	14:00	9.41' TOR			CASING SIZE AND DIAMETER	4-1/4" HSA
11/19/2013	9:45	9.86' TOR			OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
					ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DIAGRAM	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		15	Brown GRAVEL and SAND, some		2" Diameter Monitoring Well	0
1	6					weathered Asphalt, trace Slag, trace		Installed.	
	4					Silt, trace Clay, moist, (Fill, 8").		Concrete and Roadbox	
2	8					Brown and Gray mottled Silty CLAY,		10" Nominal diameter borehole	
	3	S-2	2 - 4		40	trace Sand, moist (native).		from 0 to 16.5 feet.	0
3	3								
	6								
4	14							Borehole bentonite grouted	
	4	S-3	4 - 6		80			from 2.0 to 5.3 feet.	0
5	10								
	20							2-inch PVC flush coupled riser	
6	17							pipe to 6.5' bgs.	
	8	S-4	6 - 8		100				0
7	11								
	18								
8	24								
	8	S-5	8 - 10		80				0
9	17								
	11					Grades to: wet.		Sand pack from 5.3 to 16.5 feet.	
10	13								
	3	S-6	10 - 12		40				0
11	9								
	12								
12	17							2-inch PVC Screen SCH. 40,	
	6	S-7	12 - 14		0			10 slot, from 6.5 to 16.5 feet.	0
13	6								
	7								
14	5								
	1	S-8	14 - 16.5		40				0
15	3								
	7								
16	8								
	-								
17						End of borehole at 16.5' bgs.			
18									
19									

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples.
Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

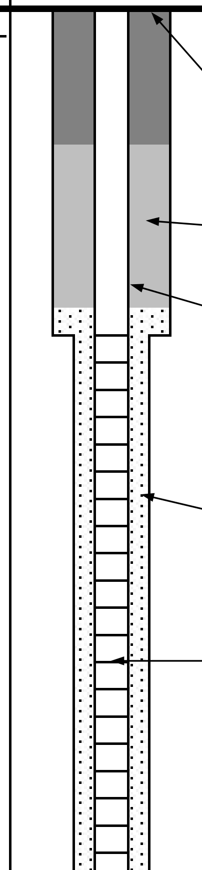
General Notes: 1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/9/2012	END DATE 11/9/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	NOTES
11/13/2012	9:30	15.34' TOR		
11/19/2012	9:50	14.81' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	1	S-1	0 - 2		20	Topsoil (3")	2" Diameter Monitoring Well	0
1	3					Brown and Gray mottled Silty CLAY,	Installed.	
	3					trace Sand, moist (native).	Concrete and Roadbox	
2	4						10" Nominal diameter borehole	
	2	S-2	2 - 4		70		from 0 to 16.0 feet.	0
3	5							
	6							
4	10						Borehole bentonite grouted	
	3	S-3	4 - 6		60		from 2.5 to 5.5 feet.	0
5	7							
	9						2-inch PVC flush coupled riser	
6	18						pipe to 6.0' bgs.	
	5	S-4	6 - 8		90			0
7	9							
	15							
8	18							
	3	S-5	8 - 10		100			0
9	4							
	8						Sand pack from 5.5 to 16.0 feet.	
10	10							
	6	S-6	10 - 12		10	Grades to: wet.		0
11	10							
	21							
12	11						2-inch PVC Screen SCH. 40,	
	6	S-7	12 - 14		10		10 slot, from 6.0 to 16.0 feet.	0
13	7							
	7							
14	5							
	1	S-8	14 - 16		10			0
15	2							
	1							
16	3							
						End of borehole at 16.0' bgs.		
17								
18								
19								



S - Split Spoon Sample
C - Rock Core Sample

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Supplemental Investigation
Niagara Falls Armed Forces Reserve Center
9400 Porter Road
Niagara Falls, NY

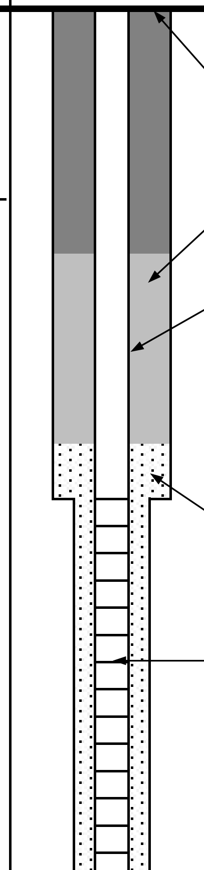
CONTRACTOR: Nature's Way | BORING LOCATION: See Location Plan
DRILLER: Corey Haaf | GROUND SURFACE ELEVATION: | DATUM: NGVD
START DATE: 11/13/2012 | END DATE: 11/13/2012 | GZA GEOENVIRONMENTAL REPRESENTATIVE: T. Bohlen

WATER LEVEL DATA				
DATE	TIME	WATER	CASING	NOTES
11/14/2012		Dry		
11/19/2012	9:55	14.97' TOR		

TYPE OF DRILL RIG: Dietrich D-50
CASING SIZE AND DIAMETER: 4-1/4" HSA
OVERBURDEN SAMPLING METHOD: 2" diameter x 24" long splitspoon
ROCK DRILLING METHOD:

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		10	Brown GRAVEL and SAND, some	2" Diameter Monitoring Well	0
1	17					weathered Asphalt, moist (Fill).	Installed.	
	4						Concrete and Roadbox	
2	6						10" Nominal diameter borehole	
	3	S-2	2 - 4		10	Grades to: wet.	from 0 to 16.0 feet.	0.9
3	4							
	6							
4	8					Brown Silty CLAY, trace Sand, moist	Borehole bentonite grouted	
	3	S-3	4 - 6		10	(native).	from 4.5 to 8.0 feet.	37.5
5	5							
	6						2-inch PVC flush coupled riser	
6	9						pipe to 9.0' bgs.	
	7	S-4	6 - 8		90			0.8
7	9							
	18							
8	20							
	9	S-5	8 - 10		95			0
9	13							
	16						Sand pack from 8 to 16 feet.	
10	17							
	4	S-6	10 - 12		100			0
11	5							
	6							
12	9						2-inch PVC Screen SCH. 40,	
	2	S-7	12 - 14		40		10 slot, from 9.0 to 16.0 feet.	0
13	4					Grades to: wet.		
	19							
14	10							
	2	S-8	14 - 16		5			0
15	2							
	5							
16	10							
						End of Borehole at 16' bgs.		
17								
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
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Supplemental Investigation
Niagara Falls Armed Forces Reserve Center
9400 Porter Road
Niagara Falls, NY

BORING No. MW-6
SHEET 12 OF 13
FILE No. 21.0056522.30
CHECKED BY: CZB

CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/13/2012	END DATE 11/13/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

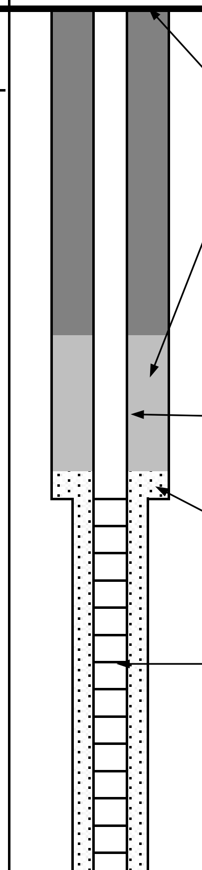
WATER LEVEL DATA

DATE	TIME	WATER	CASING	NOTES
11/14/2012		10.11' TOR		
11/19/2012	10:00	6.85' TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	WELL INSTALLATION DESCRIPTION	OVM (ppm)
		S-1	0 - 2			Asphalt (5") and Subbase to 1.5'.	2" Diameter Monitoring Well	0
1						Hand Augered to 2' due to utility	Installed.	
						proximity.	Concrete and Roadbox	
2						Brown and Gray mottled Silty CLAY	10" Nominal diameter borehole	
		S-2	2 - 4		0	trace Sand, moist (native).	from 0 to 15.9 feet.	0
3								
4							Borehole bentonite grouted	
	1	S-3	4 - 6		40		from 6.0 to 8.5 feet.	0
5	5							
	10							
6	12							
	6	S-4	6 - 8		100			0
7	7							
	14						2-inch PVC flush coupled riser	
8	21						pipe to 8.9' bgs.	
	3	S-5	8 - 10		90			0
9	6							
	17						Sand pack from 8.9 to 15.9 feet.	
10	28							
	13	S-6	10 - 12		5			0
11	6							
	10							
12	18						2-inch PVC Screen SCH. 40,	
	1	S-7	12 - 14		40		10 slot, from 8.9 to 15.9 feet.	0
13	2							
	2					Grades to: wet.		
14	4							
	3	S-8	14 - 15.9		0			0
15	10							
	18							
16	50/5							
						Auger refusal/presumed top of		
17						bedrock at 15.9' bgs.		
18								
19								

WELL INSTALLATION DIAGRAM



S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

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CONTRACTOR	Nature's Way	BORING LOCATION	See Location Plan
DRILLER	Corey Haaf	GROUND SURFACE ELEVATION	DATUM NGVD
START DATE 11/13/2012	END DATE 11/13/2012	GZA GEOENVIRONMENTAL REPRESENTATIVE	T. Bohlen

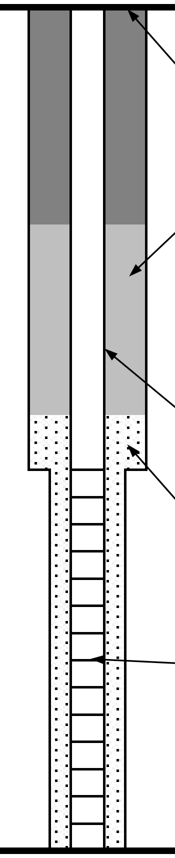
WATER LEVEL DATA

DATE	TIME	WATER	CASING	NOTES
11/15/2012		9.90' TOR		
11/19/2012	10:05	13.94 TOR		

TYPE OF DRILL RIG	Dietrich D-50
CASING SIZE AND DIAMETER	4-1/4" HSA
OVERBURDEN SAMPLING METHOD	2" diameter x 24" long splitspoon
ROCK DRILLING METHOD	

DEPTH	SAMPLE BLOWS (/6")	NO.	DEPTH (FT)	N-VALUE /RQD %	RECOVERY (%)	SAMPLE DESCRIPTION	OVM (ppm)
	-	S-1	0 - 2		5	Asphalt (5") and Subbase to 1.5'.	0
1	-						
	24						
2	27					Brown and Gray mottled Silty CLAY,	
	2	S-2	2 - 4		40	trace Sand, wet.	0
3	2					Grades to: moist.	
	6						
4	6						
	1	S-3	4 - 6		70		0
5	10						
	6						
6	20						
	4	S-4	6 - 8		100		0
7	9						
	22						
8	23						
	8	S-5	8 - 10		100		0
9	14						
	12						
10	12						
	3	S-6	10 - 12		100		0
11	3						
	4						
12	4						
	W.H.O.	S-7	12 - 14		100		0
13	W.H.O.					Grades to: wet.	
	4						
14	2						
	4	S-8	14 - 15.5		10		0
15	50/5						
16						Auger refusal/presumed top of	
						bedrock at 15.5' bgs.	
17							
18							
19							

WELL INSTALLATION DIAGRAM



WELL INSTALLATION DESCRIPTION

2" Diameter Monitoring Well Installed.
Concrete and Roadbox
10" Nominal diameter borehole from 0 to 15.5 feet.

Borehole bentonite grouted from 3.9 to 7.5 feet.

2-inch PVC flush coupled riser pipe to 8.5' bgs.

Sand pack from 7.5 to 15.5 feet.

2-inch PVC Screen SCH. 40, 10 slot, from 8.5 to 15.5 feet.

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1)Mini Rae 3000 organic vapor meter (OVM) used to screen soil samples. Meter was calibrated to the equivalent of 100 ppm isobutylene in air.
2) OVM reading from headspace screening of soil samples.

General Notes:
1) Stratification lines represent approximate boundary between soil types; transitions may be gradual.
2) Water level readings have been made at times and under conditions stated; fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

APPENDIX B
GROUNDWATER SAMPLING LOGS

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):

Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	TW-1	Ground Surface Elevation:		Riser/Screen Material:	
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	
Installed By:		Monitoring Point Elevation:		Bottom of Screen Depth:	
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations

Field Observations		Parameters +/-		Sampling Information
Exterior Observations:		pH	+/- 0.1	Sample ID: TW1-110712-1430
		Conductivity	+/- 3%	Sample Time: 1430
Interior Observations		Temperature	+/- 10%	# of Sample Containers: 7
		Turbidity	+/- 10%	Duplicate Sample ID: –
		ORP	+/- 10mV	Sample Analysis: VOC, SVOC, PCB
Signs of Damage/Tampering:		DO	+/- 10%	

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/7/12	1415	8.50		7.12	5.43	13.8	2835 AU	CLOUDY	1.62	137.9	Depth of Water:
	1420	8.56		7.03	5.43	14.1	1164 AU	CLOUDY	1.02	133.1	Length of Water Column:
	1425	8.58		7.01	5.43	14.0	1286 AU	CLOUDY	1.01	127.6	Depth of Well:
	1430	8.61		7.00	5.45	13.9	1261 AU	CLOUDY	1.02	123.5	Sheen Observed: Y N
	1435										DNAPL Observed: Y N
	1440										Did Well Go Dry: Y N
	1445										Other:
	1450										
	1455										
	1500										
	1505										

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	TW-2	Ground Surface Elevation:		Riser/Screen Material:	
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	
Installed By:		Monitoring Point Elevation:		Bottom of Screen Depth:	
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations

Field Observations		Parameters +/-		Sampling Information
Exterior Observations:		pH	+/- 0.1	Sample ID: TW-2-110712-1225
		Conductivity	+/- 3%	Sample Time: 1225
Interior Observations		Temperature	+/- 10%	# of Sample Containers: 7
		Turbidity	+/- 10%	Duplicate Sample ID: —
		ORP	+/- 10mV	Sample Analysis: VOC, SVOC, PCB
Signs of Damage/Tampering:		DO	+/- 10%	

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (~~NTU~~) AU	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/7/12	1205	11.01		6.94	7.92	14.7	872 AU	CLEAR	8.35	168.4	Depth of Water:
	1210	11.15		6.93	7.95	14.9	669 AU	CLEAR	4.03	130.1	Length of Water Column:
	1215	11.29		6.89	7.91	15.1	112 NTU	CLEAR	3.91	113.5	Depth of Well:
	1220	11.32		6.84	7.89	15.2	58 NTU	CLEAR	3.92	116.6	Sheen Observed: Y N
	1225	11.33		6.82	7.87	15.1	123 NTU	CLEAR	3.95	116.9	DNAPL Observed: Y N
	1230										Did Well Go Dry: Y N
	1235										Other: 11.03
	1240										
	1245										
	1250										
	1255										

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):

Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	TW-3	Ground Surface Elevation:		Riser/Screen Material:	PVC
Installation Date:	11/6/12	Protective Casing Elevation:	–	Top of Screen Depth:	
Installed By:	NATURE'S WAY	Monitoring Point Elevation:		Bottom of Screen Depth:	15.4
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color
~~13.74~~					

Notes:

Field Observations

Exterior Observations:

Interior Observations

Signs of Damage/Tampering:

Parameters +/-	
pH	+/- 0.1
Conductivity	+/- 3%
Temperature	+/- 10%
Turbidity	+/- 10%
ORP	+/- 10mV
DO	+/- 10%

Sampling Information

Sample ID: TW-3-110712-1023

Sample Time: 1023

\# of Sample Containers: 14 GW-DUP-110712

Duplicate Sample ID: ~~DUP-1-GW~~

Sample Analysis: VOC, SVOC, PCB

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/7/12	0938	13.74		7.09	4.85	15.0	3667 AU	CLOUDY	1.59	33.1	Depth of Water: 13.74
	0943	13.84		7.05	4.87	15.2	669 AU	CLEAR	1.37	7.9	Length of Water Column:
	0948	13.72		7.07	4.87	15.2	612 AU	CLEAR	1.55	1.0	Depth of Well: 15.8
	0953	13.92		7.04	4.87	15.3	1368 AU	CLEAR	1.40	+0.2	Sheen Observed: Y N
	0958	14.06		5.37	4.87	15.3	798 AU	CLEAR	1.44	-2.0	DNAPL Observed: Y N
	1003	14.08	2 GALLONS	7.09	4.87	15.2	798 AU	CLEAR	2.34	1.1	Did Well Go Dry: Y N
	1008	14.10		7.09	4.88	15.1	666 AU	CLEAR	2.15	0.0	Other: LOWERED FLOW RATE @
	1013	14.12		7.07	4.87	14.8	124 AU	CLEAR	1.15	-6.0	1003
	1018	14.17		7.07	4.38	14.6	65 AU	CLEAR	1.07	-7.0	
	1023	14.18	~2.6 GAL	7.06	4.88	14.6	52 AU	CLEAR	1.14	-6.0	
	1028										

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	TW-4	Ground Surface Elevation:		Riser/Screen Material:	
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	
Installed By:		Monitoring Point Elevation:		Bottom of Screen Depth:	
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations	Parameters +/-		Sampling Information
Exterior Observations:	pH	+/- 0.1	Sample ID: TW4-110812-1225
	Conductivity	+/- 3%	Sample Time: 1225
Interior Observations	Temperature	+/- 10%	# of Sample Containers: 21
	Turbidity	+/- 10%	Duplicate Sample ID: ms/msD
	ORP	+/- 10mV	Sample Analysis: VOC, SVOC, PCB
Signs of Damage/Tampering:	DO	+/- 10%	

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/8/12	1145	7.31		7.18	5.11	13.0	935 NU	CLEAR/CLOUDY	2.85	98.7	Depth of Water:
	1150	7.4		7.00	5.26	13.9	198 NTU	CLOUDY	0.87	~~0.87~~ 58.0	Length of Water Column:
	1155	7.43		6.98	5.26	13.9	19 NTU	CLOUDY	0.77	48.3	Depth of Well:
	1200	7.50		6.96	5.24	14.2	72.2	CLOUDY	0.62	42.9	Sheen Observed: Y N
	1205	7.53		6.96	5.24	14.0	70.3	CLOUDY	0.58	37.2	DNAPL Observed: Y N
	1210	7.57		6.96	5.24	14.4	43.4	CLOUDY	0.52	25.9	Did Well Go Dry: Y N
	1215	7.60		6.94	5.24	14.1	45.2	CLOUDY	0.57	11.0	Other:
	1220	7.60		6.93	5.25	14.5	51.4	CLOUDY	0.56	8.0	
	1225	7.62		6.90	5.25	14.1	43.1	CLOUDY	0.55	1.4	
	1230										
	1235										

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	TW-5	Ground Surface Elevation:		Riser/Screen Material:	
Installation Date:	11/6/12	Protective Casing Elevation:		Top of Screen Depth:	
Installed By:	NATURE'S WAY	Monitoring Point Elevation:		Bottom of Screen Depth:	
		Elevation Datum:			

Previous Field measurement Information Available (yes/no/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations	Parameters +/-		Sampling Information
Exterior Observations:	pH	+/- 0.1	Sample ID: TW-5-110812-1040
	Conductivity	+/- 3%	Sample Time: 1042
Interior Observations	Temperature	+/- 10%	# of Sample Containers: 7
	Turbidity	+/- 10%	Duplicate Sample ID: —
	ORP	+/- 10mV	Sample Analysis: VOC, SVOC, PB
Signs of Damage/Tampering:	DO	+/- 10%	

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/8/12	1010			7.92	2.78	14.3	60.2NU	Clear	1.83	72.8	Depth of Water:
	1015	11.29		7.95	2.76	14.7	63.5	Clear	3.69	65.8	Length of Water Column:
	1020	11.55		8.02	2.65	14.8	143	Clear	3.92	67.2	Depth of Well:
	1025	11.88		8.36	2.30	15.1	1055 AU	Clear	6.37	69.5	Sheen Observed: Y (N)
	1030	11.91		8.35	2.45	15.3	777 AU	Clear	5.60	71.8	DNAPL Observed: Y (N)
	1035	12.00	1 GAL	8.33	2.47	14.8	803 AU	Cloudy	5.71	71.4	Did Well Go Dry: Y N
	1040	12.23		8.33	2.49	15.1	848 AU	Cloudy	5.66	74.3	Other: LOWERED FLOW RATE @ 1120
	1045										
	1050										
	1055										
	1100										

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	MW-1	Ground Surface Elevation:		Riser/Screen Material:	PVC
Installation Date:	11/13/12	Protective Casing Elevation:		Top of Screen Depth:	5.7'
Installed By:	Nature's Way	Monitoring Point Elevation:		Bottom of Screen Depth:	12.7'
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations

Exterior Observations:

Interior Observations

Signs of Damage/Tampering:

Parameters +/-	
pH	+/- 0.1
Conductivity	+/- 3%
Temperature	+/- 10%
Turbidity	+/- 10%
ORP	+/- 10mV
DO	+/- 10%

Sampling Information

Sample ID: MW-1-111912-1140
Sample Time: 1140
# of Sample Containers: 7
Duplicate Sample ID: -
Sample Analysis: 8260, 8270, PCB

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/19/12	1056	6.55	0	7.07	3.11	13.9	59.6	L.Brown	1.07	209.1	Depth of Water: 6.50'
	1101		0.2	7.00	3.19	14.2	76.3		0.63	194.3	Length of Water Column: 6.20
	1106		0.4	7.00	3.32	14.3	44.0		0.56	185.7	Depth of Well: 12.70'
	1111		0.7	6.99	3.56	14.3	73.0		0.29	138.2	Sheen Observed: Y N
	1116		1.0	6.98	3.76	14.4	73.5		0.18	75.8	DNAPL Observed: Y N
	1121		1.3	6.93	4.05	14.5	79.6		0.13	41.5	Did Well Go Dry: Y N
	1126		1.4	6.91	4.18	14.6	67.4		0.21	27.8	Other: OVM: 9.7 ppm TOR
	1131		1.7	6.91	4.20	14.5	65.1		0.18	26.9	1 well vol: 1 gal.
	1136	↓	2.0	6.91	4.21	14.5	62.0	↓	0.19	26.7	

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	MW-2	Ground Surface Elevation:		Riser/Screen Material:	PVC
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	9'
Installed By:	Natures' Way	Monitoring Point Elevation:		Bottom of Screen Depth:	14'
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations		Parameters +/-		Sampling Information
Exterior Observations:		pH	+/- 0.1	Sample ID: MW-2-111912-1300
		Conductivity	+/- 3%	Sample Time: 1300
Interior Observations		Temperature	+/- 10%	# of Sample Containers: 7
		Turbidity	+/- 10%	Duplicate Sample ID: -
		ORP	+/- 10mV	Sample Analysis: 8260, 8270
Signs of Damage/Tampering:		DO	+/- 10%	PCBs

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/19/12	1212	7.67	0	7.08	3.48	15.1	51.6	L. Brown	2.22	121.1	Depth of Water: 7.42
	1217	8.29	0.2	6.92	3.95	15.1	27.0	↓	4.02	119.1	Length of Water Column: 6.58
	1222	8.83	0.3	6.90	3.08	15.1	23.2		2.86	117.8	Depth of Well: 14'
	1227	9.02	0.5	6.93	2.68	15.1	13.3	Clear	2.98	113.8	Sheen Observed: Y N
	1232	9.14	0.7	6.95	2.41	15.1	11.5		2.78	112.2	DNAPL Observed: Y N
	1237	9.24	1.0	6.93	2.62	15.1	11.2		2.30	110.4	Did Well Go Dry: Y N
	1242	9.34	1.2	6.92	2.78	15.1	9.09		2.12	107.9	Other: OVM = 0.7ppm TOR
	1247	9.49	1.3	6.91	2.90	15.2	9.08		2.08	104.5	1 well vol. = 1.1 gal.
	1252	9.61	1.5	6.90	2.96	15.2	9.05		2.07	104.1	
	1257	9.70	1.7	6.90	2.99	15.2	9.01		2.09	103.8	

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	MW-3	Ground Surface Elevation:		Riser/Screen Material:	PVC
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	6.5
Installed By:	Nature's Way	Monitoring Point Elevation:		Bottom of Screen Depth:	16.5
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations		Parameters +/-		Sampling Information
Exterior Observations:		pH	+/- 0.1	Sample ID: MW-3-111912-1445
		Conductivity	+/- 3%	Sample Time: 1445
Interior Observations		Temperature	+/- 10%	# of Sample Containers: 7
		Turbidity	+/- 10%	Duplicate Sample ID: -
		ORP	+/- 10mV	Sample Analysis: 8260, 8270
Signs of Damage/Tampering:		DO	+/- 10%	PCBs

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/19/12	1358	10.01	0	6.95	3.37	14.6	72.9	Lt.Brn	2.83	139.9	Depth of Water: 9.86
	1403	10.28	0.2	6.78	3.35	14.5	94.0		2.73	139.6	Length of Water Column: 6.64
	1408	10.42	0.3	6.72	3.36	14.4	1330AU		2.32	138.4	Depth of Well: 16.5
	1413	10.59	0.5	6.69	3.37	14.4	2167AU		2.12	136.8	Sheen Observed: Y N
	1418	10.75	0.8	6.68	3.38	14.4	2064 AU		1.91	135.0	DNAPL Observed: Y N
	1423	10.81	1.0	6.67	3.38	14.4	1529AU		1.84	133.4	Did Well Go Dry: Y N
	1428	10.92	1.2	6.67	3.38	14.3	1156AU		1.70	126.2	Other: OVM= 2.1 ppm
	1433	11.01	1.4	6.66	3.39	14.3	970AU		1.32	100.5	1 well vol. = 1.1 gal
	1438	11.11	1.6	6.66	3.39	14.3	830AU		1.33	100.3	
	1442	11.21	1.8	6.66	3.39	14.3	800AU		1.31	100.1	

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	MW-4	Ground Surface Elevation:		Riser/Screen Material:	PVC
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	6'
Installed By:	Nature's Way	Monitoring Point Elevation:		Bottom of Screen Depth:	16'
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations

Field Observations	Parameters +/-		Sampling Information
Exterior Observations:	pH	+/- 0.1	Sample ID: MW-4-111912-1600
	Conductivity	+/- 3%	Sample Time: 1600
Interior Observations	Temperature	+/- 10%	# of Sample Containers:
	Turbidity	+/- 10%	Duplicate Sample ID:
	ORP	+/- 10mV	Sample Analysis: 8260, 8270
Signs of Damage/Tampering:	DO	+/- 10%	PCBs

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/19/12	1532	15.10	0	7.06	3.71	13.5	21.5	Clear	0.77	114.1	Depth of Water: 14.81
	1537	15.23	0.1	6.88	3.68	13.6	7.39		1.66	96.8	Length of Water Column: 1.19
	1542	15.34	0.2	6.84	3.68	13.6	4.79		2.16	95.7	Depth of Well: 16'
	1547	15.50	0.3	6.83	3.70	13.6	4.86		2.08	97.8	Sheen Observed: Y N
	1552	15.65	0.4	6.83	3.71	13.6	4.85		2.05	95.9	DNAPL Observed: Y N
	1557	15.76	0.5	6.83	3.70	13.6	4.81		2.07	95.7	Did Well Go Dry: Y N
											Other: OVM= 0.2ppm
											1 well vol = 0.19 gal
											11/20/12 - TOW = 15.84

MW-4-111912 · 8270 · 845

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):
Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	MW-5	Ground Surface Elevation:		Riser/Screen Material:	PVC
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	9
Installed By:	Nature's Way	Monitoring Point Elevation:		Bottom of Screen Depth:	16
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations

Field Observations	Parameters +/-		Sampling Information
Exterior Observations:	pH	+/- 0.1	Sample ID:
	Conductivity	+/- 3%	Sample Time:
Interior Observations	Temperature	+/- 10%	# of Sample Containers:
	Turbidity	+/- 10%	Duplicate Sample ID:
	ORP	+/- 10mV	Sample Analysis:
Signs of Damage/Tampering:	DO	+/- 10%	

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/20/12	911	15.30	0	7.42	2.89	12.6	47	L.Brn.	5.30	159.9	Depth of Water: 15.09
	916	15.48	0.1	7.09	2.93	13.3	64	↓	3.95	163.7	Length of Water Column:
											Depth of Well: 16'
	- well going dry - sampled for VOCs - purged dry on 11/19/12										Sheen Observed: Y N
											DNAPL Observed: Y N
											Did Well Go Dry: Y N
											Other: OVM = 9.7 ppm TOR
											11/26/12: TOW = 14.69

15.79

88

File: 21.0056522.30

NIAGARA FALLS ARMED FORCES RESERVE CENTER
WELL DEVELOPMENT FORM
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK

Historic Information

Boring Log Available (yes/no/attached):

Installation Log Available (yes/no/attached)

Summary

Monitoring Well :	MW-6	Ground Surface Elevation:		Riser/Screen Material:	PVC
Installation Date:		Protective Casing Elevation:		Top of Screen Depth:	8.9'
Installed By:	Nature's Way	Monitoring Point Elevation:		Bottom of Screen Depth:	15.9'
		Elevation Datum:			

Previous Field measurement Information Available (yes/**no**/attached)

Ranges of Previous Field Measurements

Depth to Water (ft)	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color

Notes:

Field Observations

Exterior Observations:

Interior Observations

Signs of Damage/Tampering:

Parameters +/-	
pH	+/- 0.1
Conductivity	+/- 3%
Temperature	+/- 10%
Turbidity	+/- 10%
ORP	+/- 10mV
DO	+/- 10%

Sampling Information

Sample ID: MW-6-112012-1040

Sample Time: 1040

\# of Sample Containers: 7

Duplicate Sample ID: -

Sample Analysis: 8260 8270 PCBs

Locked (yes/no)	Well Cap (yes/no)	Surface Seal Intact (yes/no)	PID Measurement:	Odors:

Well Quality Data

Date	Time	Depth to Water ft bgs	Cumulative Volume Purged	pH (Standard Units)	Specific Conductance (uMhos/cm)	Temperature (°C)	Turbidity (NTU)	Color	Dissolved Oxygen	Oxygen Reduction Potential	Notes
11/20/12	948	7.16	0	7.09	3.28	13.9	15.3	Clear	5.51	163.9	Depth of Water: 6.87
	953	7.85	0.1	6.83	3.31	14.9	14.3		4.40	150.9	Length of Water Column: 9.03
	958	8.52	0.2	6.80	3.28	15.2	13.0		3.66	136.0	Depth of Well: 15.9'
	1003	9.19	0.3	6.78	3.28	15.2	5.85		3.47	126.0	Sheen Observed: Y N
	1008	9.31	0.7	6.77	3.29	15.4	5.51		3.05	120.7	DNAPL Observed: Y N
	1013	9.50	0.9	6.77	3.30	15.4	6.08		2.71	117.5	Did Well Go Dry: Y N
	1018	9.62	1.1	6.75	3.29	15.5	4.20		2.56	115.5	Other: OVM = 0.3 ppm TDR
	1023	9.79	1.2	6.73	3.28	15.6	2.84		2.03	113.4	1 well vol. = ~1.5 gal.
	1028	9.92	1.3	6.70	3.24	15.6	1.31		1.34	108.5	
	1033	10.07	1.4	6.68	3.24	15.6	1.30		1.31	107.9	
	1038	10.18	1.5	6.69	3.24	15.6	1.29		1.30	107.5	

APPENDIX C

NYSDEC AND USAR, 99TH RSC CORRESPONDENCE

From: Chek Ng <cbng@gw.dec.state.ny.us>
Sent: Monday, March 11, 2013 11:46 AM
To: Richard C CIV USARMY HQDA ACSIM (US) Ramsdell
Cc: John Swartwout
Subject: RE: New LUC Area for Niagara Falls ARC (UNCLASSIFIED)
Attachments: LRA_Survey_Prelim_Sub_2.pdf

Dick:

Based on my conversation with you on the phone, the formal survey of the LUC boundary does not differ too much from what I had originally agreed with Laura.

As such, I approve the designation of the protected area for any further work to provide health and environmental protection in the event of earthwork/construction.
Regards,

Chek Beng Ng, P.E.
Environmental Engineer 2
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany NY 12233-7015
Phone: (518) 402-9620
Fax: (518) 402-9627>>> "Ramsdell, Richard C CIV USARMY HQDA ACSIM (US)"
<richard.c.ramsdell2.civ@mail.mil> 3/1/2013 4:11 PM >>>
Classification: UNCLASSIFIED
Caveats: NONE

Mr. Ng - Laura Dell'Olio has moved on and I am working towards closing out this site and transferring it to the Town of Niagara for economic development.

We had a surveyor perform a survey of the boundary of the LUC area to be incorporated into the transfer documents. In our initial discussion with the surveyor and the LRA we decided it made sense to keep the groundwater protection area a short distance away from the buildings to avoid future confusion with building access. Attached is the draft survey of the LUC area with building setbacks. It is a little different then I imagined it would look, but I think it meets the objective of encompassing the contamination.

Can you please confirm if this protected area meets your expectations or provide further guidance on how you would prefer the protected area be laid out?

Thank you,
Dick Ramsdell
O: 703-545-2504
C: 703-981-3390

-----Original Message-----
From: Chek Ng [mailto:cbng@gw.dec.state.ny.us]
Sent: Friday, January 25, 2013 10:09 AM
To: Dellolio, Laura A CTR USARMY 99 RSC (US)
Cc: Gregory Sutton; John Swartwout; Salvatore Calandra; Ploschke, Christine M CIV USARMY 99 RSC (US); Hrzic, Jeffrey M CIV USARMY 99 RSC (US); Ramsdell, Richard C CIV USARMY HQDA ACSIM (US); mmoore@parsenviro.com

Subject: Re: New LUC Area for Niagara Falls ARC

Laura,

Based on the results presented below in your email, and upon my conversation with you, the newly defined boundary for the LUC for this property is acceptable to me.

Please keep in mind that the results from April 2012 Final RI report shows the soil levels outside the red polygon area to be above Unrestricted levels, but are below commercial levels. I understand that the entire property will be used for commercial purposes, and that the additional polygon that is noted in your attachment below requires additional Site Management Plan to be enforced in the area.

Because the TCE hit was slight above the SCGs, I believe the LUC would be sufficient to provide health and environmental protection in the event of earthwork/construction.

Regards,

Chek Beng Ng, P.E.
Environmental Engineer 2
New York State Department of Environmental Conservation Division of Environmental Remediation
625 Broadway, 12th Floor
Albany NY 12233-7015
Phone: (518) 402-9620
Fax: (518) 402-9627>>> "Dellolio, Laura A CTR USARMY 99 RSC (US)" <laura.a.dellolio.ctr@mail.mil>
1/18/2013 11:31 AM >>>

Hello Chek,

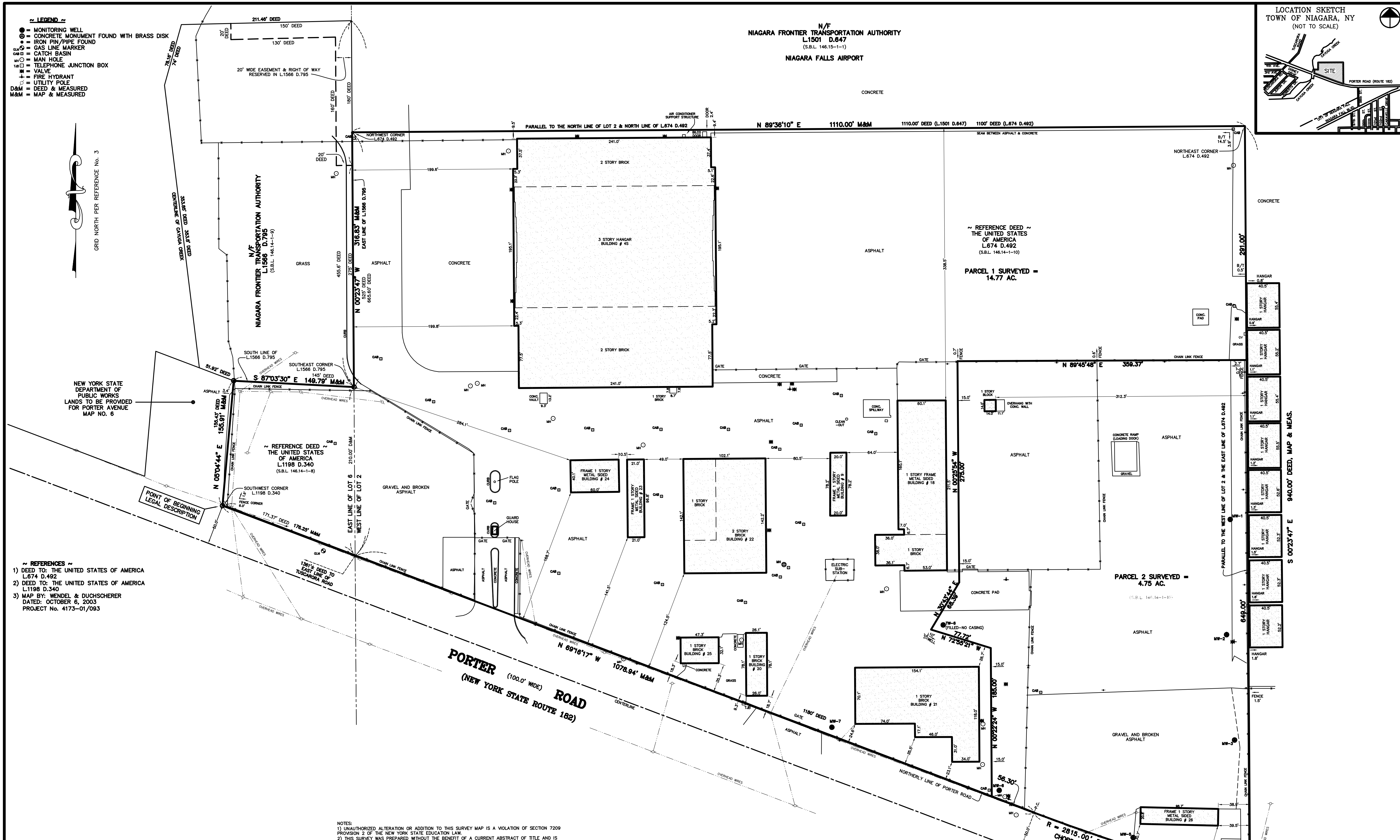
Happy New Year.

First, I just wanted to let you know that my last day with the 99th is 1/25. After supporting the Army Reserve for 4 years, I have decided to move on to a private consulting firm.

I want to touch base with you before I leave to let you know the results of the groundwater delineation that we just performed at Niagara, and also put you in touch with the folks who will be working on the site after I leave. Last summer we agreed with the future land owners that we would attempt to define the limits of contamination for the contaminates of concern in the RI. However, during the most recent groundwater water sampling we encountered a slight TCE exceedance, and we had not encountered TCE in any of the other previous sampling events. The exceedance was 7.8 ug/L in TW-5 (GA standard is 5).

We are proposing the land use control over a reduced area instead site wide as previously proposed in the RI that you had reviewed and issued a NFA for. The LUC requires the future owner provide NYSDEC with a "Site Management Plan" during any action in which groundwater is encountered in this area. We were able to better define the LUC area (see red area in the LUC figure attached), and TW-5 falls within this proposed restricted zone. Please note that MW-7 and TW-6 were dry and therefore not sampled.

Before we finalize the gw report and move forward with our proposed land use control area reduction without additional sampling, we wanted to engage you for your concurrence and get your thoughts about the reduction and the TCE hit.



NOTES:
1) UNAUTHORIZED ALTERATION OR ADDITION TO THIS SURVEY MAP IS A VIOLATION OF SECTION 7209 PROVISION 2 OF THE NEW YORK STATE EDUCATION LAW.
2) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT ABSTRACT OF TITLE AND IS SUBJECT TO ANY STATE OF FACT THAT MAY BE REVEALED BY AN EXAMINATION OF SUCH.

50 0 50 100 150
Scale: 1" = 50'

I HEREBY CERTIFY THAT THIS MAP WAS MADE FEBRUARY 8, 2012 FROM NOTES OF A SURVEY COMPLETED JANUARY 30, 2012.

KEVIN M. O'DONOGHUE, L.S. No. 49514

DATE: FEB. 8, 2012
JOB No. N12-3770s
DRAWN BY: KOD
CHECKED BY: KOD
SCALE: 1" = 50'

BOUNDARY SURVEY
OF LAND BELONGING TO
THE UNITED STATES OF AMERICA
NIAGARA FALLS AFRC/AMSA # 5(G)
BEING PART OF LOTS 2 & 6, TOWNSHIP 13, RANGE 9
OF THE HOLLAND LAND PURCHASE
SITUATE IN THE
TOWN OF NIAGARA
NIAGARA COUNTY, NEW YORK

WELCH & O'DONOGHUE
- LAND SURVEYORS, P.C.
2023 RT. 39, P.O. BOX 297
AVON, NEW YORK 14414
PH: 585-226-2990 FAX: 226-2991
OR
8713 RT. 237, P.O. BOX 669
STAFFORD, NEW YORK 14143
PH: 585-343-5334 FAX: 343-5810
EMAIL - WOSURVEY@ROCHESTER.RR.COM

REVISIONS				
NO.	DATE	BY	CHKED	DESCRIPTION

From: Chek Ng [mailto:cbng@gw.dec.state.ny.us]
Sent: Friday, January 25, 2013 10:09 AM
To: Dellolio, Laura A CTR USARMY 99 RSC (US)
Cc: Gregory Sutton; John Swartwout; Salvatore Calandra; Ploschke, Christine M CIV USARMY 99 RSC (US); Hrzic, Jeffrey M CIV USARMY 99 RSC (US); Ramsdell, Richard C CIV USARMY HQDA ACSIM (US); mmoore@parsenviro.com
Subject: Re: New LUC Area for Niagara Falls ARC

Laura,

Based on the results presented below in your email, and upon my conversation with you, the newly defined boundary for the LUC for this property is acceptable to me.

Please keep in mind that the results from April 2012 Final RI report shows the soil levels outside the red polygon area to be above Unrestricted levels, but are below commercial levels. I understand that the entire property will be used for commercial purposes, and that the additional polygon that is noted in your attachment below requires additional Site Management Plan to be enforced in the area.

Because the TCE hit was slight above the SCGs, I believe the LUC would be sufficient to provide health and environmental protection in the event of earthwork/construction.

Regards,

Chek Beng Ng, P.E.
Environmental Engineer 2
New York State Department of Environmental Conservation Division of Environmental Remediation
625 Broadway, 12th Floor
Albany NY 12233-7015
Phone: (518) 402-9620
Fax: (518) 402-9627>>> "Dellolio, Laura A CTR USARMY 99 RSC (US)" <laura.a.dellolio.ctr@mail.mil> 1/18/2013 11:31 AM >>>

Hello Chek,

Happy New Year.

First, I just wanted to let you know that my last day with the 99th is 1/25. After supporting the Army Reserve for 4 years, I have decided to move on to a private consulting firm.

I want to touch base with you before I leave to let you know the results of the groundwater delineation that we just performed at Niagara, and also put you in touch with the folks who will be working on the site after I leave. Last summer we agreed with the future land owners that we would attempt to define the limits of contamination for the contaminates of concern in the RI. However, during the most recent groundwater water sampling we encountered a slight TCE exceedance, and we had not encountered TCE in any of the other previous sampling events. The exceedance was 7.8 ug/L in TW-5 (GA standard is 5).

We are proposing the land use control over a reduced area instead site wide as previously proposed in the RI that you had reviewed and issued a NFA for. The LUC requires the future owner provide NYSDEC with a "Site Management Plan" during any action in which groundwater is encountered in this area. We were able to better define the LUC area (see red area in the LUC figure

I will be helping the 99th in a limited capacity over the next month or so until my position is backfilled, however after my departure please feel free to contact any of the people on the cc line to discuss this project.

I would like to further discuss this project with you on the phone next week if possible.

Thanks,

Laura

609-562-7661
919-270-7376

-----Original Message-----
From: Michael Moore [mailto:mmoore@parsenviro.com]
Sent: Thursday, November 15, 2012 2:14 PM
To: Chek Ng
Cc: John Swartwout; Dellolio, Laura A CTR CTR USAR 99TH RRC -NA-
Subject: RE: Additional Sampling at Niagara Falls, week of November 5th

Chek,

The soil borings are being installed at the sample locations as the wells and temporary wells. Regarding your second questions, we are focusing our investigation on the southeastern corner based on the previous work and because the buyer wanted a more focused delineation of the area for establishing the Site Management Plan.

Feel free to give me a call if you have any additional questions.

Thanks,

Michael D. Moore, PG, LSRP

Senior Project Manager

PARS Environmental, Inc.

500 Horizon Drive, Suite 540

Robbinsville, NJ 08691

-----Original Message-----
From: Chek Ng [mailto:cbng@gw.dec.state.ny.us]
Sent: Wednesday, November 14, 2012 10:47 AM
To: Michael Moore
Cc: John Swartwout; Dellolio, Laura A CTR CTR USAR 99TH RRC -NA-
Subject: Re: Additional Sampling at Niagara Falls, week of November 5th

Mike,

I reviewed the additional GW and Soil Sampling work plan, and I have a question on Figure 3. The Figure shows the location of the permanent and 1st and 2nd priority temporary wells. However, where is the soil boring locations? The report mentioned 13 test boring and I could not locate them.

Also, I presume we are narrowing our focus on the southeast corner of the property because that was the area that we found the PCBs in the first IRM, and the potential buyer wanted to make sure that area was delineated property. Am I correct?

Other than that, I have no further questions.

Thanks,

Chek Beng Ng, P.E.

Environmental Engineer 2

New York State Department of Environmental Conservation Division of Environmental Remediation

625 Broadway, 12th Floor

Albany NY 12233-7015

Phone: (518) 402-9620

Fax: (518) 402-9627>>> "Dellolio, Laura A CTR CTR USAR 99TH RRC -NA-" <laura.dellolio@usar.army.mil <mailto:laura.dellolio@usar.army.mil> > 10/31/2012 11:33 AM >>>
Hello Chek,

We will be onsite next week for the additional ground water delineation that we briefly spoke about a month or two ago. See figure 3 for sampling locations. We've had a very agressive schedule which didnt allow for a comment period for NYSDEC, however if you have any pressing issues about the sampling plan, please contact Mike Moore, our consultant at PARS Environmental, 609-890-7277. If you would like to attend the field event next week, please contact Dominic Van Tassel for site access, 814-460-9681, cc'd.

I will be out of contact next week (vacation out of the county, so no phone or cell access).

Thanks, Laura

Classification: UNCLASSIFIED
Caveats: NONE

attached), and TW-5 falls within this proposed restricted zone. Please note that MW-7 and TW-6 were dry and therefore not sampled.

Before we finalize the gw report and move forward with our proposed land use control area reduction without additional sampling, we wanted to engage you for your concurrence and get your thoughts about the reduction and the TCE hit.

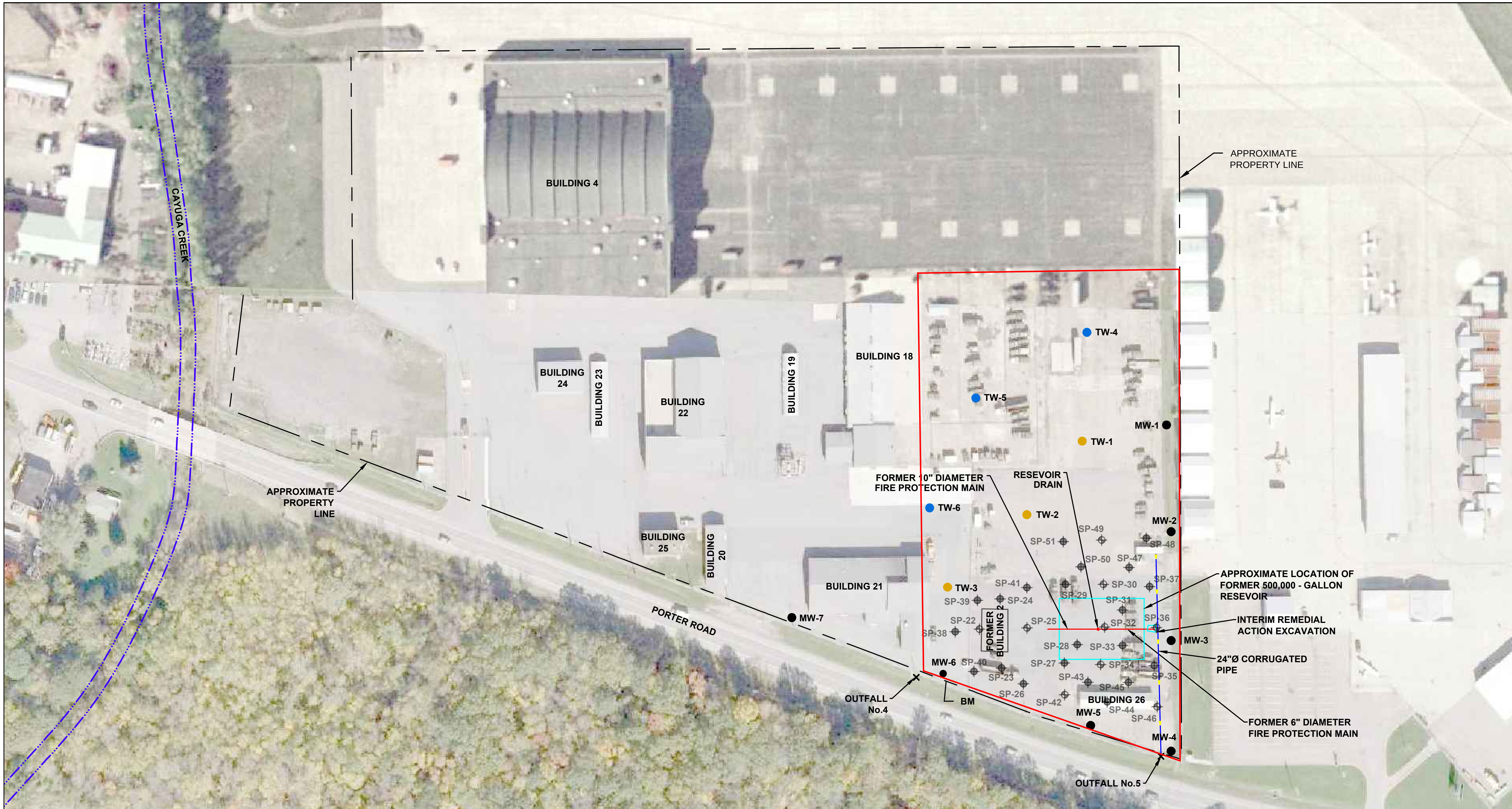
I will be helping the 99th in a limited capacity over the next month or so until my position is backfilled, however after my departure please feel free to contact any of the people on the cc line to discuss this project.

I would like to further discuss this project with you on the phone next week if possible.

Thanks,

Laura

609-562-7661
919-270-7376



LEGEND:

MW-6 ●	MONITORING WELL LOCATION
TW-3 ●	PRIMARY TEMPORARY WELL LOCATION
TW-6 ●	SECONDARY TEMPORARY WELL LOCATION
SP-51	SOIL PROBE LOCATION (SEPT. 2011)
SP-36	SOIL PROBE AND TEMPORARY WELL LOCATION (SEPT. 2011)

NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/l AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

SCALE IN FEET

40 0 70 140

FIGURE 2
MONITORING WELL / TEMPORARY WELL LOCATIONS
USAFRC
NIAGARA FALLS, NY

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: AS SHOWN	JOB No.: 773-04
CK'D. BY: MM	DATE: 1/9/13	FILE ID.: 773-04
REV. NO. --	REV. DATE: --	FIGURE NO.: 2

After Action Report
For the 99th RSC DPW Environmental Division
Dominic L. VanTassell, Regional Environmental Protection Specialist
O |814.836.4722
C |814.460.9681
dominic.l.vantassell.ctr@mail.mil

NIAGARA FALLS AFRC/AMSA 76 (G)	**NY046 (36555)**
9400 Porter Road, Niagara Falls, NY, 14304-1698	**9 July 2013**

Purpose:

The purpose of this visit was to conduct a semi-annual visit with the AFOS to check upon the facility.

Points of Contact:

Name	Rank	Status	Duty Title	Unit	Vendor	Phone
Scott Kawski	N/A	GS-12	RFOS	99th RSC DPW OPS	N/A	814.836.4712
Charlie DeMarti	N/A	CTR	AFOS	99th RSC DPW OPS	Northwind Eng.	347.219.9643
Dom VanTassell	N/A	CTR	REPS	99th RSC DPW ENV	GSRC	814.836.4722

After Action Review:

- The REPS was accompanied by the AFOS, Mr. Patterson.
- The buildings of the facility were opened and a brief inspection of the buildings was conducted.
- The facility is vacant and has no environmental concerns.

.

Attachments:

1. NTR

Assessment Report

NY046 - Niagara Falls Afrc - 2013/11/21

FacID: NY046 Site Code: 36555 Assessment ID: 008355
Facility: Niagara Falls Afrc
Address: 9400 PORTER RD
NIAGARA FALLS, NY 14304-1698

Assessor: Dominic Van Tassell
Facility POC: Mr. Wyland
Fiscal Year: 2014
Agency: 99th RSC

Assessment Findings

Reference: 08355-01 **Type:** Observation **Section:** T2.1.1.NY. (NY - March 2013) **Status:** Open

Summary Statement

If there is an incidental disturbance or other disturbance (not as part of a controlled asbestos project) of ACM, PACM, asbestos material, or suspect miscellaneous ACM assumed to be ACM at a building or structure, upon discovery of the disturbance, the property owner must contract with a licensed asbestos contractor for immediate isolation of the disturbance and cleanup.

Detailed Observation

As a result of water intrusion from the roof being damaged, the interior building walls, floors and ceiling tiles had been damaged. Much of the floor and ceiling tiles had been identified by an Asbestos Visual Inspection Report, dated July 2012, prepared by SBG EEG, as either Confirmed Asbestos Containing Material(CACM) or Assumed Asbestos Containing Material (AACM).

Water damage from the leak is causing the CACM & AACM floor tile, mastic, cove base & ceiling tile on the first and second floors to become friable. As water from rain and snow events continue to enter the building, damaging tiles and lifting floor tile, the friability of the material has increased significantly. It is to the point that floor tile breaks very easily when traversed upon, cove basing has peeled off the walls, and ceiling tiles have cracked, broke and fallen to floor in many places of the building.

There is ceiling tile damage in the following locations which have been identified as either CACM or AACM in the 2012 Asbestos Survey completed by SBG EEG:
South side of hangar:RM121, RM122, RM122A, RM209, RM210,RM 211, RM212, RM259, RM263, and RM265
North side of hangar:RM117, RM212, and RM221.

There is floor tile damage (to include mastic or cove base) in the following locations which have been identified as either CACM or AACM in the 2012 Asbestos Survey completed by SBG EEG:
South side of hangar:RM102B, RM121, RM124A, RM124B, RM210, RM211, RM253, RM259, RM263, E001 and S002.
North side of hangar: RM117, RM118B, RM212, RM219, RM223.

Citation & Requirement

12 NYCRR 56-1.5
Property owners are required to contract with licensed asbestos contractors in cases of incidental disturbance of asbestos.

Previous Finding: ☒ **Previous NOV:** ☐
Finding # 006048-01

Rating Score: Medium **Finding Category:** Class I
Environmental Threat: Unlikely **Readiness Impact:** Unlikely **Recurring Issue:** Carryover Finding
Regulatory Action: NOV for this finding is likely in the event of a regulatory inspection

Root Cause **Code / Category / Subcategory:** OO02 /Other (External Phenomena) / Other
Description: Non-compliance is caused by weather, ambient conditions, or acts of God
Justification: Damage to the hanger roof initially occurred in April of 2012, and during Hurricane Sandy's landfall, 29-30 October 2012, further damaged occurred which resulted in rain/ snow events to contribute to the asbestos disturbance.

Corrective Actions

- Contract with a licensed asbestos contractor for immediate isolation of the disturbance, cleanup, or remediation.

Pollution Preventions

- Utilize a proper and proactive O&M plan to keep disturbance of confirmed and assumed ACM to a minimum.

Attached Photos

Assessment Report

NY046 - Niagara Falls Afrc - 2013/11/21

FacID: NY046 Site Code: 36555 Assessment ID: 008355

Assessor: Dominic Van Tassell

Facility: Niagara Falls Afrc

Facility POC: Mr. Wyland

Address: 9400 PORTER RD
NIAGARA FALLS, NY 14304-1698

Fiscal Year: 2014

Agency: 99th RSC

Assessment Findings (continued)

EPAS-NY046-RM223N-20131121

EPAS-NY046-H200N-20131121

PARS
Environmental
Inc.

FINAL REMEDIAL INVESTIGATION/INTERIM REMEDIAL ACTION REPORT/HUMAN HEALTH RISK ASSESSMENT

Niagara Falls Armed Forces Reserve Center
9400 Porter Road
Niagara Falls, NY

VOLUME I OF III

Contract No. W912-12-D-0006
Delivery Order No. 0008

PREPARED FOR
U.S Army Corps of Engineers-Louisville District
600 Dr. Martin Luther King, Jr. Place
Louisville, KY 40202

PREPARED BY
PARS Environmental, Inc.
500 Horizon Center, Suite 540
Robbinsville, NJ 08691
609-890-7277
609-890-9116 (Fax)

PARS PROJECT NO. 895-08

DECEMBER 2014

TABLE OF CONTENTS

FIGURES

TABLES

PARS

LIST OF ACRONYMS

ABS	Absorption Fraction
ACH	Air Changes per Hour
AF	Soil to Skin Adherence Factor
AFRC	Armed Forces Reserve Center
AT	Averaging Time
ATSDR	Agency for Toxic Substances & Diseases Registry
BGS	Below Ground Surface
BRAC	Base Realignment and Closure
BW	Body Weight
CALEPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CF	Conversion Factor
CPC	Chemical of Potential Concern
CR	Contact Rate
CSCO	Commercial Soil Cleanup Objectives
CSF	Carcinogenic Slope Factor
DA	Absorbed Dose
DPW	Department of Public Works
ED	Exposure Duration
EF	Exposure Frequency
ELD	Environmental Law Division
EPC	Exposure Point Concentration
ESG	Environmental Service Group, Inc.
ET	Exposure time
EV	Event Frequency
FI	Fraction Ingested
HHRA	Human Health Risk Assessment
IR	Ingestion Rate
IRA	Interim Remedial Action
IRIS	Integrated Risk Information System
Kp	Permeability Coefficient
MDL	Method Detection Limit
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NYDOH	New York Department of Health
NYSDEC	New York State Department of Environmental Conservation
PAHs	Poly Aromatic Hydrocarbons
PARS	PARS Environmental, Inc.
PCBs	Polychlorinated Biphenyls
PEF	Particle Emission Factor
PID	Photo-ionization Detector
PPM	Parts Per Million
PPRTV	Provisional Peer Reviewed Toxicity Values
QAPP	Quality Assurance Project Plan

RAF	Relative Absorption Factor
RfD	Reference Doses
RI	Remedial Investigation
RL	Reporting Limit
RME	Reasonable Maximum Exposure
RSC	Regional Support Command
RSL	Regional Screening Level
SA	Skin Surface Area
SSCO	Supplemental Soil Cleanup Objectives
SVOCs	Semi Volatile Organic Compounds
TOGS	Technical and Operational Guidance Series
UCL	Upper Confidence Level
USACE	United States Corp of Engineers
USAR	United States Army Reserve
USCO	Unrestricted Soil Cleanup Objectives
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
V	Volume
VDEQ	Virginia Department of Environmental Quality
VF	Volatilization Factor
VOCs	Volatile Organic Compounds

STATEMENT OF TECHNICAL REVIEW

PARS Environmental, Inc. has completed the Final Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment for the Niagara Falls Armed Forces Reserve Center (AFRC).

Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy, principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures and materials used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results including whether the product meets the customer's needs consistent with the law and existing US Army Corp policy.

Significant concerns and explanation of the resolutions are documented within the project file. As noted above, all concerns resulting from the independent technical review of the project have been considered.

__________________________ ___________

Project Manager Date
Emily V. Esche

__________________________ ___________

Independent Technical Review Team Leader Date
Thomas P. Dobinson

1.0 INTRODUCTION

The United States Corps of Engineers (USACE), Louisville District retained the services of PARS Environmental, Inc. (PARS), under Contract No. W912QR-11-D-0022, Delivery Order No. 001, to conduct a remedial investigation (RI), human health risk assessment (HHRA), and interim remedial action (IRA) at the Niagara Falls Armed Forces Reserve Center (AFRC) in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The AFRC is located at 9400 Porter Road in Niagara Falls, New York, hereinafter the "Site." A Site Location Map and Site Plan are included as Figure 1 and Figure 2, respectively.

On August 21, 2011, a notice of 30 day period for comment was advertised in the Buffalo News for the remedial investigation at the Site. The public notice was completed in accordance with Section 120 (h) of CERCLA. A document repository for public review of files relating to the investigation was established at the Niagara Falls Public Library located in Niagara Falls, New York. No public comments were received pertaining to the Site.

A soil and groundwater investigation was conducted in the vicinity of six former underground storage tanks (USTs), former vehicle fueling area and the cast iron fire protection main that discharged to a 24-inch corrugated metal storm sewer line on the eastern boundary of the Site. The scope of work completed for this project was based on the approved Quality Assurance Project Plan (QAPP)/Sampling Plan (PARS, September 2011). The investigation was performed to investigate a potential source of the discharge that occurred at Outfall No. 5 into the drainage swale at the southeast corner of the Site in 2008 (see Section 2.7).

An IRA in the area of the fire protection main was also performed based on the findings of the site inspection conducted in November and December 2010. Residual product was observed within the fill material in an exploratory excavation (TP-12) installed adjacent to the 24-inch corrugated metal storm sewer line. A sample of impacted groundwater was collected and several compounds, including polychlorinated biphenyls (PCBs), were detected at concentrations exceeding the New York State Department of Environmental Conservation (NYSDEC) Class GA Objectives. The IRA included the removal of approximately 50 tons of soil, as well as residual product and groundwater with a visible sheen.

A supplemental investigation was performed at the Site in November 2012. The findings of this investigation are included in the *Final Supplemental Investigation Report* (PARS, March 2013).

Based on the findings of the remedial investigation and supplemental investigation, a HHRA was performed. The objective of the HHRA was to evaluate potential risks to human health under current and reasonably foreseeable future conditions. The risk assessment was completed in accordance with the regulations and guidelines set forth by the United States Environmental Protection Agency (USEPA) and the USACE.

2.0 BACKGROUND

2.1 SITE SETTING

The Niagara Falls AFRC is an approximate 19.5 acre parcel located on the southern portion of Niagara Township, in Niagara Falls, Niagara County, New York. The Site is bound to the south by Porter Road and the property located immediately south of Porter Road is undeveloped forested land. Niagara Falls International Airport is located immediately north and east of the Site. Other properties in the vicinity of the Site are used primarily for commercial purposes.

2.2 TOPOGRAPHY AND DRAINAGE

The Site is located on the USGS 7.5-minute Tonawanda West topographic map. Topography at the Site is relatively flat with a slight gradient to the west/southwest. The elevation at the Site is approximately 575 feet above mean sea level.

The Site is located within the Niagara Watershed. Surface and storm water drainage is to Cayuga Creek located immediately west of the Site. Cayuga Creek is an intermittent tributary of the Niagara River. Storm sewer lines, drainage swales and outfalls are depicted in Figure 2.

2.3 CLIMATE

According to the National Oceanic and Atmospheric Administration (NOAA), the average monthly temperature ranges from 24.8º Fahrenheit in February to 71.6º Fahrenheit in July. The annual mean temperature is 47.8º Fahrenheit. The lowest temperature recorded in Niagara Falls was -15º Fahrenheit and the highest temperature was 97º Fahrenheit.

The average annual precipitation is 33.93 inches and the average monthly precipitation ranges from 2.32 inches in February to 3.52 inches in September.

2.4 GEOLOGY

The Site is located in the Erie-Ontario Lowlands Physiographic Province. The region is characterized by relatively flat topography and dissected by east-west trending escarpments. The Site is located about 5 miles south of the Niagara Escarpment (*Environmental Condition of Property Report*, CH2MHill, June 2007).

The Niagara Falls area is underlain by glacial sediment consisting mainly of till and lacustrine silt and clay, which is approximately 5 to 80 feet thick. The glacial deposits overlay weathered dolomite and limestone of the Lockport Group (Niagaran Series of Middle Silurian age). The Lockport Group is underlain by approximately 100 feet of shale and limestone (Clinton Group), which is underlain by 110 feet of sandstone and shale (Medina Group).

Soils encountered during the site inspection consisted of non-cohesive fill from 0 to 4 feet below ground surface (bgs). Fill material at some probe locations extended from 8 to 13 feet bgs. The fill material encountered was comprised of a coarse-grained mixture of sand and gravel with varying amounts of fine-grained silt and clay. Varying amounts of brick, slag, concrete, rebar, asphalt and wood were observed within this matrix. Native surficial soils are comprised of silty clay with trace fine sand. Borings were not advanced beyond 13 feet bgs as part of the inspection activities.

2.5 HYDROGEOLOGY

The Site is underlain by the Lakemont silty clay loam and the Fonda mucky silt loam. Both soil types are fine-to moderately fine-textured and have a low permeability. These soils are subject to ponding and the water table in the vicinity of the Site is at a depth of less than 4 feet bgs (*Environmental Condition of Property Report*, CH2MHill, June 2007).

The glacial deposits at the Site act as a confining unit for the weathered bedrock below. The hydraulic properties in the Lockport dolomite and limestone are related to secondary porosity and permeability owing to the presence of factures and solutioning. The main water-bearing zones in the Lockport Group are the weathered bedrock surface and horizontal fracture zones near stratigraphic contacts. The rock matrix transmits negligible amounts of groundwater because primary porosity is very low. The horizontal hydraulic conductivity of the weathered bedrock is estimated at 40 feet per day.

Groundwater was encountered at depths ranging from 2 to 6 feet bgs in soil probes and exploratory excavations during the site inspection. It is likely that the coarse-grained fill material overlying the less-permeable native fine-grained clay is creating the perched groundwater conditions at the Site.

2.6 HISTORY OF OPERATIONS

The United States Government acquired the Site in 1955 and the United States Navy used the Site to service helicopters and airplanes. Most of the buildings at the Site were constructed by 1956. The Army obtained the Site from the Navy in 1962. From 1970 to 1975, the Site was used to service Nike Missiles from missile batteries around the state of New York.

The Site was most recently occupied by the 277th Quartermaster Company, the 865th Combat Support Hospital, the 1982nd Forward Surgical Unit and Area Maintenance Support Activity 76. A small presence was also maintained by personnel of the Department of Public Works (DPW), Fort Drum, New York (*Environmental Condition of Property Report*, CH2MHill, June 2007). No personnel or units have occupied the Site as of September 15, 2011 per Base Realignment and Closure (BRAC) law.

2.7 PREVIOUS INVESTIGATIONS

A yellow substance was observed discharging from the 24-inch diameter corrugated storm sewer at outfall (Outfall No. 5) into the drainage swale at the southeast corner of the Site. An investigation was performed by United States Army Reserve (USAR) in 2008.

The New York State Department of Environmental Conservation (NYSDEC) was notified on June 24, 2008 and Spill # 0803478 was assigned for the discharge. Product was observed discharging from the 6-inch diameter cast iron fire protection main into the 24-inch diameter corrugated storm sewer and the 6-inch line was capped. The drain valve for the 6-inch line was uncovered and dislodged in June 2008. After dislodging the valve, product was observed in the excavated hole. A sample was collected and the product was identified as diesel fuel. PCBs were detected in the sample at a concentration of 2.1 mg/kg (Aroclor 1254).

As part of the investigation, a sediment sample was collected from the 24-inch diameter storm sewer adjacent to the cast iron pipe. A sample of the yellow substance was also collected from the drainage swale. The sample results revealed that the sediment in the pipe and the yellow substance present in the swale contained detectable levels of PCBs. PCB concentrations in the sediment and yellow substance were 220 mg/kg (Aroclor 1254) and 2.81 mg/kg (Aroclor 1254), respectively.

Storm Sewer and Drainage Swale Investigation/Remediation

The USACE and the USAR 99th Regional Support Command (99th RSC) retained the services of PARS to investigate and remediate the drainage swale at Outfall No. 5. The 24-inch diameter storm sewer was also cleaned as part of the remedial action. Approximately 134 tons of PCB impacted soil was excavated from the drainage swale.

PCB concentrations in the post-excavation soil samples at Outfall No. 5 and from the drainage swale were below the maximum contaminant level of 1 milligram per kilogram (mg/kg) that was established by the NYSDEC. Investigation and remediation activities are outlined in the *Remedial Action Report* (PARS, March 2010).

Site Inspection

Six USTs were reportedly present along the eastern and western sides of former Building 2. Additionally, a vehicle fueling area was located immediately west of the building. No documentation was available regarding the closure of these USTs and fueling area.

In November and December 2010, PARS conducted a site inspection to evaluate potential impacts associated with the former USTs at Building 2 and the fire protection main. Inspection activities consisted of a geophysical survey, exploratory excavations and soil and water sampling. The findings were outlined in the *Site Inspection Report* (PARS, June 2011).

The geophysical survey noted three anomalies identified as debris from former Building 2. An approximate 150-foot long linear anomaly was identified in the general vicinity of the fire protection main that terminates at the 24-inch diameter corrugated storm sewer line. No anomalies consistent with USTs were identified as part of the geophysical survey.

Twelve exploratory excavations (TP-1 through TP-12) were completed based on the findings of the geophysical survey, previous investigations and field observations. A soil sample for laboratory analysis was collected from TP-1. Several SVOCs were detected in the sample at concentrations exceeding the NYSDEC Unrestricted and Restricted Use Soil Cleanup Objectives.

The 6-inch diameter cast iron fire protection water main was encountered in six exploratory excavations (TP-2, TP-3, TP-4, TP-11 and TP-12). At TP-11, the 6-inch diameter pipe terminated at a concrete catch basin presumed to be the 500,000-gallon reservoir drain. A sample was collected from the water flowing from the 6-inch diameter line into the concrete catch basin. Several compounds including toluene, naphthalene, PCBs and chromium were detected in the water sample at concentrations exceeding the NYSDEC Class GA Objectives. Petroleum product and a heavy sheen were observed within the fill material and on the groundwater surface in one of the exploratory excavations (TP-12). Several compounds, including PCBs, were detected in a water sample collected from TP-12 at concentrations exceeding the NYSDEC Class GA Objectives. A drum vacuum was used to remove petroleum impacted water from the excavation.

Twenty-one soil probes were completed as part of the site inspection. One soil sample was collected from each probe for laboratory analysis. Acetone, metals and PCBs were detected in several samples at concentrations exceeding the Unrestricted Use Soil Cleanup Objective. Several metals were detected at concentrations exceeding the Restricted Use Soil Cleanup Objectives. Soil probe and test pit locations from the Site Inspection are shown on Figure 3.

PARS recommended conducting an investigation to further evaluate soil and groundwater impacts at the locations of the former USTs at Building 2 and in the vicinity of the fire protection main. Additionally, PARS recommended that the residual petroleum product observed within the fill material at TP-12 be removed part of an IRA because of the close proximately of the residual product to the 24-inch corrugated metal storm sewer line.

In September 2011, PARS submitted a QAPP/Sampling Plan for the RI/IRA to NYSDEC. Comments received from the NYSDEC Case Manager, Chek Ng, stated that fill material brought on-site may be the cause of the elevated concentrations for certain metals in the soil, which should nullify any concerns for high metal content in the soils. The origin of the fill material is unknown, but the fill material does contain some slag. Iron blast slag and open hearth slag from production of carbon steel is commonly found throughout western New York. Slag from steel production facilities in the area was commonly used as fill material in the region.

3.0 SOIL INVESTIGATION

Prior to initiating the field activities, Dig Safe New York was contacted to locate the underground utilities in the public right-of-way. The soil investigation was performed as outlined in the approved QAPP/Sampling Plan. As instructed by USAR and based on NYSDEC workplan comments, metals were eliminated as a potential contaminant of concern at the Site because of regional fill material. Therefore, soil samples were not analyzed for metals.

3.1 SOIL INVESTIGATION METHODS

3.1.1 Soil Probes

Thirty soil probes (16 primary and 14 secondary) were completed on September 26, 27 and 28, 2011 using a Geoprobe 54 OUD track-mounted rig equipped with a pneumatic hammer. Soil boring locations are depicted in Figure 4. Soil probe logs are included in Appendix A.

The soil probes were advanced using direct-push methods via a 2-inch diameter, 48-inch long macro-core sampler that was driven continuously at 48-inch intervals. A dedicated acetate sampler liner was used between sampling intervals.

Material recovered in each acetate sample liner was field screened for total organic vapors using an OVM (MiniRAE 2000) equipped with a photo-ionization detector (PID) and a 10.6 eV ultraviolet lamp. The OVM used was calibrated daily in accordance with manufacturer's specifications using a gas standard of isobutylene at an equivalent concentration of 100 parts per million (ppm). Ambient air at the Site was used to establish background organic vapor concentrations.

Following field screening, when sufficient sample recovery was obtained, representative portions of the recovered soils were placed in zip-lock bags for further classification and headspace analysis. The headspace in the bag above each collected soil sample was screened for total organic vapors. With the exception of the headspace sample result of 38.6 parts per million (ppm) measured at SP-49 from 0-4 feet bgs, total organic vapor concentrations were non-detect in the headspace screening of the soil samples collected during the investigation.

Two soil samples were selected for submittal to the laboratory from each of the 30 probes completed. One sample was collected from the upper 4 feet and a second sample was collected from an interval between 4 feet and the bottom of the probe. Sample depths were determined based on visual, olfactory, field screening and professional judgment. Soil samples collected from the primary soil probe locations were submitted for TCL VOCs, TCL SVOCs and PCBs analysis. Soil samples from the secondary soil probe locations were submitted to the laboratory and placed on hold. Secondary soil probe samples were analyzed at select locations based on the results from the primary soil sample locations. A total of 44 soil samples were collected and analyzed by the laboratory. Samples were each given a unique sample designation [(e.g., SP-22-2-4 = SP (soil probe); 22 (sample location); 2-4 (sample depth in feet)].

Upon probe completion, the soil probe holes were backfilled with the soil cuttings.

3.1.2 Outfall Soil Sampling

At the request of NYSDEC, a surface soil sample was collected at the discharge location of Outfall 4 on September 27, 2011. The soil sample was collected immediately below the vegetative cover at the discharge location within the drainage swale along Porter Road. No standing water was present in the swale at the time of sampling and there was no flow from Outfall 4. The sample was analyzed for TCL VOCs, TCL SVOCs and PCBs. The location of the soil sample collected at the outfall is depicted in Figure 4.

3.2 SOIL SAMPLE RESULTS

Findings of the laboratory testing of the soil samples analyzed are presented in the following subsections. An analytical results summary table is included in Table 1. The analytical results for the soil samples are summarized on Table 2. The analytical laboratory reports are provided in Volume II.

The remedial investigation was performed to address spill case #0803478, assigned by the NYSDEC; therefore the analytical test results for the soil samples were compared to:

- NYSDEC, 6 NYCRR, Subpart 375-6, Unrestricted Soil Cleanup Objectives (USCOs) and Commercial Soil Cleanup Objectives (CSCOs), effective December 14, 2006; and
- NYSDEC Final Commissioners Policy, CP-51, Supplemental Soil Cleanup Objectives (SSCOs) dated October 21, 2010 (CP-51 SCGs).

3.2.1 Soil Probes

Volatile Organic Compounds

Acetone was detected in soil sample SP-23-2-4 at a concentration of 60 micrograms per kilogram (µg/kg) which slightly exceeds the USCO for the compound of 50 µg/kg. Acetone did not exceed the CSCO for the compound of 500,000 µg/kg. Acetone is a common laboratory contaminant and is not considered a contaminant of concern at the Site. All other detected VOCs were at concentrations below their respective USCOs and CSCO.

Based on primary soil sample results, secondary soil probe samples were not submitted for VOC analysis.

Semi-volatile Organic Compounds

Several SVOCs were detected at concentrations exceeding their respective USCO in soil samples SP-25-2-4 and SP-25-6-8. Dibenzo(a,h)anthracene and benzo(a)pyrene were also detected at concentrations exceeding their respective CSCO in these two samples.

Six SVOCs were detected at concentrations exceeding their respective USCO in soil sample SP-29-1-3. Benzo(a)pyrene was also detected at a concentration exceeding the CSCO in this sample. Benzo(b)fluoranthene was detected at a concentration exceeding the USCO in SP-37-1-3.

Based on primary soil sample results, 6 secondary soil probe samples (SP-41-1-3, SP-41-6-8, SP-50-1-3, SP-50-6-8, SP-51-1-3, and SP-51-6-8) were taken off hold and tested for SVOCs. No SVOCs were detected in these secondary soil probe samples at concentrations exceeding the respective USCO.

Polychlorinated Biphenyls
Total PCB concentrations exceeding the USCO of 100 µg/kg were identified in the following 5 samples; SP-28-1-3 (1,100 µg/kg), SP-29-1-3 (320 µg/kg), SP-30-1-3 (150 µg/kg), SP-32-2-4 (410 µg/kg) and SP-33-0-2 (940 µg/kg). The concentration of PCBs detected at SP-28-1-3 (1,100 µg/kg) also exceeds the CSCO of 1,000 µg/kg.

Based on primary soil sample results, 8 secondary soil probe samples (SP-41-1-3, SP-41-6-8, SP-47-1-3, SP-47-6-8, SP-50-1-3, SP-50-6-8, SP-51-1-3, and SP-51-6-8) were taken off hold and tested for PCBs. PCBs were not detected above MDLs in the 8 secondary soil probe samples.

3.2.2 Outfall Sampling

Volatile Organic Compounds
VOCs were not detected above MDLs in the soil sample from Outfall 4.

Semi-Volatile Organic Compounds
Nine SVOCs were detected at concentrations exceeding the respective USCO and 5 SVOCs were detected at concentrations exceeding the respective CSCO.

Polychlorinated Biphenyls
Total PCBs were detected in the outfall sample at a concentration of 210 µg/kg, which exceeds the USCO for the compound of 100 µg/kg. PCBs were not detected in the sample above the CSCO of 1,000 µg/kg, which was the cleanup objective established by NYSDEC for the previous remediation of the drainage swale.

4.0 GROUND WATER INVESTIGATION

The groundwater investigation was performed as outlined in the approved QAPP/Sampling Plan. As instructed by USAR and based on correspondence with NYSDEC workplan comments, metals were eliminated as a potential contaminant of concern at the Site because of regional fill material. Therefore, groundwater samples were not analyzed for metals.

4.1 SAMPLE METHODS

On September 26 and 27, 2011, nine temporary microwells were installed in the open probe-holes at SP-22, 25, 30, 32, 34, 36, 42, 46 and 49. The locations of the temporary microwells are depicted in Figure 4.

The microwells were constructed using one-inch diameter Schedule 40 PVC casing and screen. Groundwater was encountered in temporary microwells at a depth of 3-4 feet bgs. A peristaltic pump was used to purge the microwells prior to sampling to remove suspended particulates and to ensure that a representative groundwater sample was collected. Microwells located at SP-36, SP-42 and SP-49 were not purged due to limited recharge.

Eight groundwater samples were collected from the 9 temporary microwells using disposable Teflon© bailers. The temporary microwell installed at soil probe location SP-46 was dry following several attempts to collect a sample. Groundwater samples from SP-22, SP-25, SP-30, SP-32, SP-36 were analyzed for VOCs, SVOCs, and PCBs. Samples collected at SP-42 and SP-49 were not analyzed for SVOCs and PCBs due to insufficient groundwater recharge.

4.2 SAMPLE RESULTS

Findings of the laboratory testing of the soil samples analyzed are presented in the following subsections. An analytical results summary table is included in Table 1. The analytical results for the groundwater samples are summarized on Table 3. The analytical laboratory reports are provided in Volume II.

The analytical test results for the groundwater samples were compared to:

- NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations dated October 1993; Revised June 1998; ERRATA Sheet dated January 1999; and Addendum dated April 2000 (Class GA criteria).

Volatile Organic Compounds

Benzene was detected at SP-49 and trichlorofluoromethane was detected at SP-22 at concentrations slightly exceeding the respective Class GA criteria. No other VOCs were detected in the groundwater samples at concentrations exceeding the respective Class GA criteria.

Semi-Volatile Organic Compounds

Four SVOCs were detected at concentrations exceeding the respective Class GA criteria at 3 locations (SP-22, SP-25 and SP-34). These compounds are benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

Polychlorinated Biphenyls

Total PCBs were detected in groundwater samples from locations SP-30, SP-32 and SP-36 at concentrations exceeding the Class GA Criteria for the compound of 0.09 µg/kg. PCB concentrations in these three samples were 0.77 µg/kg (SP-30), 3 µg/kg (SP-32), and 13 µg/kg (SP-36). PCBs were not detected in the other groundwater samples at concentrations above the laboratory MDL.

5.0 INTERIM REMEDIAL ACTION

5.1 INTERIM REMEDIAL ACTION METHODOLOGY

On September 29, 2011, PARS performed IRA activities at the Site. Photographs taken during the IRA are included in Appendix B of this report.

As part of the IRA, an approximately 10-foot (north-south) by 12-foot (east-west) area was excavated to a depth of approximately 5 feet bgs in the vicinity of the former exploratory excavation, TP-12. Excavation boundaries are depicted in Figure 5.

Excavation activities were performed using a small track excavator. Approximately 6 to 12 inches of surficial stone material was removed and stockpiled for reuse as cover, following backfill of the excavation. Approximately 40 tons of soil was removed from the excavation and stockpiled within an impoundment made of polyethylene sheeting and hay bales. The soil pile was covered and secured using polyethylene sheeting upon completion of excavation activities. A waste composite sample was collected from the soil pile following excavation activities and analyzed for TCLP VOCs, SVOCs, metals, and PCBs, pH, and ignitability. Analytical results for the waste composite sample are included in Volume II.

During soil excavation activities, perched groundwater was observed at approximately 2 feet bgs. Perched groundwater exhibiting a surface sheen was pumped from the excavation using a vacuum truck operated by Environmental Service Group, Inc. (ESG) of Tonawanda, New York. Approximately 2,000-gallons of groundwater was removed from the excavation and properly disposed of at Covanta Energy in Niagara Falls, New York. Waste disposal documentation is included in Appendix C.

At the completion of soil removal activities, an approximate 8-foot long section of the 6-inch diameter cast iron fire protection main was removed from within the limits of the excavation. The open ends of the pipe were fitted with a Fernco and PVC cap prior to backfilling. The section of pipe that was removed appeared to be in good condition with no holes observed.

On December 8, 2011, the stockpiled soil from the excavation was loaded onto trucks and transported to the Allied Waste Niagara Falls Landfill, Division of Republic Services in Niagara Falls, New York. Disposal documentation is included in Appendix C.

The excavation was backfilled with approximately 40 tons of clay from Seven Springs Gravel Products, LLC in Batavia, New York. The clay backfill material was placed into the excavation in approximately 1-foot thick lifts and compacted using the bucket of the excavator. Once at grade, the gravel material initially removed was placed over the top of the backfilled excavation. Clean Fill documentation is provided in Appendix D.

5.2 CONFIRMATORY SOIL SAMPLING

Five confirmatory soil samples, four (4) sidewall samples and one (1) bottom of excavation sample, were collected from the excavation. The confirmatory soil samples were analyzed for TCL VOCs, TCL SVOCs and PCBs. The samples were analyzed for TCL VOCs, TCL SVOCs and PCBs. Sample locations are depicted in Figure 5.

VOCs, SVOCs and PCBs were not detected in the confirmatory samples at concentrations exceeding the applicable USCOs and CSCOs. The analytical results for the soil samples are summarized in Table 2. The analytical laboratory report is provided in Volume II.

6.0 TECHNICAL OVERVIEW

6.1 RELIABILITY OF ANALYTICAL DATA

A total of 47 soil samples, including one duplicate sample, were collected as part of the investigation and remediation. Forty-two (42) were collected as part of the investigation and five (5) confirmatory soil samples were collected as part of the interim remedial action. Nine groundwater samples, including one (1) duplicate sample were also collected during the investigation phase of the project.

The reliability of data generated for this report was evaluated and is presented in two sections. The first section addresses conformance with the field-sampling event and the second section addresses laboratory conformance during analysis of the samples.

The analytical test results for the soil samples were compared to NYSDEC, 6 NYCRR, Subpart 375-6, Unrestricted Soil Cleanup Objectives (USCOs) and Commercial Soil Cleanup Objectives (CSCOs), effective December 14, 2006; and NYSDEC Final Commissioners Policy, CP-51, Supplemental Soil Cleanup Objectives (October 21, 2010).

The analytical test results for the water samples were compared to NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations dated October 1993; Revised June 1998; ERRATA Sheet dated January 1999 and Addendum dated April 2000 (Class GA Objective).

6.1.1 Field Event Conformance

Field quality control and quality assurance procedures outlined in the *Quality Assurance Project Plan/Sampling Plan* (PARS, September 2011) were implemented as part of the project. These procedures included field calibration of equipment, field sampling procedures, field decontamination of equipment and sample management.

An OVM was used to field screen soils for total organic vapors. The OVM was calibrated daily in accordance with manufacturer specifications using a gas standard of isobutylene at an equivalent concentration of 100 ppm. Ambient air was used to establish background organic vapor concentrations.

Samples were collected in laboratory provided sample containers. The samples were immediately transferred to insulated coolers, provided by the laboratory, containing ice. A chain-of-custody form was used to trace the path of sample containers from the Site to the laboratory.

One field duplicate soil sample was collected to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. The field duplicate sample was a separate aliquot of the same sample. Prior to dividing the sample into "sample" and "duplicate" aliquots, the samples were homogenized (except for the VOC aliquots). A duplicate sample of SP-34-6-8 was collected. The duplicate soil sample results are summarized in Table 2. Overall, detected compounds and concentrations were consistent for the sample and field duplicate sample.

One field duplicate groundwater sample was collected as part of the remedial investigation by alternately filling the laboratory sample containers during sample collection. A duplicate sample of SP-34-110926 was collected. The duplicate groundwater sample results are summarized in Table 3. Overall, detected compounds and concentrations were consistent for the sample and field duplicate sample.

A soil rinsate sample (rinsate-soil) and a groundwater rinsate sample (rinsate-groundwater) were collected as part of the remedial investigation by passing analyte-free water through the sampling equipment into sample containers. The rinsate samples were analyzed for TCL VOCs, TCL SVOCS and PCBs. No compounds were detected in the rinsate samples at concentrations above the laboratory method detection limits. Rinsate sample results are summarized in Table 2 and 3. The laboratory analytical results are included in Volume II.

Trip blanks were prepared by the laboratory and accompanied the groundwater samples. Two trip blanks were analyzed for TCL VOCs. Methylene chloride was detected in both of the trip blanks. Methylene chloride was detected at concentrations below the Class GA Objective and was not detected in any of the groundwater samples, which indicates laboratory contamination of the samples. Analytical results for the trip blanks are summarized in Table 3. The laboratory analytical results are included in Volume II.

6.1.2 Laboratory Conformance

Soil and groundwater samples were collected for laboratory analysis as part of the project. Laboratory analysis was performed by TestAmerica Laboratories in Amherst, New York (NY Certification # NY455). Samples were analyzed for TCL VOCs, TCL SVOCs and PCBs in accordance with United States Environmental Protection Agency (USEPA) methods as summarized in Table 1.

Laboratory instruments and equipment were calibrated following SW-846 analytical method protocols. Initial calibrations and calibration checks were performed at a frequency specified in each analytical method.

Method blanks and instrument blanks were used by the laboratory to evaluate data quality. The purpose of the method blank is to assess contamination introduced during sample preparation. Method blanks are prepared and analyzed in the same manner as the field samples. Instrument blanks are analyzed with field samples to assess the presence or absence of instrument contamination. The frequency of instrument blanks is defined by the analytical method. The laboratory reports provided by Test America Laboratories are included in Volume II. The laboratory reports were prepared in accordance with the New York Analytical Services Protocol (Category B deliverable).

Analytical results with analytes identified in both the method or instrument blanks and the field sample are qualified with a “B” qualifier. Compounds identified with a “B” qualifier in soil samples were chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, phenanthrene and benzo(g,h,i)perylene. Compounds identified in groundwater samples with a “B” qualifier were di-n-butyl phthalate and phenanthrene.

Analytical results qualified with a “J” qualifer indicate that the results are estimated. The concentration detected falls between the method detection limit (MDL) and the reporting limit (RL). The MDL is the lowest concentration that the instrument can detect an analyte and the RL is the lowest concentration at which an analyte can be detected in a sample and its concentration can be reported with a reasonable degree of accuracy and precision.

7.0 HUMAN HEALTH RISK ASSESSMENT

7.1 HHRA OBJECTIVES

The objective of the HHRA is to evaluate potential risks to human health under current and reasonably foreseeable future conditions. The risk assessment is consistent with the regulations and guidelines set forth by the USEPA and the USACE.

The evaluation of human health risks was divided into four major sections: hazard identification, exposure assessment, toxicity assessment and risk characterization. Risks were examined with respect to exposure to chemicals detected in surface soil, subsurface soil and groundwater at the Site or under the influence of the Site.

7.2 IDENTIFICATION/SELECTION OF CHEMICALS OF POTENTIAL CONCERN

The first step in the risk assessment process was to identify Site-related chemicals. Site-related chemicals selected for quantitative evaluation were defined as Chemicals of Potential Concern (CPCs). CPCs were identified based on analytical results collected as part of remedial investigation activities (see Sections 2.7, 3.0 and 4.0).

One surface soil sample was collected from Outfall No. 4 during the Remedial Investigation. This sample was not evaluated for SVOCs as part of the risk assessment because these compounds detected in soil from the swale are not suspected to be from a point source release. The SVOCs detected in the sample from the drainage swale are commonly found in ditches that receive storm water runoff from asphalt paved surfaces. The NYSDEC agreed that SVOCs were not associated with a discharge from the Site and were likely related to runoff. PCBs were detected in this sample at a concentration that exceeds the USCO for the compound of 100 µg/kg, but less than the cleanup objective established by the NYSDEC for the remediation of the swale of 1,000 µg/kg. This surface soil sample will be evaluated for PCBs as part of the revised risk assessment.

The two groundwater samples (west end pipe and TP-12) collected during the *Site Inspection* (PARS, June 2011) were not used in the revised risk assessment. IRA activities were performed at the Site in September 2011. These activities included the excavation of a 10 foot by 12 foot area in the vicinity of TP-12 and the removal of approximately 2,000 gallons of water. IRA activities also included the removal and capping of an 8 foot section of the 6” line from where the west end pipe groundwater sample was collected. The groundwater samples at TP-12 and the west end pipe were collected prior to the IRA activities and it was determined that these samples were not representative of current groundwater conditions at the Site.

In addition to the samples collected during the Remedial Investigation, all subsurface soil samples collected during the Site Inspection in November 2010 (*Site Inspection Report*, PARS, June 2011) were used to evaluate subsurface soil CPCs. Only post-excavation soil sample results collected in 2009 from the drainage swale excavation *(Remedial Action Report*, PARS, March 2010) were also used to evaluate subsurface CPCs. The excavation was backfilled using one foot of clean fill material; therefore, all post-excavation sample results from the ditch remediation were analyzed in the risk assessment as subsurface soil.

A Supplemental Investigation was conducted by PARS in 2012 (*Supplemental Investigation*, PARS, March 2013). The two subsurface soil and eleven groundwater samples have been included in the risk assessment. Analytical result summary tables for samples used for the CPC selection are included in Appendix E. Volume II includes laboratory reports for samples collected as part of the Remedial Investigation and IRA discussed in Sections 3.0, 4.0 and 5.0. Volume III includes the reports and associated laboratory reports from previous investigation and remediation activities conducted by PARS. Additionally, Volume III includes laboratory analytical results from the supplemental investigation performed in 2012.

7.3 INITIAL SCREENING

The analytical results from the sampling events were evaluated and compared to applicable regulatory standards. Compounds detected at concentrations above the applicable standards were selected as part of the initial screening process.

The following subsections outline the findings of the sampling events.

7.3.1 Soil

Soil sample results were compared to the applicable NYSDEC USCO and the NYSDEC CSCO, which are more stringent than the EPA RSL. A compound was selected for secondary screening if the concentration exceeded the USCO which are the more conservative cleanup objective. All soil samples collected were evaluated as subsurface soil, which is defined as any soil sample collected at a depth greater than 1.0 feet bgs.

The compounds that were detected at concentrations above the applicable USCO in subsurface soils were acetone, benzo(a)anthracene, dibenz(a,h)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and PCBs (Aroclor 1254 and Aroclor 1260). These compounds were selected for further evaluation as CPCs using the secondary screening process (see Section 7.4).

One surface soil sample was collected at Outfall No. 4. Aroclor 1260 was detected at a concentration above the applicable USCO in the surface soil sample. This compound was selected for further evaluation as a CPC using the secondary screening process (see Section 7.4)

7.3.2 Groundwater

Groundwater sample results were compared to the NYSDEC Class GA criteria. The compounds that were detected at concentrations above the criteria were benzene, trichlorofluoromethane, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, trichloroethene and PCBs (Aroclor 1254 and 1260). These compounds were selected for further evaluation as CPCs using the secondary screening process (Section 7.4).

7.4 SECONDARY SCREENING

All compounds selected as part of the initial screening process, which were detected at concentrations above the applicable USCO, were carried into the secondary screening process. Evaluation of compounds for the secondary screening process is based on the guidelines set forth in the USEPA *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (RAGS).*

The frequency of detection, mean, range, and maximum detection concentration were calculated for each compound and media type. The frequency of detection was calculated by dividing the total number of samples collected during the sampling events by the total number of detections for each compound. The range is the minimum and maximum detected concentration for the compound for all sampling events.

The mean was calculated for each compound by adding the detected concentrations and dividing by the total number of samples. If the compound was not detected in the sample, one half the method detection limit was used based on Section 5.3.3 of the USEPA *Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual Part A*. For field duplicate samples, the higher concentration of the compound detected in the sample or its field duplicate was used for the sample location. Samples denoted with the lab qualifier J and B were also used in the risk assessment. A description of these qualifiers is listed in Section 6.1.2.

The 95% upper concentration limit (UCL) was calculated using updated PRO UCL 5.0.00 Software developed by Lockheed Martin and the USEPA (*Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites)* using the appropriate statistical method based on the distribution of data. All detected and non-detected concentrations were included. In some cases, there was an insufficient number of detections and the 95% UCL could not be calculated for the compound. If the UCL could not be calculated, the maximum detected concentration for the compound was used in the risk assessment.

Based on the distribution of statistical data for some of the groundwater and subsurface soil samples, the Pro UCL Software recommended using the 97.5% UCL, which yields a more conservative assessment. The results of the 95% and 97.5% UCL calculations are included in Appendix F.

The 95% or 97.5% UCL was used as the exposure point concentration (EPC) for each compound. The EPC is an estimate of the mean concentration of a compound found in a specific medium at an exposure point. If the compound was selected for additional analysis in the HHRA, the UCL was used as the EPC for the rest of assessment. If the UCL could not be determined, the maximum detected concentration for the compound was used as the EPC.

The maximum detected concentration for each compound identified as part of the initial screening process was compared to the respective Regional Screening Level (RSL) presented in the USEPA Regional Screening Tables. Groundwater samples were compared to the RSL Tapwater Supporting Table and the surface soil sample was compared to the RSL Residential Table.

According to the U.S. Army, the proposed future reuse within the impacted area of the Site includes a paved parking lot and commercial building. Residential use of the Site is not proposed due to the close proximity to the airport. There is no anticipated future use of the Site for residential purposes. A deed restriction prohibiting future residential land use will be established during the transfer of the Site. Additional information regarding the use of the Site is located in Section 7.6.2. Based on this information, subsurface soil samples were compared to the RSL Industrial Soil Table. The RSL is a chemical-specific, conservative, risk-based concentration for individual contaminants in air, drinking water and soil that may warrant further investigation or site cleanup. The RSL was used for the secondary screening selection to ensure a conservative assessment. RSL values and results of the secondary screening calculations are presented in Table 4 through Table 6. CPCs identified as part of the secondary screening process are shown in Table 7.

7.4.1 Evaluation of Subsurface Soil Compounds

Based on the initial screening of subsurface soil samples, compounds evaluated using the secondary screening process were acetone, benzo(a)anthracene, dibenz(a,h)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, Aroclor 1254 and Aroclor 1260. The maximum detected concentration was compared to the RSL presented in the USEPA Regional Screening Tables for Industrial Soil. The RSL values are shown in Table 4.

Acetone was detected in 39 of the 60 subsurface soil samples at concentrations ranging from 0.0067 to 0.34 milligrams per kilogram (mg/kg). The 95% UCL was calculated to be 0.037 mg/kg using the 95% KM (Percentile Bootstrap) Method. The maximum detected concentration of 0.34 mg/kg was less than the industrial soil RSL for acetone of 670,000 mg/kg. Acetone is not considered a CPC at the Site.

Benzo(a)anthracene was detected in 44 of the 66 subsurface soil samples at concentrations ranging from 0.0089 to 10.0 mg/kg. The 97.5% UCL was calculated using the KM Chebyshev Method and was determined to be 1.55 mg/kg. The maximum detected concentration of 10.0 mg/kg was greater than the industrial soil RSL for benzo(a)anthracene of 2.9 mg/kg. Therefore, benzo(a)anthracene is considered a CPC at the Site.

Dibenz(a,h)anthracene was detected in 15 of the 66 subsurface soil samples at concentrations ranging from 0.01 to 2.3 mg/kg. The 95% UCL was calculated using the KM Chebyshev Method and was determined to be 0.247 mg/kg. The maximum detected concentration of 2.3 mg/kg was greater than the industrial soil RSL for dibenz(a,h)anthracene of 0.29 mg/kg. Therefore, dibenz(a,h)anthracene is considered a CPC at the Site.

Chrysene was detected in 43 of the 66 subsurface soil samples at concentrations ranging from 0.0078 to 9.7 mg/kg. The 97.5% UCL was determined to be 1.516 mg/kg using the KM Chebyshev Method. The maximum detected concentration of 9.7 mg/kg was less than the industrial soil RSL for chrysene of 290 mg/kg. Chrysene is not considered a CPC at the Site.

Benzo(b)fluoranthene was detected in 49 of the 66 subsurface soil samples at concentrations ranging from 0.0048 to 14.0 mg/kg. The 97.5% UCL was determined to be 2.024 mg/kg using the KM Chebyshev Method. The maximum detected concentration of 14.0 mg/kg was greater than the industrial soil RSL for benzo(b)fluoranthene of 2.9 mg/kg. Benzo(b)fluoranthene is considered a CPC at the Site.

Benzo(k)fluoranthene was detected in 43 of the 66 subsurface soil samples at concentrations ranging from 0.0042-6.5 mg/kg. The 97.5% UCL was determined to be 0.952 mg/kg using the KM Chebyshev Method. The maximum detected concentration of 6.5 mg/kg was less than the industrial soil RSL for benzo(k)fluoranthene of 29 mg/kg. Benzo(k)fluoranthene is not considered a CPC at the Site.

Benzo(a)pyrene was detected in 44 of the 66 subsurface soil samples at concentrations ranging from 0.007 to 14.0 mg/kg. The 97.5% UCL was determined to be 1.963 mg/kg using the KM Chebyshev Method. The maximum detected concentration of 14.0 mg/kg was greater than the industrial soil RSL for benzo(a)pyrene of 0.29 mg/kg. Benzo(a)pyrene is considered a CPC at the Site.

Indeno(1,2,3-cd)pyrene was detected in 38 of the 66 subsurface soil samples at concentrations ranging from 0.062 to 8.8 mg/kg. The 97.5% UCL was determined to be 1.113 mg/kg using the KM Chebyshev Method. The maximum detected concentration of 8.8 mg/kg was greater than the industrial soil RSL for indeno(1,2,3-cd)pyrene of 2.9 mg/kg. Indeno(1,2,3-cd)pyrene is considered a CPC at the Site.

Aroclor 1254 was detected in 27 of the 83 subsurface soil samples at concentrations ranging from 0.007 to 18.0 mg/kg. The 97.5% UCL was determined to be 2.793 mg/kg using the KM Chebyshev Method. The maximum detected concentration of 18.0 mg/kg was greater than the industrial soil RSL for Aroclor 1254 of 1.0 mg/kg. Aroclor 1254 is considered a CPC at the Site.

Aroclor 1260 was detected in 15 of the 83 subsurface soil samples at concentrations ranging from 0.025 to 1.6 mg/kg. The 95% UCL was determined to be 0.14 mg/kg using the KM Percentile Bootstrap Method. The maximum detected concentration of 1.6 mg/kg was greater than the industrial soil RSL for Aroclor 1260 of 1.0 mg/kg. Aroclor 1260 is considered a CPC at the Site.

7.4.2 Evaluation of Surface Soil Compounds

Aroclor 1260 was evaluated as part of the secondary screening process for surface soil at Outfall No. 4. Since the sample was collected outside the security fence and the surface soil could be accessed by a child trespasser, the maximum detected concentration was compared to the RSL presented in the USEPA Regional Screening Tables for Residential Soil. The RSL value is shown in Table 5.

Aroclor 1260 was detected in the surface soil sample at a concentration of 0.21 mg/kg. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 0.21 mg/kg was less than the residential RSL for Aroclor 1260 of 0.24 mg/kg. Therefore, Aroclor 1260 in surface soil is not considered a CPC at the Site.

7.4.3 Evaluation of Groundwater Compounds

Compounds evaluated as part of the secondary screening process for groundwater were benzene, trichlorofluoromethane, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, trichloroethene and PCBs (Aroclor 1254 and 1260). The maximum detected concentration was compared to the RSL presented in the USEPA Regional Screening Tables for tap water. The RSL values are shown in Table 6.

Benzene was detected in 3 of the 19 groundwater samples at concentrations ranging from 0.51 to 1.6 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 1.6 µg/L was greater than the tap water RSL for benzene of 0.45 µg/L. Therefore, benzene is considered a CPC at the Site.

Trichlorofluoromethane was detected in 1 of the 19 groundwater samples at a concentration of 6.3 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 6.3 µg/L was less than the tap water RSL for trichlorofluoromethane of 1,100 µg/L. Therefore, trichlorofluoromethane is not considered a CPC at the Site.

Benzo(a)anthracene was detected in 3 of the 17 groundwater samples at concentrations ranging from 0.44 to 0.85 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 0.85 µg/L was greater than the tap water RSL for benzo(a)anthracene of 0.034 µg/L. Therefore, benzo(a)anthracene is considered a CPC at the Site.

Benzo(b)fluoranthene was detected in 1 of the 17 groundwater samples at a concentration of 1.1 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 1.1 µg/L is greater than the RSL for benzo(b)fluoranthene of 0.034 µg/L. Therefore, benzo(b)fluoranthene is considered a CPC at the Site.

Chrysene was detected in 3 of the 17 groundwater samples at concentrations ranging from 0.39 to 0.77 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 0.77 µg/L was less than the tap water RSL for chrysene of 3.4 µg/L. Therefore, chrysene is not considered a CPC at the Site.

Indeno(1,2,3-cd)pyrene was detected in 1 of the 17 groundwater samples at a concentration of 0.91 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 0.91 µg/L is greater than the RSL for indeno(1,2,3-cd)pyrene of 0.034 µg/L. Therefore, indeno(1,2,3-cd)pyrene is considered a CPC at the Site.

Trichloroethene was detected in 2 of the 19 groundwater samples at concentrations of 0.58 and 7.8 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 7.8 µg/L is greater than the RSL for trichloroethene of 0.49 µg/L. Therefore, trichloroethene is considered at CPC at the Site.

Aroclor 1254 was detected in 1 of the 17 groundwater samples at a concentration of 2.0 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 2.0 µg/L is greater than the RSL for Aroclor 1254 of 0.039 µg/L. Therefore, Aroclor 1254 is considered a CPC at the Site.

Aroclor 1260 was detected in 3 of the 17 groundwater samples at concentrations ranging from 0.77 to 13.0 µg/L. The 95% UCL was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates. The maximum detected concentration of 13.0 µg/L is greater than the RSL for Aroclor 1260 of 0.039 µg/L. Therefore, Aroclor 1260 is considered a CPC at the Site.

7.5 SUMMARY OF CPC SELECTION

All compounds identified through the secondary screening process as CPCs will be considered in the risk assessment. A summary table showing the final selected compounds for each medium is shown in Table 7.

The CPCs identified in subsurface soil are benzo(a)anthracene, dibenz(a,h)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, Aroclor 1254 and Aroclor 1260.

The CPCs identified in groundwater are benzene, benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, trichloroethene, Aroclor 1254 and Aroclor 1260.

7.6 EXPOSURE ASSESSMENT

7.6.1 Characterization of Exposure Setting

An exposure assessment was conducted to identify the potential for human contact to compounds detected in soil and ground water at the Site. Current land use and future planned land use conditions were examined to evaluate actual and potential exposures. The physical and geologic conditions at the Site are described in Section 2.0.

7.6.2 Potentially Exposed Population

The Site is currently vacant and adjacent to the Niagara Falls International Airport, between the ends of Runway 6 and Runway 10R. Changes in the season do not affect the activities at the Site and there are no residential or recreational activities. The proposed future reuse within the impacted area includes a paved parking lot and commercial building. There is no anticipated future use of the Site for residential purposes. A deed restriction prohibiting future residential land use will be established during the transfer of the Site.

According to the *Draft Sustainable Airport Master Plan* from the Niagara Falls International Airport, there are several potential non compatible land uses along Porter Road in the vicinity of the Runway 6 end. The land uses include several residential structures, as well as a mobile home park and several hotels (McFarland Johnson, 2014). Residential use of the Site is not proposed due to the close proximity to the airport. Therefore, residential populations have not been considered as part of the risk assessment for potential exposure to subsurface soils and groundwater.

While a trespasser might gain access to the Site, they would not come into contact with subsurface soil or groundwater. Therefore, the trespasser scenario will not be evaluated for subsurface soil and groundwater.

One surface soil sample was collected from outside the fence at Outfall No. 4. A child trespasser may have access to this location. No compounds at this location were selected during the secondary screening process because the detected concentration of Aroclor 1260 was below the residential RSL. Therefore, a child trespasser will not be considered for the surface soil sample location outside of the fence line.

Based on the anticipated future use of the Site and the proposed deed restriction prohibiting residential use of the Site, the following populations will be evaluated in the risk assessment: commercial/industrial workers and construction workers.

7.6.3 Identification of Exposure Pathway – Subsurface Soils

Release of potential compounds of concern in subsurface soil may result in exposure to individuals through three major pathways (direct contact, inhalation and ingestion).

7.6.3.1 Dermal Exposure through Direct Contact

Direct contact with contaminated soil through construction may result in dermal exposure. Both organic and inorganic compounds may be absorbed through the skin from exposure to soil.

Future use of the Site is commercial/industrial; therefore, the potential exists for direct exposure by construction crews and other workers performing intrusive activities at the Site. Dermal exposure to subsurface soil by the construction worker and commercial/industrial worker will be considered as a pathway of concern.

7.6.3.2 Inhalation from Particulates

If the correct conditions exist, contaminated soils can become airborne resulting in exposure through inhalation.

While the Site does contain some vegetation and grass, there is a potential for land disturbance during construction activities that may allow soil particulates to become airborne. Based on this information, inhalation from soil particulates is considered a pathway of concern for future construction and commercial/industrial workers at the Site.

7.6.3.3 Incidental Ingestion

Incidental ingestion of soil can occur in adults by consuming or placing in one's mouth objects, food, cosmetics, cigarettes and hands that may have either come in direct contact with soil or been contaminated with soil particulates carried by the wind. Therefore, incidental ingestion is considered a pathway of concern and will be analyzed for the construction and commercial/industrial worker.

7.6.3.4 Vapor Intrusion to Indoor Air Pathway from Soil

Subsurface soil sample results were compared to the screening levels in the USEPA OSWER *Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance* (USEPA, 2002a). Compounds detected in subsurface soil samples do not have screening levels; therefore, vapor intrusion to indoor air from subsurface soils will not be considered in this risk assessment.

7.6.4 Identification of Exposure Pathway – Groundwater

Release of CPCs to groundwater may result in exposure to individuals through four major pathways, including ingestion of groundwater as a drinking source, incidental ingestion, inhalation of vapor phase chemicals through exposure of groundwater and dermal exposure through direct contact of groundwater.

7.6.4.1 Drinking Source

Contaminated water used for drinking or cooking can cause exposure to individuals and population. Drinking water at the Niagara Falls AFRC is derived from public water. Therefore, the pathway of ingestion of groundwater is not a potential risk.

7.6.4.2 Incidental Ingestion

Incidental ingestion of exposed groundwater during construction activities or trenching may occur sporadically through splashing during excavation activities. Since future use of the Site is industrial/commercial and depth to water varies from 2 to 6 feet bgs, it is possible for groundwater to be exposed during excavation and trenching work. Therefore, the pathway of incidental ingestion of exposed groundwater will be considered for the construction worker.

7.6.4.3 Inhalation of Volatiles through Exposed Groundwater

Since future use of the Site is industrial/commercial and depth to water varies from 2 to 6 feet bgs, it is possible for groundwater to be exposed during excavation and trenching work. Therefore, the pathway of inhalation will be considered for exposed groundwater to the construction worker.

Contaminants with molecular weights less than 200 g/mol and a Henry's Law constant greater than $1.0E^{-5}$ atm-m^3/mol have the highest potential for volatilization (EPA, 1996).

Only two of the seven CPCs identified in groundwater have molecular weights less than 200 g/mol and Henry's Law Constant greater than $1.0E^{-5}$ atm-m^3/mol. These CPCs are benzene and trichloroethene. Volatilization of contaminants from groundwater will be considered as a pathway of concern for benzene and trichloroethene.

7.6.4.4 Dermal Exposure

Direct dermal exposure to groundwater can cause both inorganic and organic contaminants in water to be absorbed through the skin. Potential dermal exposure to groundwater could occur during drilling, excavation and other construction activities at the Site. Therefore, dermal exposure to groundwater to the construction worker will be considered as a pathway of concern.

7.6.4.5 Vapor Intrusion to Indoor Air from Groundwater

In accordance with USEPA OSWER *Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance* (USEPA, 2002a), benzene and trichloroethene in groundwater were selected in the primary screening level as contaminants with potential toxic and volatile properties for vapor intrusion.

The maximum detected concentrations in groundwater samples for benzene and trichloroethene were 1.6 and 7.8 ug/L, respectively. These concentrations were inputted into the *USEPA OSWER Vapor Intrusion Assessment, Groundwater Concentration to Indoor Air Concentration Calculator Version 3.3.1* (USEPA, May 2014). The calculator assumed a commercial exposure scenario with a target risk of 1.00E-06 for carcinogens and a target hazard quotient of 1.0 for non-carcinogens. The average groundwater temperature used was 13.52 °C based on groundwater sampling logs from the Site. The calculations are included in Appendix G.

The calculated groundwater screening Vapor Intrusion Carcinogenic Risk levels for benzene and trichloroethene were 1.3 E-07 and 5.9 E-07, respectively. This is below the screening risk of 1.00 E-06. Therefore, vapor intrusion to indoor air from groundwater will not be considered in this risk assessment.

7.6.5 Summary of Exposure Pathways

A summary of potential exposure pathways at the Site is outlined in Table 8. After examining current and reasonably foreseeable future uses of the Site, as well as contaminated media and the nature of the contaminants, six pathways of exposure have been identified. These exposures are dermal exposure to subsurface soil and groundwater, inhalation of subsurface soil particulates, incidental ingestion of subsurface soil and groundwater, and inhalation of groundwater. The construction worker will be examined for all pathways. The industrial/commercial worker will be examined for exposure to subsurface soil via dermal exposure, inhalation of particulates and incidental ingestion.

7.6.6 Estimation of Exposure

Once potential exposure pathways and potentially-exposed populations have been identified, the degree of exposure must be estimated as part of the assessment. The degree of exposure is evaluated by determining the contaminant concentrations that the population may be exposed, as well as the duration of the exposure and exposure pathways. These steps are necessary to estimate the dose of the contaminant to the exposed individual. This analysis is presented in the following subsections.

7.6.6.1 Estimation of Exposure Point Concentrations

To quantitatively estimate the risk of exposure to an individual, the concentration of the CPC must be known or estimated. This concentration is referred to as the EPC.

The EPC calculations follow the guidance of USEPA regulations, which recommends using the 95% UCL of the mean concentration. The 95% UCL was calculated using the recommended PRO UCL 5.0.00 software. EPC values are shown in Section 7.4.1 and 7.4.3. All calculations are included in Appendix F. For data sets that could not be tested for normality due to the small sample size, the maximum detected concentration was used as the EPC. The EPCs for all CPCs are included in Tables 4, 5 and 6.

Quantitative exposure estimates are derived by combining EPCs with information describing the extent, frequency and duration of exposure for each receptor of concern. An overview of the approach used to quantify exposures is presented in the following subsection. The approach is consistent with guidance provided by the USEPA.

7.6.6.2 Reasonable Maximum Exposure

Based on USEPA risk assessment guidance, exposures are quantified by estimating the Reasonable Maximum Exposure (RME) associated with each pathway of concern. The RME is the maximum exposure that is reasonably expected to occur at a site under both current and future land-use conditions. The RME or intake estimate for a given pathway is derived by combining the EPC for each compound with reasonable maximum values describing the extent, frequency and duration of exposure (USEPA, 1989b). The RME is intended to place a conservative upper-bound limit on the potential risk.

The general equation used for calculating chemical intake in this risk assessment is:

$$\text{Intake} = \frac{C \times CR \times RAF \times EF \times ED}{BW \times AT}$$

Where:

Intake	daily intake averaged over the exposure period
C	concentration of the chemical in the exposure medium (EPC)
CR	contact rate for the medium of concern
RAF	relative absorption factor
EF	exposure frequency
ED	duration of exposure
BW	body weight of the exposed individual (standard default value)
AT	averaging time (for carcinogens, 25,550 days)

Intake calculations were performed for the construction worker and commercial/industrial worker at the Site. Exposure factors at the Site were selected in accordance with the RAGS guidelines, the USEPA Exposure Factors Handbook and the USEPA Supplemental Guidance: Update of Standard Default Exposure Factors (OSWER Directive 9200.1-120). To ensure a conservative estimation for the commercial/industrial worker, the exposure frequency was 250 days and the exposure duration was 25 years. For the construction worker, the exposure frequency was 180 days and the exposure duration was 1 year. The average time period for lifetime exposure was 70 years (25,550 days) for carcinogenic risk. The body weight used for an adult was 80 kilograms, which is the standard default value for body weight. Additional values specific to each pathway are detailed in the next subsection.

7.6.7 Calculation of Intake

Below are the equations used to calculate total intakes for the identified potential pathways.

Dermal exposure from subsurface soil (construction worker and industrial/commercial worker)

$$DA_{event} = C_{soil} \times CF \times AF \times ABS_d$$

$$\text{Dermal absorbed dose (mg/kg-day)} = \frac{DA \times EF \times ED \times EV \times SA}{BW \times AT}$$

DA	Absorbed dose per event (mg/cm^2-event)
C_{soil}	Chemical concentration (EPC in mg/kg)
CF	Conversion factor (10^{-6} kg/mg)
AF	Soil to Skin Adherence Factor (mg/cm^2 –event)
ABS	Absorption Fraction
EF	Exposure frequency (days/year)
ED	Exposure duration (years)
EV	Event frequency (events/day)
SA	Skin surface area available for contact (cm^2)
BW	Body weight (kg)
AT	Averaging Time (lifetime in years x 365 days per year)

The dermal exposure equation was taken from *RAGS Part E: Supplemental Guidance for Dermal Risk Assessments*, Equations 3.11 and 3.12. The EPC was expressed in mg/kg and varied for each specific compound. The skin surface available for contact by a worker assumed exposure of the head, hands and arms of an adult male (3,470 cm^2) and the soil to skin adherence factor was assumed to be 0.12 mg/cm^2 for the commercial/industrial worker and 0.3 mg/cm^2 for the construction worker as recommended by the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA 2002) and the USEPA OSWER Directive 9200.1-120. The absorption fraction (ABS) value varied for each compound and was obtained from Exhibit 3-4 of RAGS Part E. Calculations for dermal exposure from subsurface soil are presented in Tables 9 and 10.

Inhalation exposure from subsurface soil (construction worker and industrial/commercial worker)

$$\text{Exposure concentration } (ug/m^3) = \frac{CA \times ET \times EF \times ED}{AT}$$

Where:

CA	Chemical concentration in air (ug/m^3)
ET	Exposure time (hours/day)
EF	Exposure frequency (days/year)
ED	Exposure duration (years)
AT	Averaging Time (lifetime in years x 365 days/year x 24 hours/day)

The inhalation exposure equation was taken from *RAGS Part F: Supplemental Guidance for Inhalation Risk Assessments*, Equation 6. The EPC was converted to ug/m^3 and varied for each specific compound. Exposure concentration calculations for inhalation from subsurface soil are presented in Tables 11 and 12.

In order to convert the concentration of compounds in soil to air, the soil concentration was divided by a particle emission factor (PEF). The PEF describes the fraction of each COPC in exposed subsurface soil that becomes airborne in particulate form. The PEF was obtained from the Regional Screening Level Industrial Soil Tables and was 1.4E9 m^3/kg for all compounds.

Incidental ingestion from subsurface soil (construction worker and industrial/commercial worker)

$$\text{Intake } (mg/kg\text{-}day) = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

CS	Chemical concentration (EPC in mg/kg)
IR	Ingestion rate (mg of soil per day)
CF	Conversion factor (10^{-6} kg/mg)
FI	Fraction Ingested from Contaminated Source (no unit)
EF	Exposure frequency (days/year)
ED	Exposure duration (years)
BW	Body weight (kg)
AT	Averaging Time (lifetime in years x 365 days per year)

The ingestion exposure equation was taken from *RAGS Part A: Risk Assessment Guidance for Superfund*, Exhibit 6-14. EPC was expressed in mg/kg and varied for each specific compound. The ingestion rate was assumed to be 100 mg/day for the commercial/industrial worker and 330 mg/day for the construction worker based on *RAGS Part A* (USEPA, 1992), the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA 2002) and the USEPA OSWER Directive 9200.1-120. The conversion factor was 10^{-6} mg/kg. The fraction ingested from a contaminated source was assumed to be 100%. Absorbed dose calculations for incidental ingestion from subsurface soil are presented in Tables 13 and 14.

Inhalation of volatiles from exposed groundwater (construction worker)

$$\text{Exposure concentration } (\text{ug/m}^3) = \frac{CA \times ET \times EF \times ED}{AT}$$

Where:
CA Chemical concentration in air (ug/m^3)
ET Exposure time (hours/day)
EF Exposure frequency (days/year)
ED Exposure duration (years)
AT Averaging Time (lifetime in years x 365 days/year x 24 hours/day)

The inhalation exposure equation was taken from *RAGS Part F: Supplemental Guidance for Inhalation Risk Assessments,* Equation 6. The EPC was converted to ug/m^3 and varied for each specific compound. Exposure concentration calculations for inhalation from groundwater are presented in Table 15.

In order to convert the concentration of compounds in groundwater to air, guidance provided by the Virginia Department of Environmental Quality (VDEQ), *Exposures of Workers to Volatiles in a Construction/Utility Trench*, was used. Using Equation 3-1 from the VDEQ guidance, the airborne concentration of a contaminant in a trench is calculated below.

$$C_{trench} = C_{groundwater} \times VF$$

Where:
C_{trench} Concentration of the contaminant in the trench (ug/m^3)
$C_{groundwater}$ Concentration of the contaminant in groundwater (ug/L)
VF Volatilization factor (L/m^3)

The volatilization factor was calculated for each compound using Equation 3-4: VF for Groundwater Less Than or Equal to 15 Feet and default values provided in Table 3.8 in the VDEQ guidance.

$$VF = \frac{K_i \times A \times F \times 10^{-3} \times 10^{4} \times 3{,}600}{ACH \times V}$$

Where:

K_i	Overall mass transfer coefficient of contaminant (cm/s)
A	Area of the trench floor (m^2)
F	Fraction of floor through which contaminant can enter (unitless)
ACH	Air changes per hour (h^{-1})
V	Volume of trench (m^3)
10^{-3}	Conversion factor (L/cm^3)
10^4	Conversion factor (cm^2/m^2)
3,600	Conversion factor (s/hr)

The K_i values are compound specific and values were obtained from Table 3.8 of the VDEQ guidance. The trench was assumed to be 3 feet wide by 8 feet long by 8 feet deep. It was assumed that there are two air changes per hour.

Dermal exposure from groundwater (construction worker)

$$\text{Dermal Absorbed dose (mg/kg-day)} = \frac{DA_{event} \text{ x EV x ED x EF x SA}}{\text{BW x AT}}$$

DA_{event}	Absorbed dose per event (mg/cm^2-event)
EV	Event frequency (events/day)
ED	Exposure duration (years)
EF	Exposure frequency (days/year)
SA	Skin averaging surface (cm^2)
BW	Body weight (kg)
AT	Averaging Time (for carcinogens, lifetime in years x 365 days/year)

The dermal exposure equation was taken from *RAGS Part E: Supplemental Guidance for Dermal Risk Assessments*, Equation 3.1. The EPC was expressed in milligrams per cubic centimeter (mg/cm^3) and varied for each specific compound. The skin surface available for contact by an adult worker was 3,470 cm^2, as recommended by EPA OSWER Directive 9200.1-120. Body weight was assumed to be 80 kg. Absorbed dose calculations for dermal exposure from groundwater are presented in Table 16.

When the event duration is less than the time it takes for a compound to reach a steady state, the following equation is used:

$$DA_{event} = 2 \text{ x FA x Kp x CW x } \sqrt{[(6 \text{ x } J_{event} \text{ x } T_{event}) / \pi]}$$

FA	Fraction absorbed from water (dimensionless)
Kp	Dermal permeability coefficient (cm/hr)
CW	Chemical concentration in water (mg/cm^3)
J_{event}	Lag time per event (hr/event)
T_{event}	Event duration (hr/event)

The fraction absorbed from water is chemical specific and was obtained from *RAGS Part E*, Exhibit B-3. The dermal permeability constant (Kp) varied for each compound. Kp values were obtained from *RAGS Part E*: Exhibit B-2. The J_{event} is the chemical specific lag time between exposure events located in *RAGS Part E*, Appendix B, Exhibit B-3. The T_{event} is the hours per event and was assumed to be 0.58 in accordance with *RAGS Part E*, Exhibit 3-2.

Incidental ingestion from groundwater (construction worker)

$$\text{Intake (mg/kg per day)} = CW \times IF$$

$$IF = \frac{IR \times EF \times ED}{BW \times AT}$$

CW Chemical concentration in water (mg/L)
IR Ingestion rate of water (liters per day)
EF Exposure frequency (days/year)
ED Exposure duration (years)
BW Body weight (kg)
AT Averaging Time (days)

The *RAGS for Superfund Part A Guidance* (USEPA, 1992) does not have an equation for incidental ingestion of groundwater by the construction worker. The above equation is from the guidance from *Table 3.11: Groundwater Ingestion for the Construction/Utility Worker* from the VDEQ. The CW was the EPC expressed in mg/L and varied for each specific compound. The USEPA does not have suggested values to input for the incidental ingestion of groundwater by a construction worker. The *VDEQ Voluntary Remediation Program Risk Assessment Guidance Section 3.3.2.2: Construction/Utility Workers* uses a default ingestion rate for groundwater by the construction worker of 0.02 liters per day. Absorbed dose calculations for incidental ingestion from groundwater are presented in Table 17.

7.7 TOXICITY ASSESSMENT

7.7.1 Hazard Identification

The purpose of the toxicity assessment is to define the relationship between the dose of a compound and the probability that a carcinogenic or non-carcinogenic effect will occur. The toxicity assessment is divided into two parts: hazard identification and dose-response evaluation. As stated in RAGS, hazard identification is the process of determining whether exposure to a compound will cause an increase in the incidence of a particular adverse health effect and whether the health effect is likely to occur in humans. The dose-response evaluation quantifies the toxicological information and characterizes the relationship between the dose of a compound and the incidence of adverse health effects in a population. Toxicity values are expressed as reference doses (RfD) for oral non-carcinogenic effects and slope factors for carcinogenic effects.

Each compound was classified by its degree of carcinogenic properties. This information was obtained from the USEPA Integrated Risk Information System (IRIS). The USEPA uses a weight of evidence narrative to define the level of a carcinogen (Guidelines for Carcinogenic Risk Assessment, 2005). However, all the compounds used in this risk assessment except for benzene and trichloroethene are still listed with IRIS under the old alphanumerical classification system (USEPA, 1986). Ratings for the compounds evaluated as part of the risk assessment are included in Tables 18 through 26.

Alphanumerical USEPA Cancer Classification:

A- Human Carcinogen: There is enough evidence to conclude that it can cause cancer in humans.

B1- Probable Human Carcinogen: There is limited evidence that it can cause cancer in humans, but at present it is not conclusive.

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans, but at present it is far from conclusive.

C- Possible Human Carcinogen: There is limited evidence that it can cause cancer in animals in the absence of human data, but at present it is not conclusive.

D- Not classifiable as to Human Carcinogenicity: There is no evidence at present that it causes cancer in humans.

E- Evidence of Non-Carcinogenicity for Humans: There is strong evidence that it does not cause cancer in humans.

All subsurface soil compounds identified in this risk assessment were rated as B2 by the USEPA classification system. Therefore all toxicity values were evaluated as carcinogens.

In the groundwater compounds, benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene, Aroclor 1254 and Aroclor 1260 were rated as B2 by the USEPA classification system. Benzene was rated an A by the USEPA classification system and classified as a known/likely human carcinogen under the *Proposed Guidelines for Carcinogen Risk Assessment* (USEPA, 1996). Trichloroethene was classified as carcinogenic to humans under *Guidelines for Carcinogen Risk Assessment* (USEPA, 2005). All toxicity values were evaluated as carcinogens.

Although Aroclor 1254 is rated as a B2 carcinogen, risk characterization data exists for non-cancer risk to dermal exposure. Therefore, Aroclor 1254 was examined for carcinogenic and non-carcinogenic risk to dermal exposure.

Summaries of the Agency for Toxic Substances & Diseases Registry (ATSDR) toxicological profiles (ToxFAQs™) were reviewed to determine possible health effects from chronic exposure. The ToxFAQs™ are included in Appendix H.

7.7.2 Dose Response Evaluation

The hierarchy of sources for identifying dose-response values was followed using the guidelines set forth in Memorandum: *Human Health Toxicity Values in Superfund Risk Assessments* which replaces the guidelines of RAGS Part A. The USEPA IRIS database was first consulted for all compounds. For compounds not available through IRIS, the USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) and California EPA values (CALEPA) were consulted.

Using the recommended equations for each pathway, the absorbed dose for each CPC was calculated for all carcinogens and non-carcinogens. The slope factor for each compound was obtained from the Regional Screening Level Tables. The slope factor was adjusted for all dermal routes of exposure to represent the absorbed amount and not the administered. The calculated absorbed dose for subsurface soil is presented in Tables 18 and 21.

In accordance with RAGS Part E, Exhibit 4-1, toxicity factors for PCBs and PAHs were not adjusted for exposure to groundwater. Therefore, only benzene and trichloroethene required adjustment. The slope factors for benzene and trichloroethene were divided by the oral absorbed efficiency value, which was obtained from the RSL tables. The calculated absorbed dose for the compounds in groundwater is presented in Table 25.

7.8 RISK CHARACTERIZATION

The exposure analysis and toxicity assessment are integrated to develop both the quantitative and qualitative risk evaluations. The average daily intakes calculated as part of the exposure assessment were combined with the dose-response values from the toxicity assessment. The methodology used to quantitatively assess carcinogenic risk is described in detail in the following subsection.

All compounds with potential carcinogenic effects were evaluated based on guidance from the USEPA RAGs. An individual upper-bound excess lifetime cancer risk was calculated by multiplying the calculated estimated daily intake by the appropriate carcinogenic slope factor (CSF) for each compound. The total lifetime cancer risk for simultaneous exposure to all chemicals within a pathway was calculated using the summation of each individual chemical.

Non-carcinogens were evaluated based on guidance from the USEPA RAGS. A non-cancer hazard quotient was calculated by dividing the calculated exposure intake by the appropriate reference dose for each compound.

The USEPA has developed an estimate of the potential risk for carcinogenic compounds. Potential carcinogenic effects are expressed as a probability or risk of cancer resulting from exposure to a compound. The USEPA considers a cancer risk value greater than 1.0E-4 to 1.0E-6 to represent a potentially unacceptable level of risk (*EPA Memo: Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*). The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) states that for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10E-4 and 10E-6.

The non-cancer hazard quotient assumes that there is a level of exposure below which it is unlikely for even sensitive populations to experience adverse health effects. At this point, the hazard quotient would equal one. If the exposure level exceeds this threshold, there may be a concern for potential non-cancer effects.

Receptors may have contact with more than one contaminated medium. The risks of these exposures are summed and evaluated to provide a complete characterization of health risks associated with contamination at the Site. The risk characterization summary tables are included as Tables 27 and 30.

7.8.1 Summary of Carcinogenic Risk – Subsurface Soil – Commercial/Industrial Worker

The total carcinogenic risk for the future commercial/industrial worker exposure to dermal contact from subsurface soil is 3.24E-05. Cancer risks for dermal contact from subsurface soil for each carcinogenic compound are summarized in Table 18. Benzo(a)pyrene had the highest lifetime cancer risk of dermal contact from subsurface soil (1.80E-05).

The total carcinogenic risk for the commercial/industrial worker exposure to inhalation of particles from subsurface soil is 3.11E-09. Cancer risks for inhalation of particles from subsurface soil for each carcinogenic compound are summarized in Table 19. Benzo(a)pyrene had the highest lifetime cancer risk of inhalation from subsurface soil particulates (1.30E-09).

The total carcinogenic risk for the commercial/industrial worker exposure to ingestion from subsurface soil is 7.77E-06. Cancer risks for ingestion from subsurface soil for each carcinogenic compound are summarized in Table 20. Benzo(a)pyrene had the highest lifetime cancer risk from ingestion of subsurface soil (4.38E-06).

The total cancer risk for commercial/industrial workers from exposure to subsurface soil is 4.02E-05. This value is within the acceptable range set by USEPA from 1E-04 to 1E-06. Total cancer risk for commercial/industrial workers from exposure to subsurface soil is summarized in Table 27.

7.8.2 Summary of Carcinogenic Risk – Subsurface Soil – Construction Worker

The total carcinogenic risk for the construction worker exposure to dermal contact from subsurface soil is 2.33E-06. Cancer risks for dermal contact from subsurface soil for each carcinogenic compound are summarized in Table 21. Benzo(a)pyrene had the highest lifetime cancer risk of dermal contact from subsurface soil (1.31E-06).

The total carcinogenic risk for the construction worker exposure to inhalation of particles from subsurface soil is 8.95E-11. Cancer risks for inhalation of particles from subsurface soil for each carcinogenic compound are summarized in Table 22. Benzo(a)pyrene had the highest lifetime cancer risk of inhalation from subsurface soil particulates (3.74E-11).

The total carcinogenic risk for the construction worker exposure to ingestion from subsurface soil is 7.38E-07. Cancer risks for ingestion from subsurface soil for each carcinogenic compound are summarized in Table 23. Benzo(a)pyrene had the highest lifetime cancer risk from ingestion of subsurface soil (4.16E-07).

The total cancer risk for construction workers from exposure to subsurface soil is 3.07 E-06. This value is within the acceptable range set by USEPA from 1E-04 to 1E-06. Total cancer risk for workers from exposure to subsurface soil is summarized in Table 27.

7.8.3 Summary of Carcinogenic Risk – Groundwater – Construction Worker

The total carcinogenic risk for the construction worker exposure to inhalation of volatiles from groundwater is 8.19E-07. Cancer risks for the future construction worker exposure to inhalation of volatiles from groundwater for each carcinogenic compound are summarized in Table 24. Trichloroethene had the highest lifetime cancer risk of inhalation of volatiles from groundwater (5.45E-07).

The total carcinogenic risk for the construction worker exposure to dermal contact from groundwater is 1.53E-05. Cancer risks for the construction worker exposure to dermal contact from groundwater for each carcinogenic compound are summarized in Table 25. Aroclor 1260 had the highest lifetime cancer risk of dermal contact from groundwater (1.17E-05).

The total carcinogenic risk for the construction worker exposure to incidental ingestion of groundwater is 5.73E-08. Cancer risks for the construction worker exposure to incidental ingestion of groundwater for each carcinogenic compound are summarized in Table 26. Aroclor 1260 had the highest lifetime cancer risk of incidental ingestion of groundwater (4.58 E-08).

The total cancer risk for construction workers from exposure to groundwater is 1.62E-05. This value is within the acceptable range set by USEPA from 1E-04 to 1E-06. Total cancer risk for workers from exposure to groundwater is summarized in Table 27.

7.8.4 Summary of Risk – Groundwater – Non Carcinogenic – Construction Worker

The total non-carcinogenic risk for the future construction worker exposure to dermal contact from groundwater is 5.45E-02. Non cancer risks are summarized in Table 28.

The total non-carcinogenic risk for the future worker exposure to groundwater is 5.45E-02, which is less than the hazard quotient of 1 set by the USEPA. Total non-cancer risks for workers exposed to groundwater are summarized in Table 30.

7.8.5 Summary of Risk – Subsurface Soil – Non Carcinogenic – Construction Worker

The total non-carcinogenic risk for the construction worker exposure to dermal contact from subsurface soil is 1.28E-02. Non cancer risks are summarized in Table 29.

The total non-carcinogenic risk for the construction worker exposure to subsurface soil is 1.28E-02, which is less than the hazard quotient of 1 set by the USEPA. Total non-cancer risks for workers exposed to subsurface soil is summarized in Table 30.

7.8.6 Summary of Risk – Subsurface Soil – Non Carcinogenic - Commercial/Industrial Worker

The total non-carcinogenic risk for the commercial/industrial worker exposure to dermal contact from subsurface soil is 1.78E-01. Non cancer risks are summarized in Table 29.

The total non-carcinogenic risk for the commercial/industrial worker exposure to subsurface soil is 1.78E-01, which is less than the hazard quotient of 1 set by the USEPA. Total non-cancer risks for workers exposed to subsurface soil is summarized in Table 30.

7.9 UNCERTAINTY IN RISK ESTIMATES

The interpretation of risk estimates is subject to a number of uncertainties as a result of conservative assumptions inherent in risk assessments. Quantitative human health risk estimates are based on numerous conservative assumptions. These conservative estimates lead to uncertainty in exposure and toxicity. Major sources of uncertainty and their potential effects are detailed in Exhibit 1.

Exhibit 1: Sources of Uncertainty

Uncertainty	Effect	Justification
Exposure point concentration	Overestimate	The 95% UCL was calculated for each compound at the Site and used as the EPC in the risk assessment calculations. In addition, for sub surface soil, the 97.5% UCL yielded an even more conservative estimates than the 95% UCL
Exposure assumptions (frequency, duration, time)	Overestimate	Parameters selected are conservative estimates of exposure. This is true for the construction worker exposure. The impacted area is approximately one acre of the 19.5 acre Site, and the construction worker was calculated as spending 180 days working at the site. This yields a conservative estimate to the total amount of risk.
Exposure assumptions (frequency, duration, time)	Overestimate	Parameters selected are conservative estimates of exposure. This is true for the commercial/industrial worker exposure. The impacted area is approximately one acre of the 19.5 acre Site, and the commercial/industrial worker was calculated as spending 250 days working at the site. This yields a conservative estimate to the total amount of risk.
Degradation of chemicals	Overestimate	All intake calculations and risk estimates are based on chemical concentrations from previous sampling events. Concentrations will tend to decrease over time as a result of degradation.

Uncertainty	Effect	Justification
Extrapolation of animal toxicity data to humans	Unknown	Animal studies typically involve high dose exposures, while humans are exposed to low doses in the environment
Industrial RSL are not available for groundwater	Overestimate	Tap water groundwater screening levels are used in the risk assessment, since industrial groundwater levels are not available. This makes the exposure estimates much more conservative.
Dermal Doses	Unknown	Dermal cancer slope factors and reference doses were not listed in the USEPA RSL Tables or the IRIS database. To obtain the correct dermal doses, the ingestion values were converted following guidelines presented in RAGS Part A.
Fraction Ingested (FI)	Overestimate	The fraction of soil ingested from a contaminated source was assumed to be 100%. This is a conservative estimate of risk to the construction worker.

Exposure factors at the Site were selected in accordance with the RAGS guidelines, the USEPA Exposure Factors Handbook and the USEPA Supplemental Guidance: Update of Standard Default Exposure Factors (OSWER Directive 9200.1-120). The guidance recommended a default exposure frequency for a commercial/industrial worker of 250 days. A groundskeeper is the most likely profession to be exposed at the Site, since subsurface soil is the only expected pathway for a commercial/industrial worker. It is unlikely that the groundskeeper would spend 250 days per year constantly exposed to subsurface soils. Most grounds keeping activities (mowing, planting, tilling etc.) do not require continuous digging or subsurface exposure. Additionally, during the late fall and winter, weather conditions are not conducive to planting and lawn care. The 250 days of exposure per year assumption is overly conservative and overestimates the risk to the commercial/industrial worker at the Site.

In addition to the uncertainties listed in Exhibit 1, the following describes sampling procedures conducted during the 2010 Site Inspection and the 2011 Remedial Investigation that may also overestimate the calculated risk.

Nine soil samples were collected from a depth interval starting at ground surface (0 feet). These soil probes contained predominantly gravel in the upper foot of the boring, which were not included in the sample submitted for laboratory analysis. Therefore, these samples were considered as subsurface soil for the risk assessment. Four soil samples were collected from a depth of 0-4 feet and four soil samples were collected from a depth of 4-8 feet. The soil boring logs for these samples show poor recovery from the macrocore at ranges of 42-56%. As a result of this poor recovery, the sample range was noted as four feet to ensure adequate soil volume for lab analysis. Soil probe logs for the remedial investigation are located in Appendix A. Soil probe logs from the 2011 Site Inspection Report are located in Volume II.

Soil samples collected as part of the Site Inspection and Remedial Investigation were biased based on field screening for VOCs with an OVM, visual, olfactory and professional judgment as determined in the Sampling Plan and in accordance with the requirements of Section 2.4 of the NYSEC DER-10/Technical Guidance for Site Investigation and Remediation. Since the samples were collected from intervals that were suspected to be impacted, this bias leads to a more conservative risk assessment.

8.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

8.1 SUMMARY

The USACE, Louisville District retained the services of PARS to conduct a RI, IRA and HHRA at the Niagara Falls Armed Forces Reserve Center located at 9400 Porter Road in Niagara Falls, New York. The RI and IRA were conducted in accordance with the approved *QAPP/Sampling Plan* (PARS, September 2011).

8.1.1 Remedial Investigation

On September 26 through September 28, 2011, thirty soil probes (16 primary locations and 14 secondary locations) were advanced at the Site. Two samples were collected for laboratory analysis from each of the probes. Soil samples collected from the primary locations were submitted for TCL VOCs, TCL SVOCs and PCBs analysis. Secondary soil samples were analyzed at select locations based on the results of the primary samples.

Acetone was detected in soil sample SP-23-2-4 at a concentration of 60 µg/kg, slightly exceeding the USCO for the compound of 50 µg/kg. Acetone is a common laboratory contaminant and is not considered a contaminant of concern at the Site. All other detected VOCs were at concentrations below their respective USCO and CSCO.

Six SVOCs were detected at concentrations exceeding their respective USCO in soil sample SP-29-1-3. Benzo(a)pyrene was also detected at a concentration exceeding the CSCO in this sample. Benzo(b)fluoranthene was detected at a concentration exceeding the USCO in soil sample SP-37-1-3. SVOCs were not detected in any other samples at concentrations exceeding the respective USCO and CSCO.

Total PCB concentrations exceeding the USCO were identified in 5 samples (SP-28-1-3, SP-29-1-3, SP-30-1-3, SP-32-2-4 and SP-33-0-2). The concentration of PCBs detected at SP-28-1-3 also exceeds the CSCO of 1,000 µg/kg. PCBs were not detected in the remaining samples at concentrations exceeding the USCO and CSCO.

At the request of NYSDEC, a surface soil sample was collected at Outfall 4, immediately below the vegetative cover within the drainage swale along Porter Road. The sample was analyzed for TCL VOCs, TCL SVOCs and PCBs. Nine SVOCs were detected at concentrations exceeding the respective USCO and 5 SVOCs were detected at concentrations exceeding the respective CSCO. The SVOCs detected in the sample from the drainage swale are commonly found in ditches that receive storm water runoff from asphalt paved surfaces. Based on maps of the storm water drainage system for the Site, discharge to Outfall No. 4 is only from runoff from parking areas.

Total PCBs were detected in the outfall sample at a concentration of 210 µg/kg. This concentration exceeded the USCO for the compound of 100 µg/kg, but not the CSCO of 1,000 µg/kg, which was the cleanup objective established by NYSDEC for the previous remediation of the drainage swale.

On September 26 and 27, 2011, 9 temporary microwells were installed in the open probe-holes at SP-22, 25, 30, 32, 34, 36, 42, 46 and 49. Eight groundwater samples were collected and analyzed for VOCs, SVOCs, and PCBs. Samples collected at SP-42 and SP-49 were not analyzed for SVOCs and PCBs due to insufficient groundwater recharge.

Benzene was detected at SP-49 and trichlorofluoromethane was detected at SP-22 at concentrations slightly exceeding the respective Class GA criteria. No other VOCs were detected in the groundwater samples at concentrations exceeding the respective Class GA criteria.

Four SVOCs were detected at concentrations exceeding the respective Class GA criteria at 3 locations (SP-22, SP-25 and SP-34). These compounds are benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

Total PCBs were detected in groundwater samples from locations SP-30, SP-32 and SP-36 at concentrations exceeding the Class GA Criteria for the compound of 0.09 µg/L. PCB concentrations in these three samples were 0.77 µg/L (SP-30), 3 µg/L (SP-32), and 13 µg/L (SP-36). PCBs were not detected in the other groundwater samples at concentrations above the laboratory MDL.

8.1.2 Interim Remedial Action

An IRA was performed on September 29, 2011. As part of the IRA, an approximately 10-foot (north-south) by 12-foot (east-west) area was excavated to a depth of approximately 5 feet bgs in the vicinity of the former exploratory excavation, TP-12. Approximately 40 tons of soil was removed from the excavation and stockpiled.

During soil excavation activities, perched groundwater was observed at approximately 2 feet bgs. Perched groundwater exhibiting a surface sheen was pumped from the excavation using a vacuum truck. Approximately 2,000-gallons of groundwater was removed from the excavation and properly disposed.

At the completion of soil removal activities, an approximate 8-foot long section of the 6-inch diameter cast iron fire protection main was removed from within the limits of the excavation. The open ends of the pipe were fitted with a Fernco and PVC cap prior to backfilling. On December 8, 2011, the stockpiled soil from the excavation was loaded onto trucks and transported off-Site for proper disposal.

Five confirmatory soil samples, four (4) sidewall samples and one (1) bottom of excavation sample, were collected from the excavation. The confirmatory soil samples were analyzed for TCL VOCs, TCL SVOCs and PCBs. VOCs, SVOCs and PCBs were not detected in the confirmatory samples at concentrations exceeding the applicable USCOs and CSCOs.

8.1.3 Human Health Risk Assessment

A HHRA was conducted at the Site to evaluate potential risks to human health under current and reasonably foreseeable future conditions from exposure to VOCs, SVOCs and PCBs in subsurface soils and groundwater. In addition to the samples collected during the Remedial Investigation, all subsurface soil samples collected during the Site Inspection in November 2010 (*Site Inspection Report*, PARS, June 2011) were used to evaluate subsurface soil CPCs. Only post-excavation soil sample results collected in 2009 from the drainage swale excavation *(Remedial Action Report*, PARS, March 2010) were also used to evaluate subsurface CPCs. The two subsurface soil and eleven groundwater samples collected during the Supplemental Investigation conducted by PARS in 2012 (*Supplemental Investigation*, PARS, November 2012) were also included in the risk assessment.

The CPCs identified in subsurface soil were benzo(a)anthracene, dibenz(a,h)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, Aroclor 1254 and Aroclor 1260. The CPCs identified in groundwater were benzene, benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, trichloroethene, Aroclor 1254 and Aroclor 1260.

Potential exposure pathways were examined in the exposure assessment. Six pathways of exposure were identified. These exposures were dermal exposure to subsurface soil and groundwater, inhalation of subsurface soil particulates, incidental ingestion of subsurface soil and groundwater, and inhalation of groundwater. The construction worker was examined for all pathways. The industrial/commercial worker was examined for exposure to subsurface soil via dermal exposure, inhalation of particulates and incidental ingestion.

The USEPA considers a cancer risk between 1 in 10,000 (1.0E-4) and 1 in 1,000,000 (1.0E-6) to be a potentially acceptable level of risk (*EPA Memo: Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*). None of the exposure scenarios evaluated in this human health risk assessment resulted in a cancer risk exceeding this potentially acceptable range.

- For the construction worker, the total cancer risk from exposure to subsurface soil was 3.07 E-06. The total cancer risk from exposure to groundwater was 1.62E-05, resulting in a total cancer risk of 2.0 E-05.
- The total cancer risk for commercial/industrial workers from exposure to subsurface soil is 4.02E-05. This is no potential exposure of the commercial/industrial worker to Site groundwater.

Although the quantitative risk estimates were within the high end of the acceptable risk range, these calculated values are based on highly conservative exposure frequencies and durations, and therefore overestimate the actual risk exposure at the Site. Uncertainties that may contribute to this overestimate are discussed in Section 7.9.

Under current or future conditions and based on the quantitative and qualitative analysis of the risk assessment, the commercial/industrial and construction worker exposure pathways at the Site do not pose an unacceptable risk.

8.2 CONCLUSION AND RECOMMENDATIONS

Based on the findings summarized in Section 8.1.3, the Site does not pose an unacceptable risk to human health. No further action is therefore recommended for this Site.

10.0 REFERENCES

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FIGURES

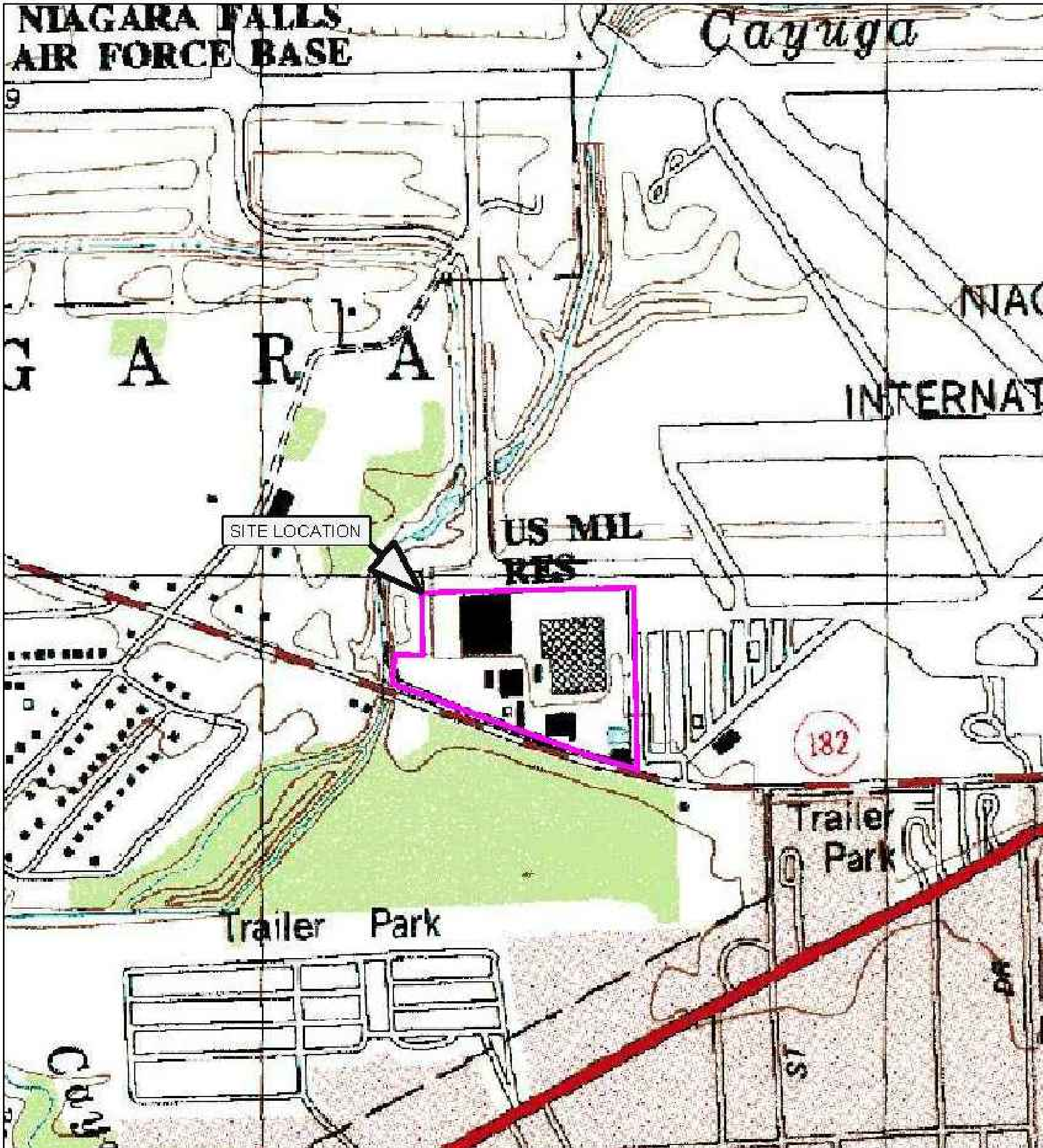
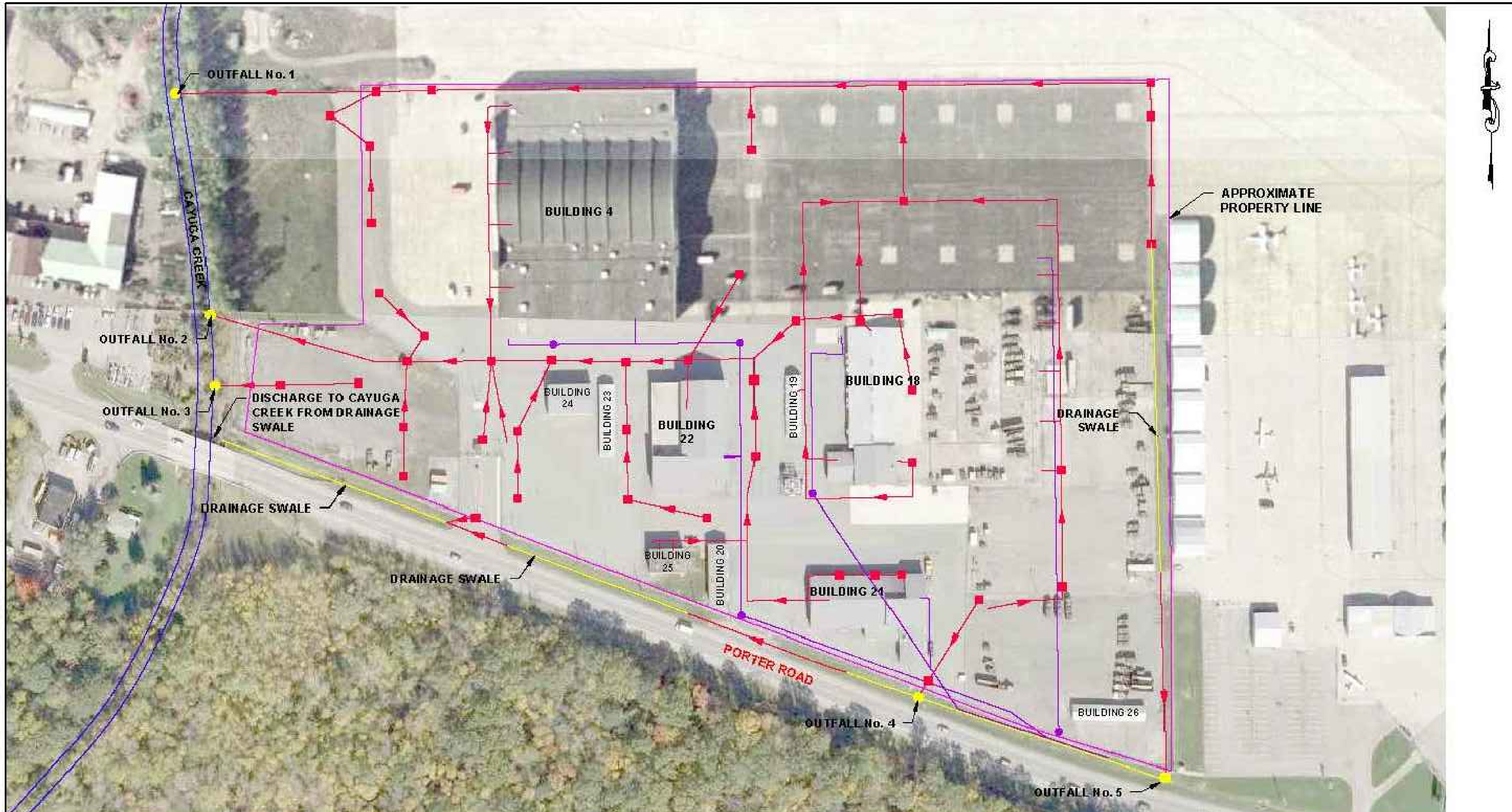


FIGURE 1
SITE LOCATION MAP
NIAGARA FALLS AFRC COMPLEX
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: 1"=750'	JOB No.: 895-08
CK'D. BY: TD	DATE: 11/29/11	FILE NO.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 1



LEGEND:

SANITARY SEWER LOCATION

STORM SEWER LOCATION WITH FLOW DIRECTION

NOTES:

1. BASE MAP ADAPTED FROM AN AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.bing.com/maps/, AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

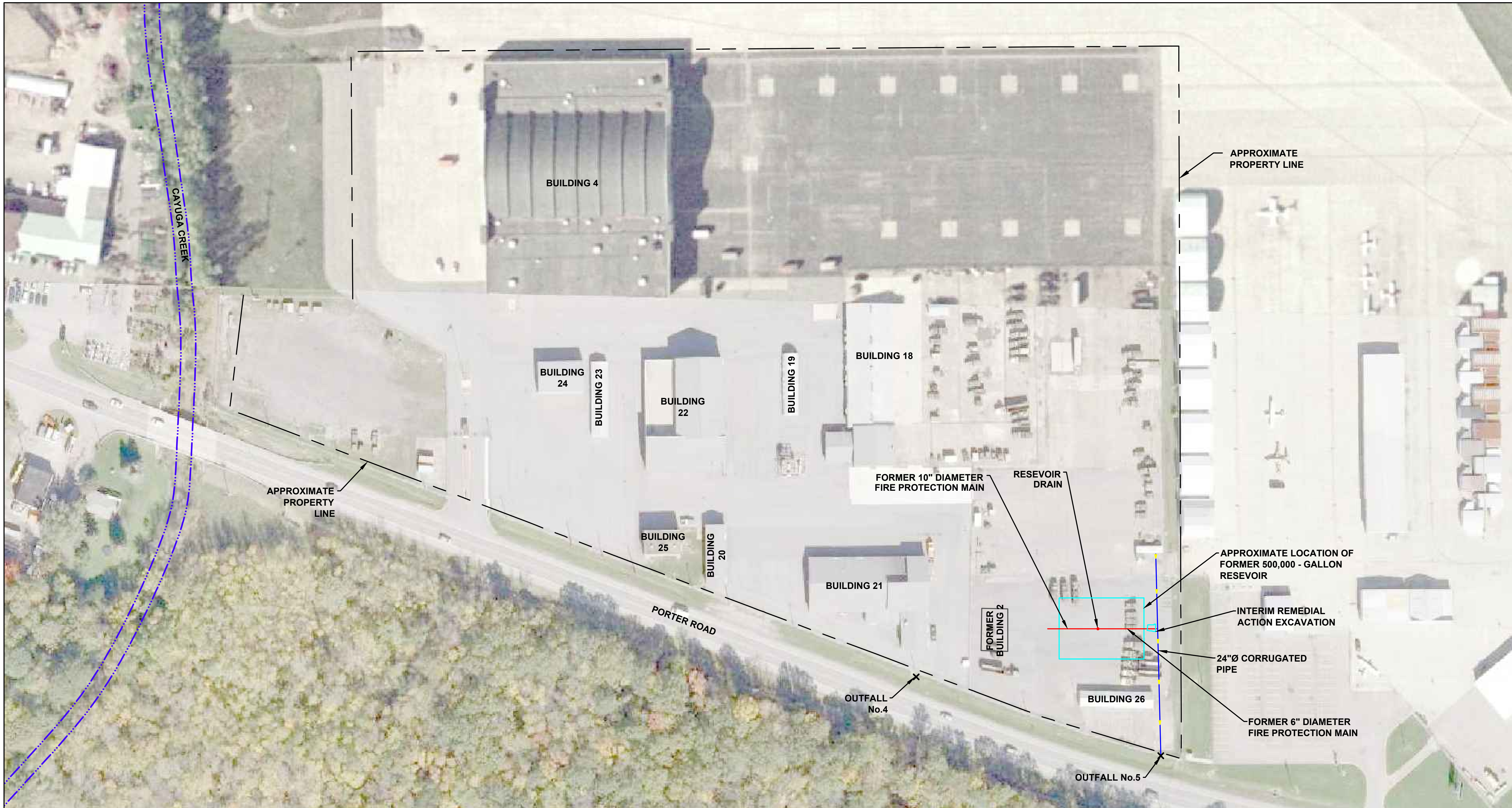
SCALE IN FEET

0 50 100 150

FIGURE 2
SITE PLAN
USAFRC
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: 1"=150'	JOB No.: 895-08
CK'D. BY: TD	DATE: 11/29/11	FILE NO.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 2



LEGEND:

- MW-6 ● MONITORING WELL LOCATION
- TW-3 ● PRIMARY TEMPORARY WELL LOCATION
- TW-6 ● SECONDARY TEMPORARY WELL LOCATION
- SP-51 SOIL PROBE LOCATION (SEPT. 2011)
- SP-36 SOIL PROBE AND TEMPORARY WELL LOCATION (SEPT. 2011)

NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/l AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

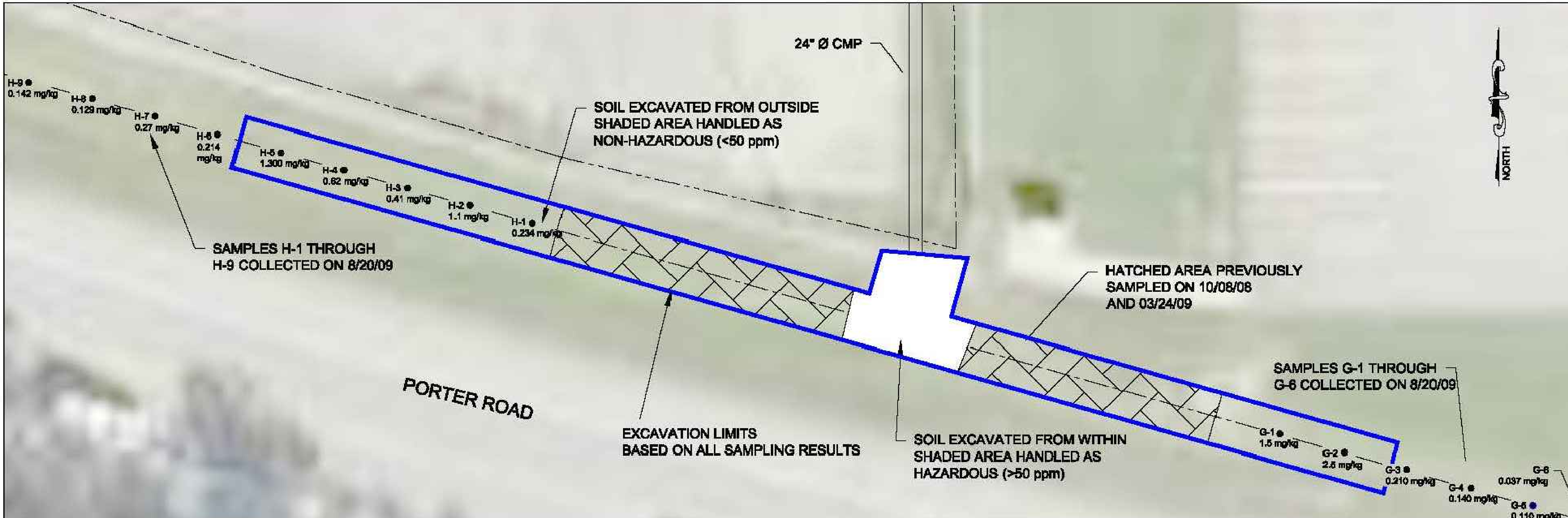
SCALE IN FEET

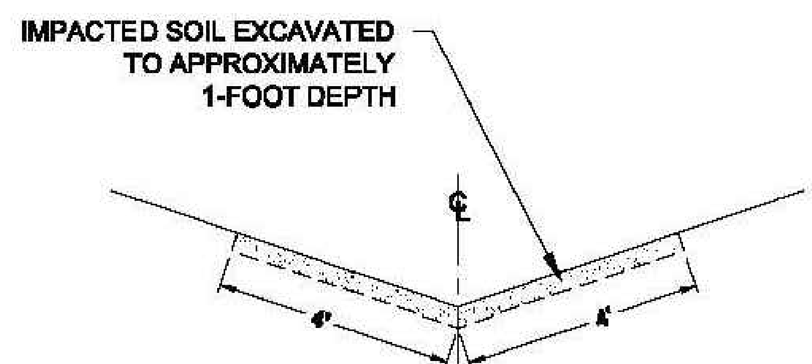
40 0 70 140

FIGURE 3
AREAS OF CONCERN MAP
USAFRC
NIAGARA FALLS, NY

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: AS SHOWN	JOB No.: 895-08
CK'D. BY: MM	DATE: 1/9/13	FILE ID.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 3





DITCH SECTION
NOT TO SCALE

NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/l AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

0 15 30
SCALE IN FEET

LEGEND:

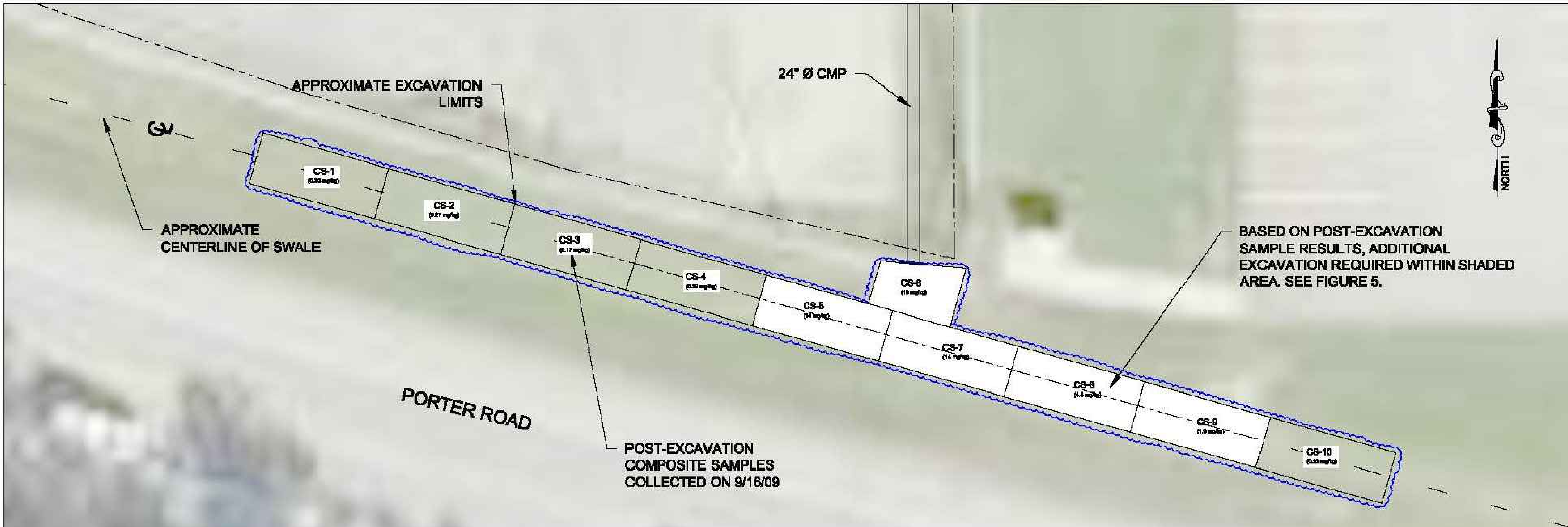
H-2 ● 0.840 mg/kg — SAMPLE LOCATION, DESIGNATION AND CONCENTRATION OF POLYCHLORINATED BIPHYNOLS (PCB's)

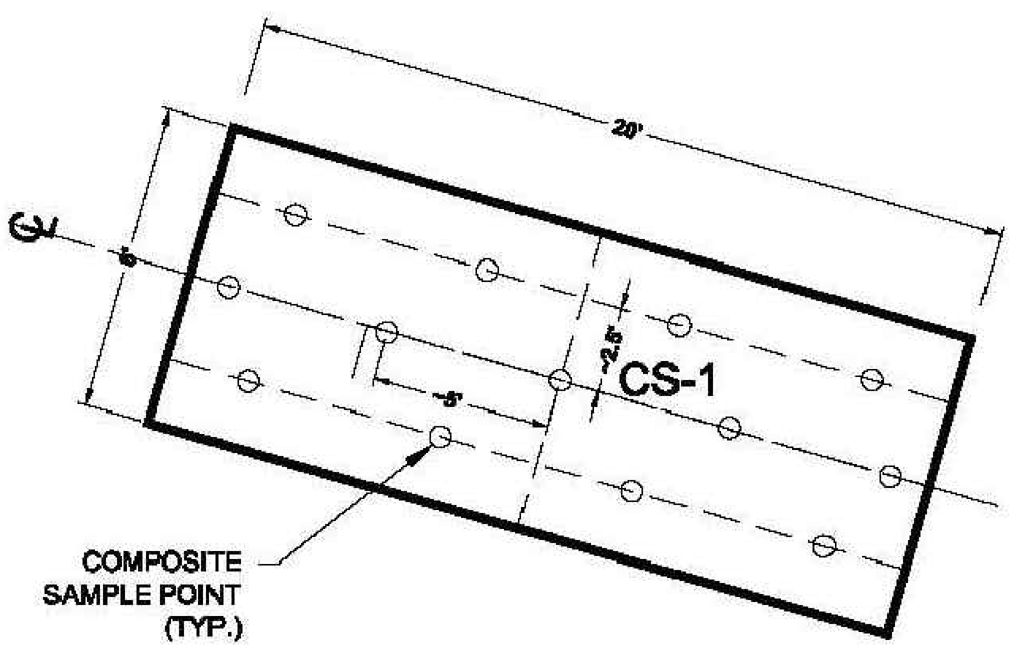
EXCAVATION LIMITS BASED ON ALL SAMPLING RESULTS

FIGURE 4
SOIL DELINEATION MAP (AUGUST 20, 2009) AND EXCAVATION LIMITS
USAFRC
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

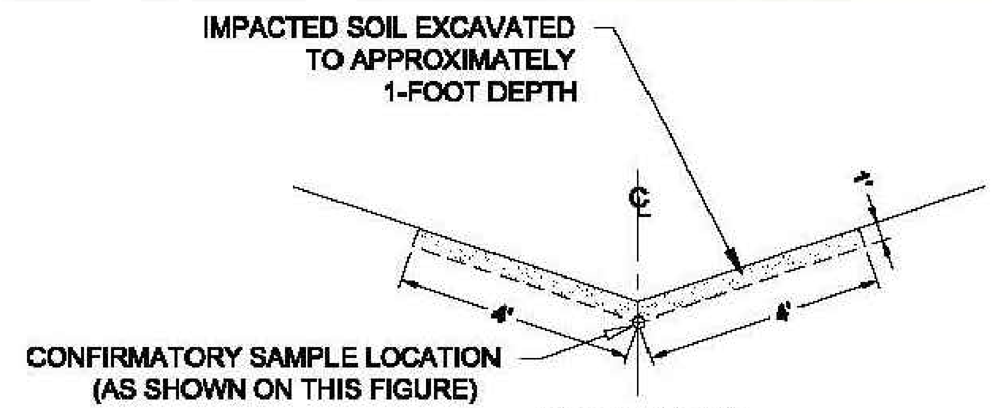
DR. BY: KN	SCALE: 1"=15'	JOB No.: 895-08
CK'D. BY: MM	DATE: 1/10/10	FILE NO.: 895-08
REV. NO. --	REV. DATE: 3/2/10	FIGURE NO.: 4





POST-EXCAVATION COMPOSITE SAMPLE TEMPLATE

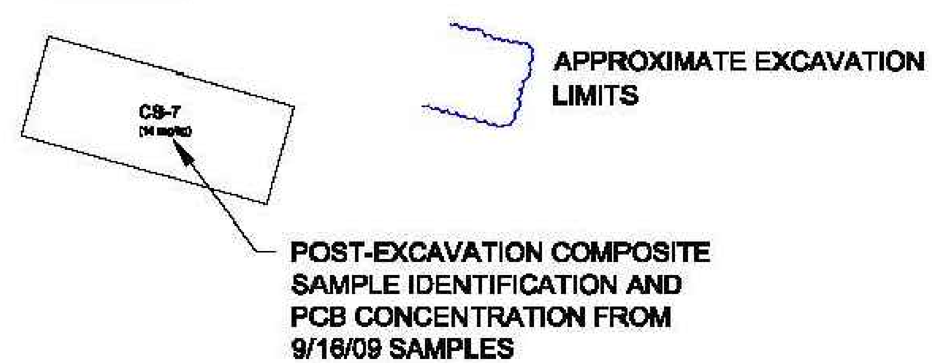
NOT TO SCALE



DITCH SECTION

NOT TO SCALE

LEGEND:



NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/l AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

3. COMPOSITE SAMPLE SPACING BASED ON "*FIELD MANUAL FOR GRID SAMPLING OF PCB SPILL SITES TO VERIFY CLEANUP*" EPA, MAY, 1986.

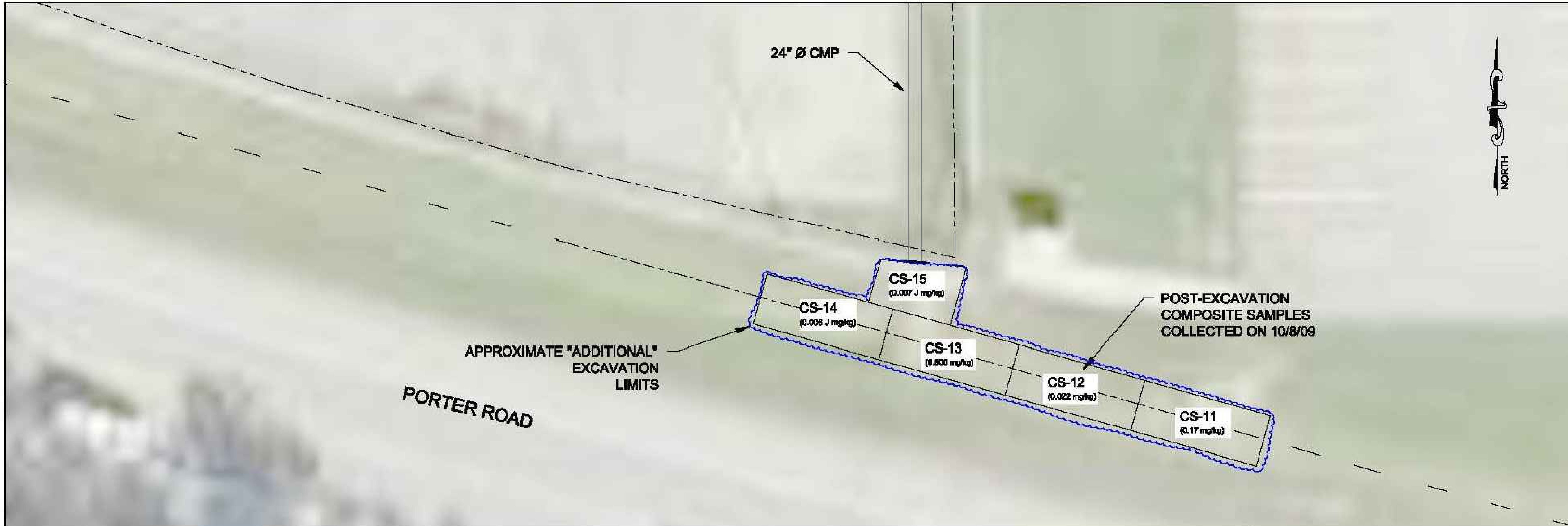
0 15 30

SCALE IN FEET

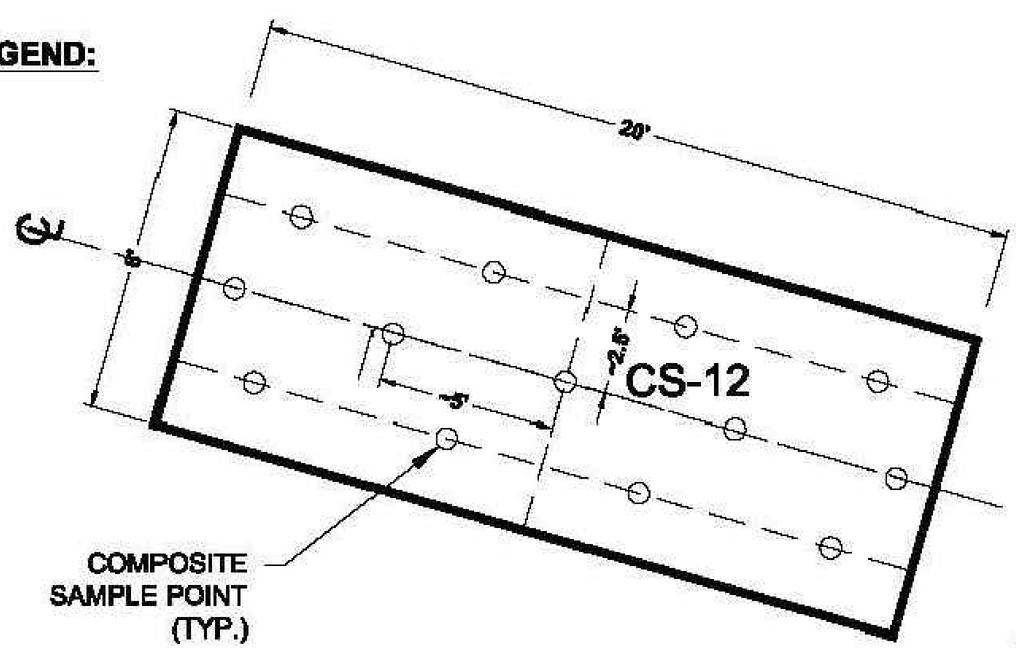
FIGURE 5
POST-EXCAVATION CONFIRMATORY SAMPLE LOCATION MAP (9/16/2009)
USAFRC
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

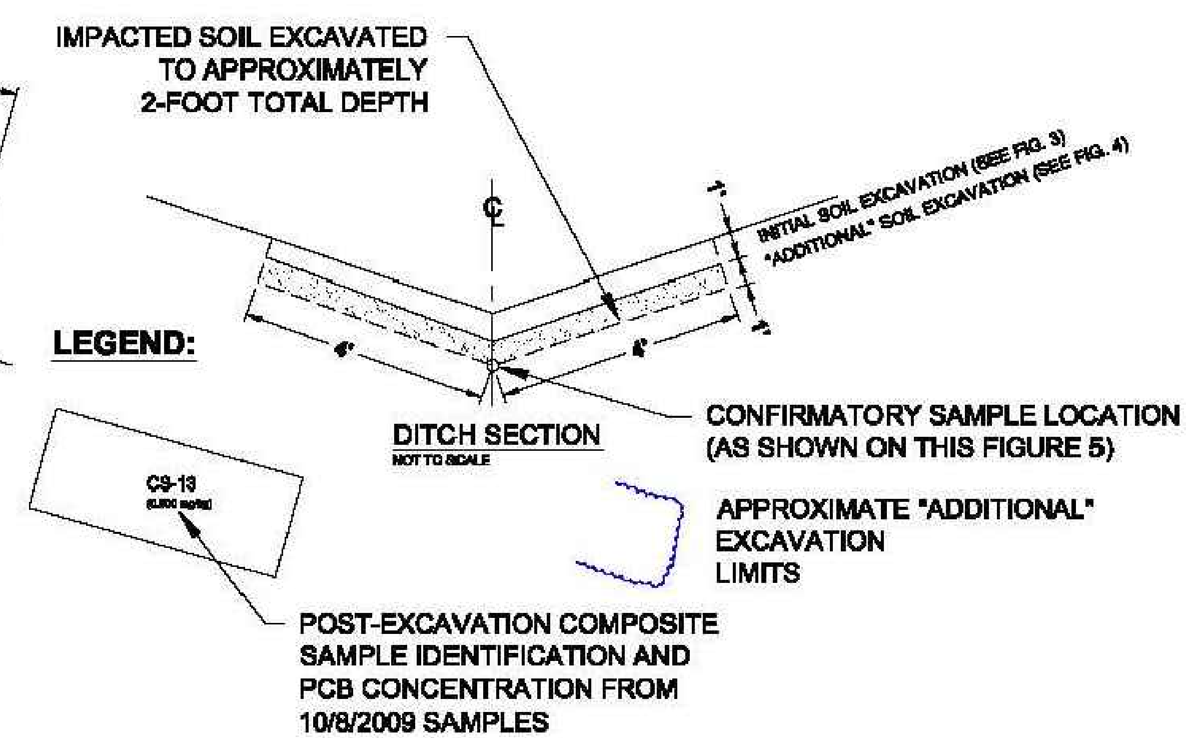
DR. BY: KN	SCALE: 1"=15'	JOB No.: 895-08
CK'D. BY: MM	DATE: 1/10/10	FILE NO.: 895-08
REV. NO. --	REV. DATE: 3/2/10	FIGURE NO.: 5



LEGEND:



POST-EXCAVATION COMPOSITE SAMPLE TEMPLATE
NOT TO SCALE



NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/I AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

3. COMPOSITE SAMPLE SPACING BASED ON "*FIELD MANUAL FOR GRID SAMPLING OF PCB SPILL SITES TO VERIFY CLEANUP*" EPA, MAY, 1986.

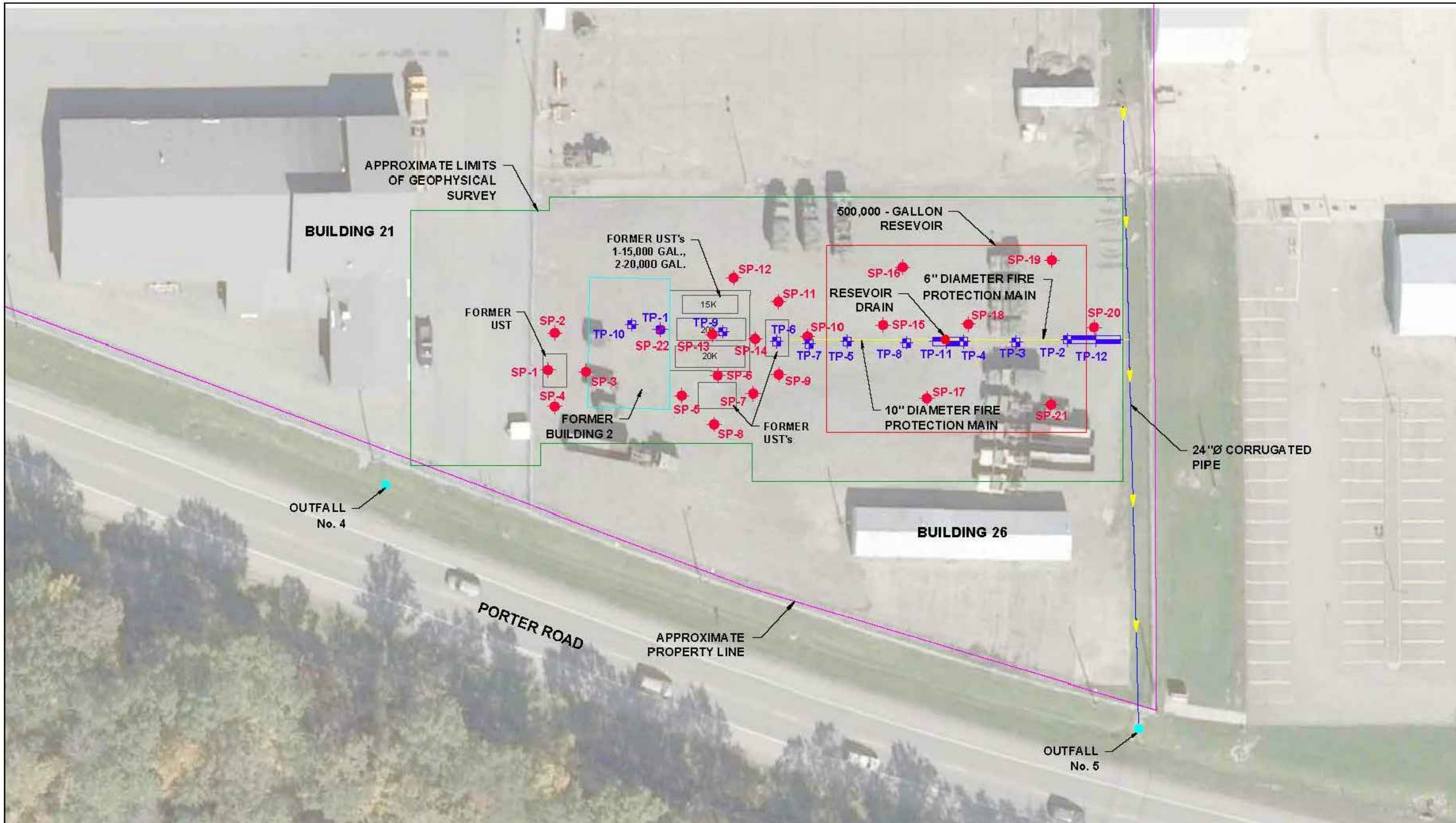
4. J-ANALYTE DETECTED AT A LEVEL LESS THAN THE REPORTING LIMIT AND GREATER THAN THE METHOD DETECTION LIMIT.

0 15 30
SCALE IN FEET

FIGURE 6
POST-EXCAVATION CONFIRMATORY SAMPLE LOCATION MAP (10/8/2009)
USAFRC
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: KN	SCALE: 1"=15'	JOB No.: 895-08
CK'D. BY: MM	DATE: 1/10/10	FILE NO.: 895-08
REV. NO. --	REV. DATE: 3/2/10	FIGURE NO.: 6



LEGEND:

SP-19 — APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE COMPLETED ON DECEMBER 6 & 7, 2010 (21 LOCATIONS)

TP-3 — APPROXIMATE LOCATION AND DESIGNATION OF TEST PIT COMPLETED ON DECEMBER 7 & 8, 2010 (12 LOCATIONS)

TP-1 SP-22 — APPROXIMATE LOCATION AND DESIGNATION OF SOIL PROBE SP-22 CONVERTED TO TEST PIT, TP-1 DUE TO SUBSURFACE REFUSAL FOLLOWING SEVERAL ATTEMPTS COMPLETED ON DECEMBER 7, 2010.

NOTES:

1. BASE MAP ADAPTED FROM AN AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.bing.com/maps/, AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

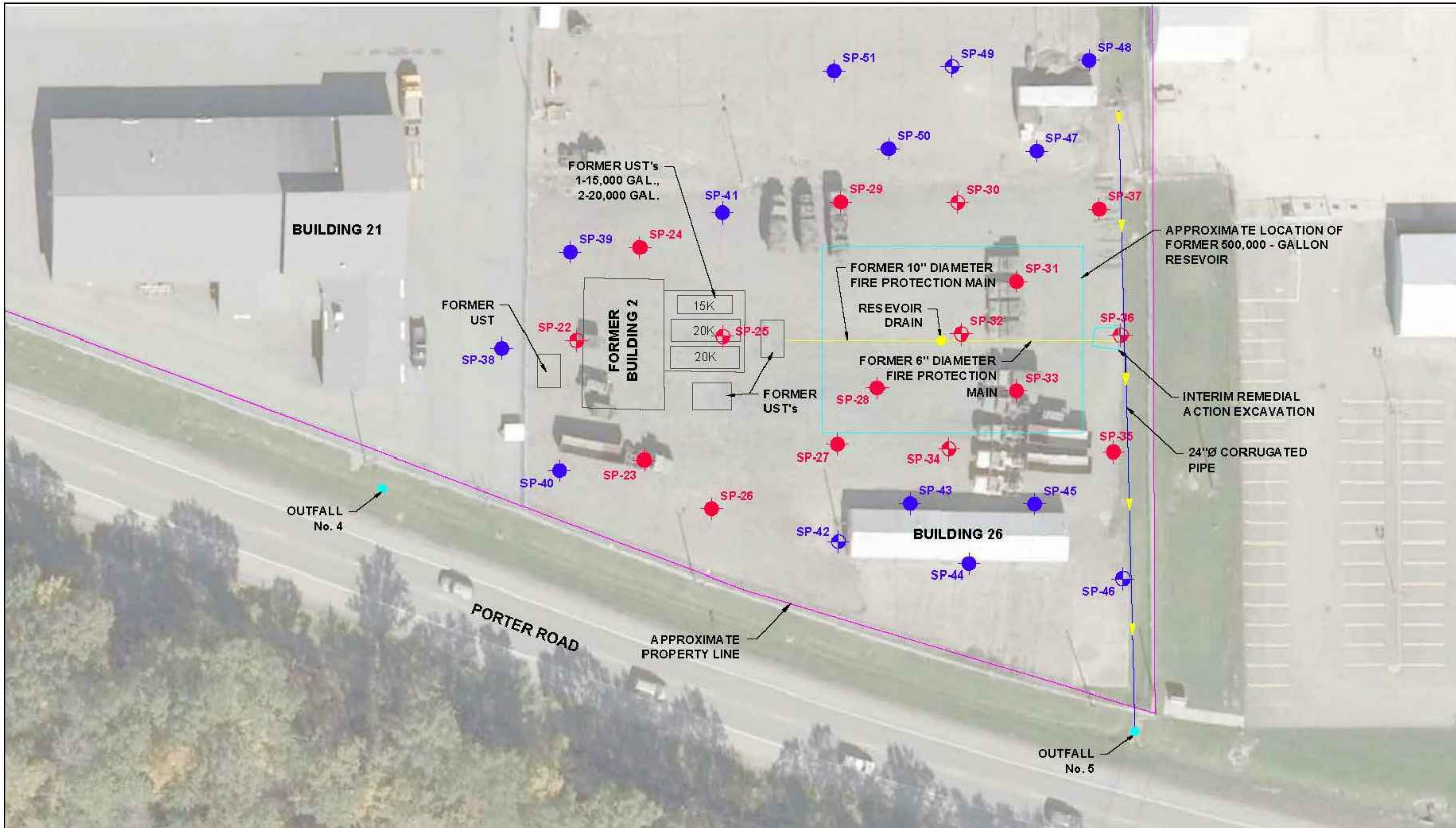
SCALE IN FEET

0 10 20 30 40 50

FIGURE 7
SOIL SAMPLE LOCATION MAP – DECEMBER 2010
NIAGARA FALLS AFRC COMPLEX
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: 1"=50'	JOB No.: 895-08
CK'D. BY: TD	DATE: 11/29/11	FILE NO.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 7



LEGEND:

- SP-26 — APPROXIMATE LOCATION AND DESIGNATION OF PRIMARY SOIL PROBE
- SP-34 — APPROXIMATE LOCATION AND DESIGNATION OF PRIMARY SOIL PROBE WITH TEMPORARY PIEZOMETER INSTALLED
- SP-40 — APPROXIMATE LOCATION AND DESIGNATION OF SECONDARY SOIL PROBE
- SP-42 — APPROXIMATE LOCATION AND DESIGNATION OF SECONDARY SOIL PROBE WITH TEMPORARY PIEZOMETER INSTALLED

NOTES:

1. BASE MAP ADAPTED FROM AN AERIAL PHOTOGRAPH DOWNLOADED FROM http://www.bing.com/maps/, AND FIELD OBSERVATIONS.

2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.

SCALE IN FEET

0 10 20 30 40 50

FIGURE 8
SOIL SAMPLE LOCATION MAP – SEPTEMBER 2011
NIAGARA FALLS AFRC COMPLEX
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: 1"=50'	JOB No.: 895-08
CK'D. BY: TD	DATE: 11/29/11	FILE NO.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 8

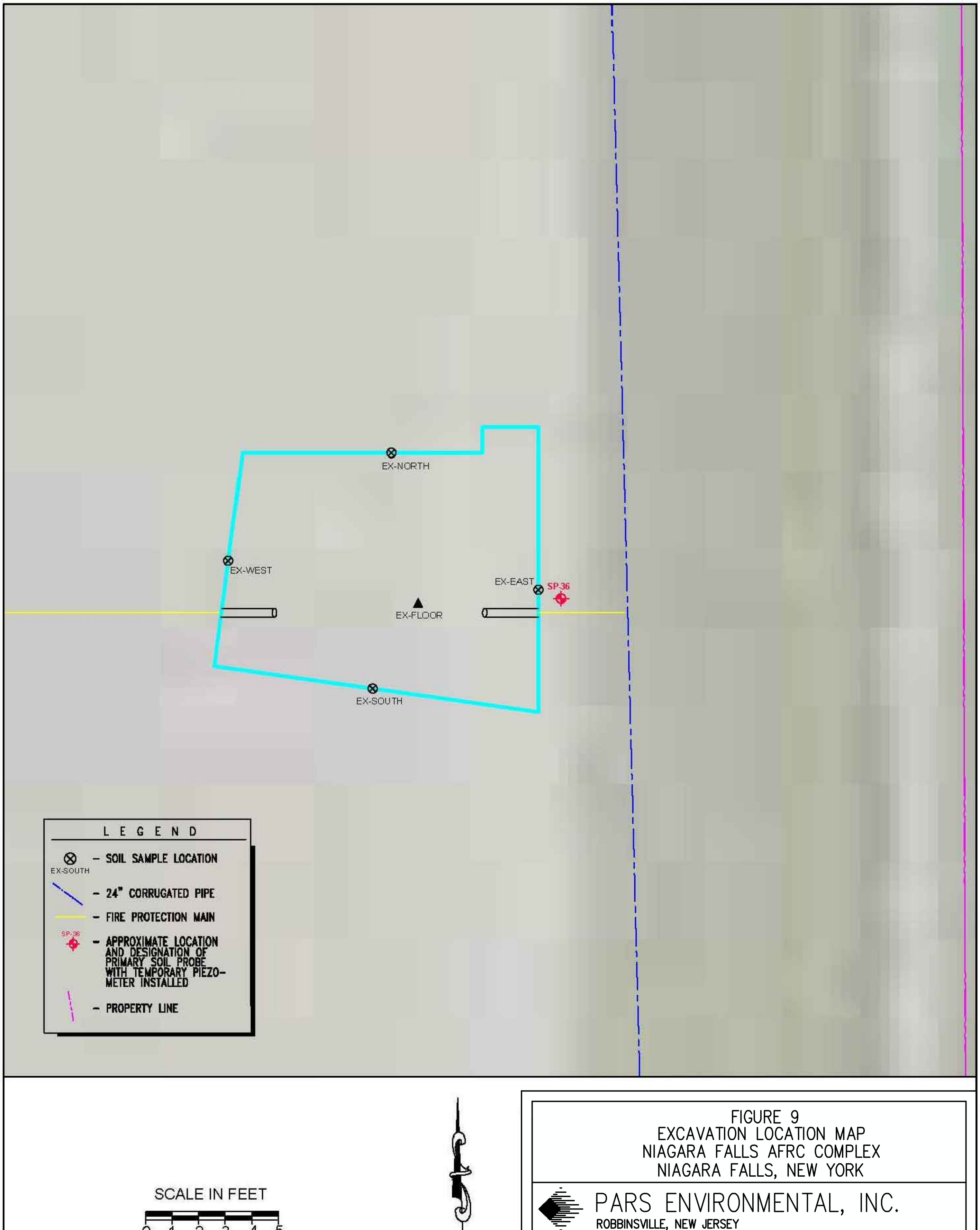
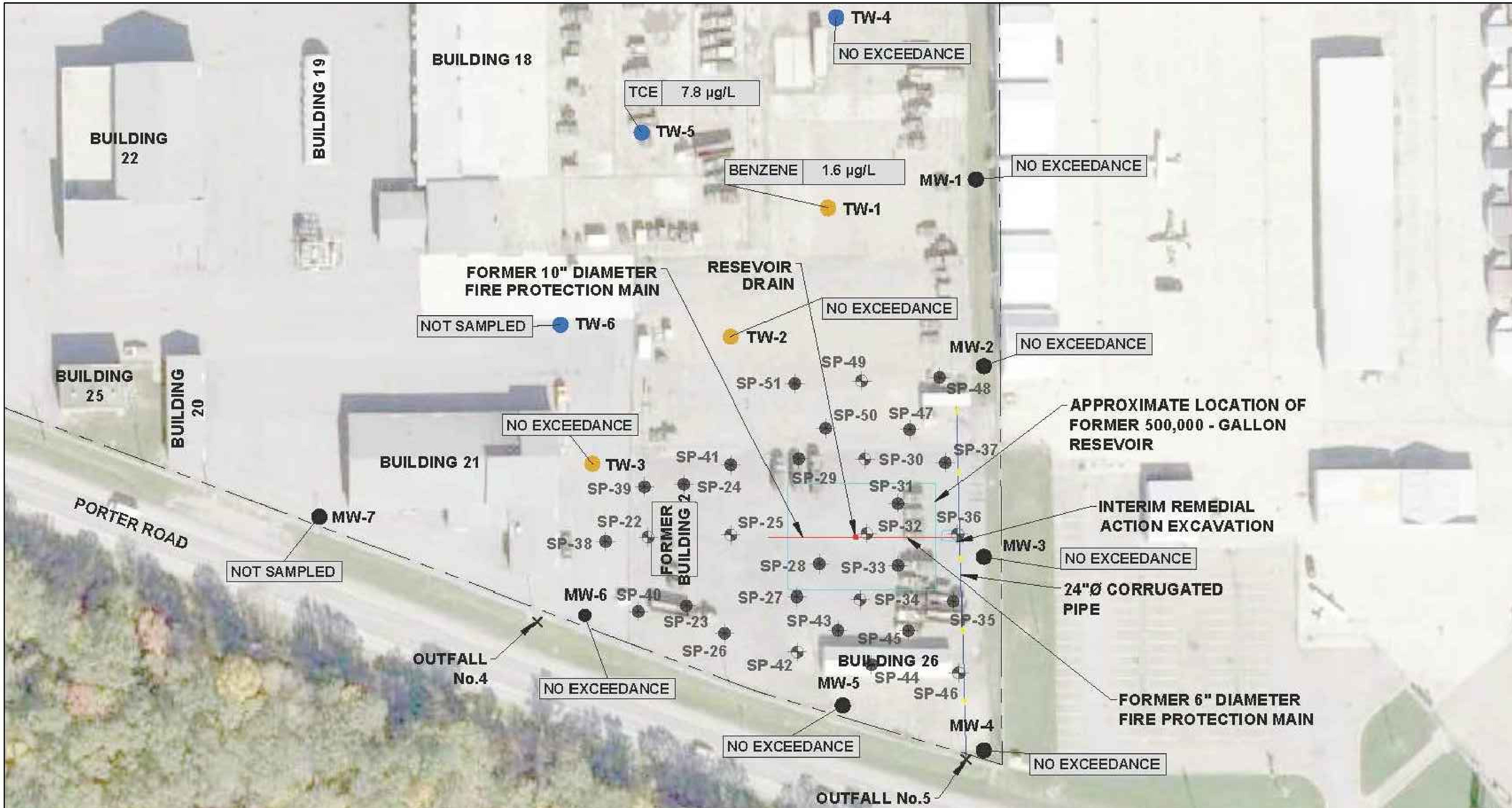


FIGURE 9
EXCAVATION LOCATION MAP
NIAGARA FALLS AFRC COMPLEX
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: 1"=5'	JOB No.: 895-08
CK'D. BY: TD	DATE: 11/29/11	FILE NO.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 9



LEGEND:

- MW-6 ● MONITORING WELL LOCATION
- TW-3 ● PRIMARY TEMPORARY WELL LOCATION
- TW-6 ● SECONDARY TEMPORARY WELL LOCATION
- SP-51 SOIL PROBE LOCATION (SEPT. 2011)
- SP-36 SOIL PROBE AND TEMPORARY WELL LOCATION (SEPT. 2011)

NOTES:

1. BASE MAP ADAPTED FROM A 2008 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps/ AND FIELD OBSERVATIONS.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.
3. ONLY COMPOUDS THAT EXCEED THE GROUNDWATER CLASS GA CRITERIA ARE SHOWN.
4. TW-6 AND MW-7 DID NOT CONTAIN A SUFFICIENT VOLUME OF WATER FOR SAMPLING.

SCALE IN FEET
20 0 40 80

FIGURE 10
SAMPLE LOCATION / GROUNDWATER CONCENTRATION MAP
USAFRC
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: AS SHOWN	JOB No.: 895-08
CK'D. BY: MM	DATE: 2/13/13	FILE NO.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 10

TABLES

Table 1
Analytical Results Summary Table
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Sample Identification	Date Collected	VOCs EPA Method 8260-TCL	SVOCs EPA Method 8270 - TCL	PCBs EPA Method 8082	Waste Characterization
Soil Probe Samples					
SP-22-2-4	9/26/2011	X	X	X	
SP-22-10-12	9/26/2011	X	X	X	
SP-23-2-4	9/26/2011	X	X	X	
SP-23-6-8	9/26/2011	X	X	X	
SP-24-2-4	9/26/2011	X	X	X	
SP-24-8-10	9/26/2011	X	X	X	
SP-25-2-4	9/26/2011	X	X	X	
SP-25-6-8	9/26/2011	X	X	X	
SP-26-1-3	9/26/2011	X	X	X	
SP-26-6-8	9/26/2011	X	X	X	
SP-27-2-4	9/26/2011	X	X	X	
SP-27-6-8	9/26/2011	X	X	X	
SP-28-1-3	9/26/2011	X	X	X	
SP-28-6-8	9/26/2011	X	X	X	
SP-29-1-3	9/26/2011	X	X	X	
SP-29-6-8	9/26/2011	X	X	X	
SP-30-1-3	9/27/2011	X	X	X	
SP-30-10-12	9/27/2011	X	X	X	
SP-31-1-3	9/27/2011	X	X	X	
SP-31-8-10	9/27/2011	X	X	X	
SP-32-2-4	9/26/2011	X	X	X	
SP-32-8-10	9/26/2011	X	X	X	
SP-33-0-2	9/27/2011	X	X	X	
SP-33-8-10	9/27/2011	X	X	X	
SP-34-2-4	9/26/2011	X	X	X	
SP-34-6-8	9/26/2011	X	X	X	
SP-35-1-3	9/27/2011	X	X	X	
SP-35-6-8	9/27/2011	X	X	X	
SP-36-1-3	9/27/2011	X	X	X	
SP-36-8-10	9/27/2011	X	X	X	
SP-37-1-3	9/27/2011	X	X	X	
SP-37-4-6	9/27/2011	X	X	X	
SP-41-1-3	9/28/2011		X	X	
SP-41-6-8	9/28/2011		X	X	
SP-47-1-3	9/27/2011			X	
SP-47-6-8	9/27/2011			X	
SP-50-1-3	9/28/2011		X	X	
SP-50-6-8	9/28/2011		X	X	
SP-51-1-3	9/28/2011		X	X	
SP-51-6-8	9/28/2011		X	X	
OUTFALL 004	9/27/2011	X	X	X	
Soil Excavation Samples					
EX-NORTH	9/29/2011	X	X	X	
EX-SOUTH	9/29/2011	X	X	X	
EX-EAST	9/29/2011	X	X	X	
EX-WEST	9/29/2011	X	X	X	
EX-FLOOR	9/29/2011	X	X	X	
WC-1-SOIL	9/29/2011				X[7]
Groundwater Samples					
SP-22-110926	9/26/2011	X	X	X	
SP-25-110926	9/26/2011	X	X	X	
SP-30-110927	9/27/2011	X	X	X	
SP-32-110926	9/26/2011	X	X	X	
SP-34-110926	9/26/2011	X	X	X	
SP-36-110927	9/27/2011	X	X	X	
SP-42-110927	9/27/2011	X			
SP-49-110927	9/27/2011	X			

Notes:
1. SP-22-2-4 = (SP-22), type of sample and number from which sample was obtained, (2-4) depth of sample below ground surface. SP = soil probe.
2. VOCs = Volatile Organic Compounds
3. SVOCs = Semi-Volatile Organic Compounds
4. TCL = Target Compound List
5. TAL = Target Analyte List
6. PCBs = Polychlorinated Biphenyls
7. Waste characterization sample (WC-1-SOIL) was analyzed for the following parameters TCLP VOCs, SVOCs, RCRA Metals, PCBs, pH, and Ignitability.

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-22-2-4 Result	SP-22-10-12 Result	SP-23-2-4 Result	SP-23-6-8 Result	SP-24-2-4 Result	SP-24-8-10 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	7.1 J	60	22 J	28 J	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	4.9 J	5.6 J	4.8 J	5.1 J	5.1 J	3.9 J
2-Butanone (MEK)	100,000	*NV*	ND	ND	7.5 J	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	51 J	ND	ND	ND	ND
2-Methylnaphthalene	410 [J]	*NV*	ND	12 J	ND	ND	ND	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	*500,000*	ND	68 J	ND	ND	ND	ND
Fluorene	30,000	*500,000*	ND	96 J	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	500 J	210 J	ND	ND	ND	ND
Anthracene	100,000	*500,000*	ND	97 J	ND	ND	ND	ND
Fluoranthene	100,000	*500,000*	830 J	250	ND	ND	ND	ND
Pyrene	100,000	*500,000*	590 J	160 J	ND	ND	ND	ND
Benzo(a)anthracene	1,000	*5,600*	650 J	110 J	12 J	ND	21 J	ND
Dibenzo(a,h)anthracene	330	*560*	ND	14 J	ND	ND	30 J	ND
Dibenzofuran	7,000	*NV*	ND	31 J	ND	ND	ND	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [J]	*NV*	ND	ND	ND	88 J	ND	ND
Carbazole	NV	*NV*	ND	17 J	ND	ND	ND	ND
Chrysene	1,000	*56,000*	670 JB	100 JB	11 JB	ND	29 JB	ND
Benzo(b)fluoranthene	1,000	*5,600*	590 J	91 J	16 J	11 J	ND	11 J
Benzo(k)fluoranthene	800	*56,000*	420 J	64 J	13 J	11 J	ND	13 J
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	550 J	90 J	13 J	9.5 J	ND	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	280 J	32 J	ND	ND	30 J	ND
Benzo(g,h,i)perylene	100,000	*500,000*	310 J	33 J	ND	ND	35 J	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-25-2-4 Result	SP-25-6-8 Result	SP-26-1-3 Result	SP-26-6-8 Result	SP-27-2-4 Result	SP-27-6-8 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	ND	27 J	6.7 J	ND	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	5.1 J	5.6 J	4.6 J	4.8 J	4.9 J	5.0 J
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	410 [9]	*NV*	ND	ND	ND	ND	ND	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	ND	ND
Fluorene	30,000	*500,000*	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	5100 J	3300 J	ND	ND	83 J	ND
Anthracene	100,000	*500,000*	1300 J	ND	ND	ND	ND	ND
Fluoranthene	100,000	*500,000*	7100 J	7000 J	16 J	ND	80 J	ND
Pyrene	100,000	*500,000*	4900 J	6100 J	11 J	ND	40 J	ND
Benzo(a)anthracene	1,000	*5,600*	3600 J	5600 J	14 J	ND	37 J	ND
Dibenzo(a,h)anthracene	330	*560*	**630 J**	**1200 J**	ND	ND	10 J	ND
Dibenzofuran	7,000	*NV*	ND	ND	ND	ND	ND	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [9]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	ND	ND	ND
Chrysene	1,000	*56,000*	3500 JB	5400 JB	14 JB	ND	45 JB	ND
Benzo(b)fluoranthene	1,000	*5,600*	4100 J	5600 J	19 J	12 J	59 J	15 J
Benzo(k)fluoranthene	800	*56,000*	1700 J	3100 J	16 J	12 J	27 J	9.1 J
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	**3200 J**	**5800 J**	15 J	9.9 J	39 J	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	1200 J	2100 J	9.3 J	8.8 J	23 J	ND
Benzo(g,h,i)perylene	100,000	*500,000*	1400 J	2500 J	ND	9.8 J	26 J	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-28-1-3 Result	SP-28-6-8 Result	SP-29-1-3 Result	SP-29-6-8 Result	SP-30-1-3 Result	SP-30-10-12 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	9.7 J	7.3 J	ND	12 J	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	3.0 J	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	<
Methylene Chloride	50	*500,000*	4.7 J	5.8 J	7.8	5.6 J	3.8 JB	2.9 JB
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	ND	ND	ND	17 J	ND
2-Methylnaphthalene	410 [9]	*NV*	ND	ND	ND	ND	9.3 J	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	32 J	22 J	ND
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	25 J	ND
Fluorene	30,000	*500,000*	ND	ND	ND	33 J	26 J	ND
Phenanthrene	100,000	*500,000*	15 J	18 J	1800 J	360	320 B	8.8 JB
Anthracene	100,000	*500,000*	ND	ND	ND	97 J	52 J	ND
Fluoranthene	100,000	*500,000*	36 J	77 J	3100 J	570	630 B	17 JB
Pyrene	100,000	*500,000*	25 J	57 J	2000 J	350	430 B	12 JB
Benzo(a)anthracene	1,000	*5,600*	27 J	46 J	1700 J	210 J	260 B	14 JB
Dibenzo(a,h)anthracene	330	*560*	ND	12 J	ND	29 J	ND	ND
Dibenzofuran	7,000	*NV*	ND	ND	ND	19 J	16 J	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	14 JB	12 JB
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	32 J	32 J
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [9]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	15 J	53 J	4.1 J
Chrysene	1,000	*56,000*	25 JB	47 JB	2300 JB	200 J	290 B	17 JB
Benzo(b)fluoranthene	1,000	*5,600*	40 J	72 J	3500 J	210 J	440 B	18 JB
Benzo(k)fluoranthene	800	*56,000*	19 J	35 J	1700 J	110 J	180 JB	16 JB
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	26 J	54 J	**2900 J**	160 J	290 B	15 JB
Indeno(1,2,3-cd)pyrene	500	*5,600*	16 J	27 J	1400 J	86 J	120 JB	10 JB
Benzo(g,h,i)perylene	100,000	*500,000*	15 J	28 J	1800 J	91 J	120 JB	7.8 JB
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	1,100	ND	320	ND	150 J	ND
Total PCBs	100*	*1,000**	1,100	ND	320	ND	150	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-31-1-3 Result	SP-31-8-10 Result	SP-32-2-4 Result	SP-32-8-10 Result	SP-33-0-2 Result	SP-33-8-10 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	ND	ND	30	ND	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	4.3 JB	3.2 JB	5.6 J	5.2 J	ND	ND
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	7.7 J	ND	ND	ND	ND	ND
2-Methylnaphthalene	410 [g]	*NV*	ND	ND	ND	ND	52 J	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	15 J	ND	ND	ND	68 J	ND
Acenaphthene	20,000	*500,000*	3.0 J	ND	ND	ND	ND	ND
Fluorene	30,000	*500,000*	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	96 JB	6.6 JB	88 J	ND	190 JB	ND
Anthracene	100,000	*500,000*	28 J	ND	22 J	ND	88 J	ND
Fluoranthene	100,000	*500,000*	250 B	13 JB	180 J	ND	560 JB	5.5 JB
Pyrene	100,000	*500,000*	170 JB	11 JB	120 J	ND	440 JB	4.9 JB
Benzo(a)anthracene	1,000	*5,600*	150 JB	15 JB	97 J	11 J	330 JB	9.1 JB
Dibenzo(a,h)anthracene	330	*560*	ND	ND	20 J	ND	ND	ND
Dibenzofuran	7,000	*NV*	6.4 J	ND	ND	ND	28 J	ND
Diethyl phthalate	NV	*NV*	16 JB	11 JB	ND	ND	ND	9.8 JB
Di-n-octyl phthalate	NV	*NV*	38 J	30 J	ND	ND	310 J	31 J
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [g]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	14 J	3.7 J	ND	ND	74 J	3.6 J
Chrysene	1,000	*56,000*	140 JB	14 JB	110 JB	10 JB	380 JB	7.9 JB
Benzo(b)fluoranthene	1,000	*5,600*	190 JB	20 JB	140 J	14 J	740 JB	12 JB
Benzo(k)fluoranthene	800	*56,000*	82 JB	15 JB	64 J	13 J	360 JB	10 JB
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	130 JB	15 JB	98 J	14 J	490 JB	7.0 JB
Indeno(1,2,3-cd)pyrene	500	*5,600*	56 JB	10 JB	45 J	ND	210 JB	7.6 JB
Benzo(g,h,i)perylene	100,000	*500,000*	57 JB	11 JB	52 J	ND	400 JB	8.8 JB
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	410	ND	940	ND
Total PCBs	100*	*1,000**	ND	ND	410	ND	940	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-34-2-4 Result	SP-34-6-8 Result	SP-34-6-8 (DUP) Result	SP-35-1-3 Result	SP-35-6-8 Result	SP-36-1-3 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	6.7 J	ND	ND	ND	27 J
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	6.9	5.9 J	3.9 J	ND	ND	2.9 JB
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	5.2 J
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	33 J	ND	ND	ND	ND	5.7 J
2-Methylnaphthalene	410 [g]	*NV*	38 J	ND	ND	ND	ND	4.1 J
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	ND	9.0 J
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	ND	4.3 J
Fluorene	30,000	*500,000*	ND	ND	ND	ND	ND	12 J
Phenanthrene	100,000	*500,000*	120 J	ND	ND	7.7 JB	ND	89 JB
Anthracene	100,000	*500,000*	ND	ND	ND	ND	ND	22 J
Fluoranthene	100,000	*500,000*	140 J	ND	ND	27 JB	7.9 JB	130 JB
Pyrene	100,000	*500,000*	89 J	ND	ND	20 JB	6.0 JB	98 JB
Benzo(a)anthracene	1,000	*5,600*	66 J	15 J	15 J	23 JB	8.9 JB	55 JB
Dibenzo(a,h)anthracene	330	*560*	13 J	ND	ND	ND	ND	ND
Dibenzofuran	7,000	*NV*	24 J	ND	ND	ND	ND	6.1 J
Diethyl phthalate	NV	*NV*	ND	ND	ND	11 JB	7.4 JB	13 JB
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	30 J	28 J	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [g]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	3.6 J	ND	14 J
Chrysene	1,000	*56,000*	78 J	14 JB	13 JB	24 JB	10 JB	62 JB
Benzo(b)fluoranthene	1,000	*5,600*	81 J	16 J	19 J	46 JB	20 JB	97 JB
Benzo(k)fluoranthene	800	*56,000*	40 J	14 J	12 J	24 JB	11 JB	43 JB
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	59 J	14 J	14 J	30 JB	11 JB	63 JB
Indeno(1,2,3-cd)pyrene	500	*5,600*	38 J	ND	ND	17 JB	7.4 JB	30 JB
Benzo(g,h,i)perylene	100,000	*500,000*	52 J	ND	ND	19 JB	6.9 JB	32 JB
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-36-8-10 Result	SP-37-1-3 Result	SP-37-4-6 Result	SP-41-1-3 Result	SP-41-6-8 Result	SP-47-1-3 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	17 J	19 J	29 J	NT	NT	NT
Methylcyclohexane	NV	*NV*	ND	ND	ND	NT	NT	NT
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	NT	NT	NT
Methylene Chloride	50	*500,000*	ND	2.9 J	ND	NT	NT	NT
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	NT	NT	NT
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	45 J	ND	ND	ND	NT
2-Methylnaphthalene	410 [g]	*NV*	ND	28 J	ND	ND	ND	NT
4-Methylphenol	NV	*NV*	ND	ND	ND	17 J	ND	NT
Acenaphthylene	100,000	*500,000*	ND	9.8 J	ND	ND	ND	NT
Acenaphthene	20,000	*500,000*	ND	160 J	ND	ND	ND	NT
Fluorene	30,000	*500,000*	ND	320	ND	ND	ND	NT
Phenanthrene	100,000	*500,000*	4.5 JB	2,400 B	10 JB	ND	ND	NT
Anthracene	100,000	*500,000*	ND	690	ND	ND	ND	NT
Fluoranthene	100,000	*500,000*	5.8 JB	2,700 B	17 JB	ND	ND	NT
Pyrene	100,000	*500,000*	5.1 JB	1,700 B	9.8 JB	ND	ND	NT
Benzo(a)anthracene	1,000	*5,600*	9.4 JB	950 B	13 JB	ND	21 J	NT
Dibenzo(a,h)anthracene	330	*560*	ND	64 J	ND	ND	19 JB	NT
Dibenzofuran	7,000	*NV*	ND	190 J	ND	ND	ND	NT
Diethyl phthalate	NV	*NV*	12 JB	7.9 JB	10 JB	ND	ND	NT
Di-n-octyl phthalate	NV	*NV*	31 J	31 J	ND	ND	ND	NT
Di-n-butyl phthalate	NV	*NV*	ND	380	ND	ND	ND	NT
Bis(2-ethylhexyl)phthalate	50,000 [g]	*NV*	ND	ND	ND	ND	ND	NT
Carbazole	NV	*NV*	4.4 J	230	ND	ND	ND	NT
Chrysene	1,000	*56,000*	9.6 JB	940 B	9.7 JB	ND	24 J	NT
Benzo(b)fluoranthene	1,000	*5,600*	8.8 JB	1,200 B	18 JB	ND	24 J	NT
Benzo(k)fluoranthene	800	*56,000*	8.1 JB	620 B	16 JB	ND	29 J	NT
Biphenyl	NV	*NV*	ND	17 J	ND	ND	ND	NT
Benzo(a)pyrene	1,000	*1,000*	7.3 JB	920 B	11 JB	ND	17 J	NT
Indeno(1,2,3-cd)pyrene	500	*5,600*	6.2 JB	270 B	9.0 JB	ND	19 JB	NT
Benzo(g,h,i)perylene	100,000	*500,000*	6.0 JB	290 B	7.9 JB	ND	15 JB	NT
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-47-6-8 Result	SP-50-1-3 Result	SP-50-6-8 Result	SP-51-1-3 Result	SP-51-6-8 Result	EX-NORTH Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	NT	NT	NT	NT	NT	44
Methylcyclohexane	NV	*NV*	NT	NT	NT	NT	NT	ND
Tetrachloroethene	1,300	*150,000*	NT	NT	NT	NT	NT	2.4 JB
Methylene Chloride	50	*500,000*	NT	NT	NT	NT	NT	ND
2-Butanone (MEK)	100,000	*NV*	NT	NT	NT	NT	NT	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	NT	ND	ND	ND	ND	ND
2-Methylnaphthalene	410 [9]	*NV*	NT	ND	ND	ND	ND	ND
4-Methylphenol	NV	*NV*	NT	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	NT	ND	ND	ND	ND	ND
Acenaphthene	20,000	*500,000*	NT	21 J	ND	ND	ND	ND
Fluorene	30,000	*500,000*	NT	ND	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	NT	750 J	160 J	ND	ND	ND
Anthracene	100,000	*500,000*	NT	160 J	ND	ND	ND	ND
Fluoranthene	100,000	*500,000*	NT	1,000 J	260 J	ND	19 J	ND
Pyrene	100,000	*500,000*	NT	740 J	200 J	ND	ND	ND
Benzo(a)anthracene	1,000	*5,600*	NT	410 J	140 J	ND	ND	ND
Dibenzo(a,h)anthracene	330	*560*	NT	ND	ND	ND	ND	ND
Dibenzofuran	7,000	*NV*	NT	ND	ND	ND	ND	ND
Diethyl phthalate	NV	*NV*	NT	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	NT	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	NT	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [9]	*NV*	NT	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	NT	ND	ND	ND	ND	ND
Chrysene	1,000	*56,000*	NT	390 J	120 J	ND	ND	ND
Benzo(b)fluoranthene	1,000	*5,600*	NT	420 J	150 J	ND	ND	4.8 J
Benzo(k)fluoranthene	800	*56,000*	NT	280 J	89 J	ND	ND	4.2 J
Biphenyl	NV	*NV*	NT	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	NT	380 J	130 J	ND	ND	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	NT	230 JB	93 JB	ND	ND	ND
Benzo(g,h,i)perylene	100,000	*500,000*	NT	230 JB	97 JB	ND	17 JB	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	EX-SOUTH Result	EX-EAST Result	EX-WEST Result	EX-FLOOR Result	OUTFALL 004 Result	RINSATE-SOIL Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	17 J	17 J	29	ND	ND	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	2.4 JB	2 JB	1.8 JB	2 JB	ND	ND
Methylene Chloride	50	*500,000*	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	ND	ND	ND	390 J	ND
2-Methylnaphthalene	410 [9]	*NV*	ND	ND	ND	ND	460 J	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	180 J	ND
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	4,500	ND
Fluorene	30,000	*500,000*	ND	ND	ND	ND	5,400	ND
Phenanthrene	100,000	*500,000*	ND	ND	ND	85 J	56,000 B	ND
Anthracene	100,000	*500,000*	ND	ND	ND	41 J	19,000	ND
Fluoranthene	100,000	*500,000*	18 J	ND	ND	580	190,000	ND
Pyrene	100,000	*500,000*	18 J	ND	ND	550	160,000	ND
Benzo(a)anthracene	1,000	*5,600*	26 J	ND	ND	320	**120,000**	ND
Dibenzo(a,h)anthracene	330	*560*	20 J	ND	ND	47 J	ND	ND
Dibenzofuran	7,000	*NV*	ND	ND	ND	ND	2,400 J	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [9]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	ND	8,600	ND
Chrysene	1,000	*56,000*	15 J	ND	ND	290	**120,000**	ND
Benzo(b)fluoranthene	1,000	*5,600*	32 J	ND	ND	290	**120,000**	ND
Benzo(k)fluoranthene	800	*56,000*	22 J	ND	ND	170 J	49,000 B	ND
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	28 J	ND	ND	270	**82,000 B**	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	26 J	ND	ND	130 J	**28,000 B**	ND
Benzo(g,h,i)perylene	100,000	*500,000*	27 J	ND	ND	140 J	29,000 B	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	70 J	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	210	ND
Total PCBs	100*	*1,000**	ND	ND	ND	70	210	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Notes:
1. Compounds detected in one or more samples are presented on this table. Refer to Attachment C for list of all compounds included in analysis.
2. Analytical testing completed by Test America Laboratories.
3. ug/kg = part per billion; mg/kg = parts per million
4. < indicates compound was not detected above method detection limits.
5. B = Compound was found in the blank and sample.
6. J = Result is less than the reporting limit but greater or equal to the method detection limit and the concentration is an approximate value.
7. NV = no value.
8. NT = not tested.
9. Shading indicates value exceeds Unrestricted Use Soil Cleanup Objectives.
10. **Bold** indicates value exceeds Restricted Commercial Use Soil Cleanup Objectives.
11. A duplicate sample (DUP-1) was collected at soil probe location SP-34, 6 to 8 feet.
12. *Soil cleanup objective is for the sum of the Aroclor compound concentrations detected (Total PCBs).
13. Soil cleanup objectives (SCOs) are from NYSDEC Part 375, Subpart 375-6: Unrestricted Use Soil Cleanup Objectives and the Supplemetal Soil Cleanup Objectives (SSCOs) are from NYSDEC Final Commissioners P

Table 3
Groundwater Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Class GA Criteria	SP-22-110926	SP-25-110926	SP-30-110927	SP-32-110926	SP-34-110926	SP-34-110926 (DUP)	SP-36-110927	SP-42-110927
Volatile Organic Compounds - EPA Method 8260 TCL (ug/L)									
2-Butanone (MEK)	50	ND	ND	ND	ND	ND	ND	ND	3.8 J
Acetone	50	ND	5.8 J	ND	3.0 J	3.4 J	3.8 J	6.6 J	23
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	NV	0.32 J	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	NV	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	NV	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	0.58 J	ND	ND	ND	ND
Trichlorofluoromethane	5	6.3	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND
Total VOCs	NV	6.6	5.8	ND	3.6	3.4	3.8	0.0	26.8
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/L)									
2,4-Dimethylphenol	1	ND	ND	ND	ND	ND	ND	ND	NT
2-Methylnaphthalene	NV	ND	ND	ND	ND	ND	ND	ND	NT
4-Methylphenol	1	ND	ND	ND	ND	ND	ND	ND	NT
Acenaphthene	20	3.3 J	ND	ND	ND	ND	ND	ND	NT
Anthracene	50	0.91 J	0.43 J	ND	ND	ND	ND	ND	NT
Benzo [a] anthracene	0.002*	0.49 J	0.85 J	ND	ND	0.44 J	0.35 J	ND	NT
Benzo [a] pyrene	ND	ND	0.95 J	ND	ND	ND	ND	ND	NT
Benzo [b] fluoranthene	0.002*	ND	1.1 J	ND	ND	ND	ND	ND	NT
Benzo(g,h,i)perylene	NV	ND	0.79 J	ND	ND	ND	ND	ND	NT
Carbazole	5	1.9 J	0.41 J	ND	ND	ND	ND	ND	NT
Chrysene	0.002*	0.39 J	0.77 J	ND	ND	0.43 J	0.47 J	ND	NT
Dibenzofuran	NV	1.2 J	ND	ND	ND	ND	ND	ND	NT
Diethyl phthalate	50	4.0 J	ND	ND	ND	ND	ND	ND	NT
Di-n-butyl-phthalate	NV	0.5 JB	0.46 JB	ND	0.47 JB	0.33 JB	0.44 JB	0.74 J	NT
Dibenz(a,h)anthracene	NV	ND	0.67 J	ND	ND	ND	ND	ND	NT
Fluoranthene	50	1.7 J	1.2 J	0.45 J	ND	0.90 J	0.77 J	ND	NT
Fluorene	50	2.8 J	ND	ND	ND	ND	ND	ND	NT
Indeno(1,2,3-cd)pyrene	0.002	ND	0.91 J	ND	ND	ND	ND	ND	NT
Naphthalene	10 *	3.8 J	ND	ND	ND	ND	ND	ND	NT
Phenanthrene	50 *	3.7 J	0.59 J	ND	ND	0.44 J	0.44 JB	ND	NT
Pyrene	50	1.5 J	1.2 J	ND	ND	0.99 J	0.83 J	ND	NT
Total SVOCs	NV	26.2	10.3	0.5	0.5	3.5	3.3	0.7	NT
PCBs - EPA Method 8082 (ug/L)									
Aroclor 1254	NV	ND	ND	ND	2	ND	ND	ND	NT
Aroclor 1260	NV	ND	ND	0.77	1	D	ND	13	NT
Total PCBs	0.09 [11]	0.0	0.0	0.77	3.0	0.0	0.0	13.0	NT

Table 3
Groundwater Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Class GA Criteria	SP-49-110927	RINSATE	TRIP BLANK 1	TRIP BLANK 2
Volatile Organic Compounds - EPA Method 8260 TCL (ug/L)					
2-Butanone (MEK)	50	ND	ND	ND	ND
Acetone	50	ND	ND	ND	ND
Benzene	1	1.6	ND	ND	ND
Carbon disulfide	NV	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND
Cyclohexane	NV	0.95 J	ND	ND	ND
Ethylbenzene	5	1.3	ND	ND	ND
Methylcyclohexane	NV	1.1	ND	ND	ND
Methylene chloride	5	ND	ND	0.62 J	0.66 J
Toluene	5	2.7	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND
Trichlorofluoromethane	5	ND	ND	ND	ND
Total Xylenes	5	1.8 J	ND	ND	ND
Total VOCs	NV	6.7	ND	0.62	0.66
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/L)					
2,4-Dimethylphenol	1	NT	ND	NT	NT
2-Methylnaphthalene	NV	NT	ND	NT	NT
4-Methylphenol	1	NT	ND	NT	NT
Acenaphthene	20	NT	ND	NT	NT
Anthracene	50	NT	ND	NT	NT
Benzo [a] anthracene	0.002*	NT	ND	NT	NT
Benzo [a] pyrene	ND	NT	ND	NT	NT
Benzo [b] fluoranthene	0.002*	NT	ND	NT	NT
Benzo(g,h,i)perylene	NV	NT	ND	NT	NT
Carbazole	5	NT	ND	NT	NT
Chrysene	0.002*	NT	ND	NT	NT
Dibenzofuran	NV	NT	ND	NT	NT
Diethyl phthalate	50	NT	ND	NT	NT
Di-n-butyl-phthalate	NV	NT	ND	NT	NT
Dibenz(a,h)anthracene	NV	NT	ND	NT	NT
Fluoranthene	50	NT	ND	NT	NT
Fluorene	50	NT	ND	NT	NT
Indeno(1,2,3-cd)pyrene	0.002	NT	ND	NT	NT
Naphthalene	10 *	NT	ND	NT	NT
Phenanthrene	50 *	NT	ND	NT	NT
Pyrene	50	NT	ND	NT	NT
Total SVOCs	NV	NT	0.0	0.0	0.0
PCBs - EPA Method 8082 (ug/L)					
Aroclor 1254	NV	NT	ND	NT	NT
Aroclor 1260	NV	NT	ND	NT	NT
Total PCBs	0.09 [11]	NT	0.0	0.0	0.0

Table 3
Groundwater Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Notes:
1. Compounds detected in one or more samples are presented on this table.
2. Analytical testing completed by Test America Laboratories.
3. NYSDEC Class GA criteria obtained from Division of Water Technical and Operational Guidance Series (TOGS 1.1.1)
4. ug/L = part per billion (ppb); mg/L = part per million (ppm)
5. Shading indicates values exceeding NYSDEC Class GA groundwater criteria.
6. Class GA criteria shown is for total xylene concentration.
7. < = compound was not detected.
8. * indicates a Guidance Value instead of a Standard Value.
9. NT= not tested
10. NV = no value.
11. ND = non-detectable concentration by approved analytical methods.
12. Groundwater criteria is for the sum of the Aroclor compound concentrations detected (Total PCBs).

Table 4
Secondary Screening Process - Subsurface Soil CPC Selection
USACE Niagara - Niagara Falls, NY

Analyte	CAS Number	Frequency of Detection	Mean of Detected (mg/kg)	Range of Detected(mg/kg)	95% UCL (mg/kg)	Max. Detect (mg/kg)	EPC (mg/kg)	RSL industrial (mg/kg)	CPC
Acetone	67-64-1	39/60	0.0391	0.0067-0.34	0.037[a]	0.34	0.037	670,000	N
Benzo(a)anthracene	56-55-3	44/66	0.629	0.0089-10	1.55[b]	10.0	1.55	2.9	Y
Dibenzo(a,h)anthracene	53-70-3	15/66	0.296	0.01-2.3	0.247[c]	2.3	0.247	0.29	Y
Chrysene	218-01-9	43/66	0.634	0.0078-9.7	1.516[b]	9.7	1.516	290	N
Benzo(b)fluoranthene	205-99-2	49/66	0.719	0.0048-14.0	2.024[b]	14.0	2.024	2.9	Y
Benzo(k)fluoranthene	207-08-9	43/66	0.374	0.0042-6.5	0.952[b]	6.5	0.952	29	N
Benzo(a)pyrene	50-32-8	44/66	0.738	0.007-14.0	1.963[b]	14.0	1.963	0.29	Y
Indeno(1,2,3-cd)pyrene	193-39-5	38/66	0.423	0.0062-8.8	1.113[b]	8.80	1.113	2.9	Y
Aroclor 1254	11097-69-1	27/83	2.313	0.007-18.0	2.793[b]	18.0	2.793	1.0	Y
Aroclor 1260	11096-82-5	15/83	0.473	0.025-1.6	0.14[a]	1.60	0.14	1.0	Y

Notes:

mg/kg - Milligrams per Kilogram
UCL- Upper Concentration Limit
EPC - Exposure Point Concentration
RSL - Risk Based Concentration (USEPA Regional Screening Level (RSL) Tables for Industrial Soil, May 2014)
CPC - Contaminant of Potential Concern
Y - Yes
N- No
a- Calculated using the 95% KM (Percentile Bootstrap) Method
b- Calculated using the 97.5% KM (Chebyshev) Method
c- Calculated using the 95% KM (Chebyshev) Method

Table 5
Secondary Screening Process - Surface Soil CPC Selection
USACE Niagara - Niagara Falls, NY

Analyte	CAS Number	Frequency of Detection	Mean of Detected (mg/kg)	Range of Detected(mg/kg)	95% UCL (mg/kg)	Max. Detect (mg/kg)	EPC (mg/kg)	RSL Residential(mg/kg)	CPC
Aroclor 1260	11096-82-5	1/1	NA	NA	NA	0.21	0.21	0.24	N

Notes:

mg/kg - Milligrams per Kilogram
UCL- Upper Concentration Limit
EPC - Exposure Point Concentration
RSL - Risk Based Concentration (USEPA Regional Screening Level (RSL) Tables for Residential Soil, May 2014)
CPC - Contaminant of Potential Concern
Y - Yes
N- No
NA- Not calculated because there are not enough detected values to compute meaningful or reliable statistics and estimates.

Table 6
Secondary Screening Process - Groundwater CPC Selection
USACE Niagara - Niagara Falls, New York

Analyte	CAS Number	Frequency of Detection	Mean of Detected (ug/L)	Range of Detected(ug/L)	95% UCL (ug/L)	Max. Detect (ug/L)	EPC (ug/L)	RSL (ug/L)	CPC
Benzene	71-43-2	3/19	1.237	0.51-1.6	NC	1.6	1.6	0.45	Y
Trichlorofluoromethane	75-69-4	1/19	NA	NA	NC	6.3	6.3	1,100	N
Benzo(a)anthracene	56-55-3	3/17	0.593	0.44-0.85	NC	0.85	0.85	0.034	Y
Benzo(b)fluoranthene	205-99-2	1/17	NA	NA	NC	1.1	1.1	0.034	Y
Chrysene	218-01-9	3/17	0.543	0.39-0.77	NC	0.77	0.77	3.4	N
Indeno(1,2,3-cd)pyrene	193-39-5	1/17	NA	NA	NC	0.91	0.91	0.034	Y
Trichloroethene	79-01-6	2/19	4.19	0.58-7.8	NC	7.8	7.8	0.49	Y
Aroclor 1254	11097-69-1	1/17	NA	NA	NC	2.0	2.0	0.039	Y
Aroclor 1260	11096-82-5	3/17	4.923	0.77-13.0	NC	13.0	13.0	0.039	Y

Notes:

ug/L - Micrograms per liter
UCL- Upper Concentration Limit
EPC - Exposure Point Concentration
RSL - Regional Screening Level (USEPA Regional Screening Level (RSL) Tables for Tap Water, May 2014)
CPC - Contaminant of Potential Concern
Y- Yes
N- No
NA- Not enough detected data available
NC- Not calculated because there are not enough detected values to compute meaningful or reliable statistics and estimates.

Table 7
Final CPC Selection
USACE Niagara - Niagara Falls, New York

Chemicals of Potential Concern		
Subsurface Soil	Surface Soil	Groundwater
Benzo(a)anthracene	None	Benzene
Dibenz(a,h)anthracene		Benzo(a)anthracene
Benzo(b)fluoranthene		Benzo(b)fluoranthene
Benzo(a)pyrene		Indeno(1,2,3-cd)pyrene
Indeno(1,2,3-cd)pyrene		Trichloroethene
Aroclor 1254		Aroclor 1254
Aroclor 1260		Aroclor 1260

Table 8
Summary of Potential Exposure Pathways
USACE Niagara - Niagara Falls, New York

Potentially Exposed Population	Exposure Route, Medium, Exposure Point	Pathway Selected for Evaluation	Reason for Selection
Child Trespasser	Dermal exposure to surface soil; ingestion of surface soil	No	There were no compounds of potential concern identified above the screening levels, therefore the pathway could not be completed.
Construction Worker	Dermal exposure to subsurface soil	Yes	Future use of the Site is industrial/commerical, therefore the potential exists for future construction workers to come in contact with soil during excavation or construction activities.
Construction Worker	Inhalation of subsurface soil particulates from wind	Yes	Future use of the Site is industrial/commerical, therefore the potential for land disturbance could cause future construction workers to come in contact with soil particulates.
Construction Worker	Incidental ingestion of subsurface soil	Yes	Future use of the Site is industrial/commerical, therefore the potential exists for future construction workers to come in contact with soil during excavation or construction activities.
Construction Worker	Incidental Ingestion of groundwater	Yes	Future use of the Site is industrial/commerical, therefore the potential exists for future construction workers to come in contact with groundwater during excavation or construction activities.
Construction Worker	Inhalation of exposed groundwater	Yes	Future use of the Site is industrial/commericial, therefore the potential exists for future construction workers to be exposed to volatiles from groundwater during construction activities.
Construction Worker	Dermal exposure to groundwater	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future construction workers to come in contact with the groundwater during construction activities at the Site.

Table 8
Summary of Potential Exposure Pathways
USACE Niagara - Niagara Falls, New York

Potentially Exposed Population	Exposure Route, Medium, Exposure Point	Pathway Selected for Evaluation	Reason for Selection
Commercial/Industrial Worker	Dermal exposure to subsurface soil	Yes	Future use of the Site is industrial/commerical, therefore the potential exists for future commercial/industrial workers to come in contact with soil during landscaping activities.
Commercial/Industrial Worker	Inhalation of subsurface soil particulates from wind	Yes	Future use of the Site is industrial/commerical, therefore the potential for land disturbance could cause future commerical/industrial workers to come in contact with soil particulates.
Commercial/Industrial Worker	Incidental ingestion of subsurface soil	Yes	Future use of the Site is industrial/commerical, therefore the potential exists for future commercial/industrial workers to come in contact with soil during landscaping activities.
Commercial/Industrial Worker	Accidental Ingestion of groundwater	No	The future commercial/industrial worker would not come in contact with groundwater at the Site during trenching activities. Therefore this pathway is incomplete.
Commercial/Industrial Worker	Inhalation of exposed groundwater	No	The future commercial/industrial worker would not come in contact with groundwater at the Site during trenching activities. Therefore this pathway is incomplete.
Commercial/Industrial Worker	Dermal exposure to groundwater	No	The future commercial/industrial worker would not come in contact with groundwater at the Site during trenching activities. Therefore this pathway is incomplete.

Table 9
Exposure Assessment
Subsurface Soil - Dermal
USACE Niagara - Niagara Falls, New York

Dermal Contact with Chemicals in Subsurface Soil (Adult Commercial/Industrial Worker Scenario)					
Compound	EPC (mg/kg)	DA (mg/cm^2)	Absorbed Dose (mg/kg-day)	Absorption fraction	Carcinogen
Benzo(a)anthracene	1.55	2.42E-08	2.57E-07	0.13	Y
Dibenzo(a,h)anthracene	0.247	3.85E-09	4.09E-08	0.13	Y
Benzo(b)fluoranthene	2.024	3.16E-08	3.35E-07	0.13	Y
Benzo(a)pyrene	1.963	3.06E-08	3.25E-07	0.13	Y
Indeno(1,2,3-cd)pyrene	1.113	1.74E-08	1.84E-07	0.13	Y
Aroclor 1254	2.793	4.69E-08	4.98E-07	0.14	Y
Aroclor 1260	0.14	2.35E-09	2.50E-08	0.14	Y

Notes:

Calculated dosage is absorbed dose, not the intake dose

DA= C x CF x AF x ABS

Absorbed dose(mg/kg-day) = DA x EF x ED X EV X SA / BW X AT

Equation from RAGS Part E- Equations 3.11 and 3.12

C = chemical concentration (EPC) mg/kg (varies per compound)

CF= Conversion factor (10E-6 kg/mg)

AF= Soil to Skin Adherence Factor (mg/cm^2), Assume 0.12 for adult worker(USEPA OSWER Directive 9200.1-120)

SA = Skin surface area available for contact (cm^2/event) Assume 3,470 cm^2 for average adult (USEPA OSWER Directive 9200.1-120)

ABS= Absorption Fraction, varies per compound, use valuesfrom Exhibit 3-4 of RAGS Part E

EF= Exposure frequency (days per/year), assume 250 (RAGS Part E Exhibit 3-5)

ED= Exposure duration, 25 years (RAGS Part E, Exhibit 3-5)

EV= Event frequency, assume 1 (RAGS Part E, Exhibit 3-5)

BW= Body weight, assume 80kg (USEPA OSWER Directive 9200.1-120)

AT= Averaging Time (period over which exposure is average, days) For carcinogens 70 years x 365 days/year)

EPC- Exposure Point Concentration

Table 10
Exposure Assessment
Subsurface Soil - Dermal
USACE Niagara - Niagara Falls, New York

Dermal Contact with Chemicals in Subsurface Soil (Adult Construction Worker Scenario)					
Compound	EPC (mg/kg)	DA (mg/cm^2)	Absorbed Dose (mg/kg-day)	Absorption factor	Carcinogen
Benzo(a)anthracene	1.55	6.05E-08	1.85E-08	0.13	Y
Dibenz(a,h)anthracene	0.247	9.63E-09	2.94E-09	0.13	Y
Benzo(b)fluoranthene	2.024	7.89E-08	2.41E-08	0.13	Y
Benzo(a)pyrene	1.963	7.66E-08	2.34E-08	0.13	Y
Indeno(1,2,3-cd)pyrene	1.113	4.34E-08	1.33E-08	0.13	Y
Aroclor 1254	2.793	1.17E-07	3.58E-08	0.14	Y
Aroclor 1260	0.14	5.88E-09	1.80E-09	0.14	Y

Notes:

Calculated dosage is absorbed dose, not the intake dose

DA= C x CF x AF x ABS

Absorbed dose(mg/kg-day) = DA x EF x ED X EV X SA / BW X AT

Equation from RAGS Part E- Equations 3.11 and 3.12

C = chemical concentration (EPC) mg/kg (varies per compound)

CF= Conversion factor (10E-6 kg/mg)

AF= Soil to Skin Adherence Factor (mg/cm^2), Assume 0.3 for construction worker (Supplemental Guidance for Developing Soil Screening Levels)

SA = Skin surface area available for contact (cm^2/event) Assume 3,470 cm^2 for average adult (USEPA OSWER Directive 9200.1-120)

ABS= Absorption Fraction, varies per compound, use valuesfrom Exhibit 3-4 of RAGS Part E

EF= Exposure frequency (days per/year), assume 180

ED= Exposure duration, 1 year

EV= Event frequency, assume 1 (RAGS Part E, Exhibit 3-5)

BW= Body weight, assume 80kg (USEPA OSWER Directive 9200.1-120)

AT= Averaging Time (period over which exposure is average, days) For carcinogens 70 years x 365 days/year

EPC- Exposure Point Concentration

Table 11
Exposure Assessment
Subsurface Soil - Inhalation
USACE Niagara - Niagara Falls, New York

Inhalation of Soil Particulates from Subsurface Soil (Commercial/Industrial Worker)						
Compound	EPC (mg/kg)	CS (mg/m^3)	CA(ug/m^3)	Exposure concentration(ug/m^3)	Carcinogen	Molecular Weight
Benzo(a)anthracene	1.55	1.45E+01	1.03E-05	8.43E-07	Y	228.29
Dibenz(a,h)anthracene	0.247	2.81E+00	2.01E-06	1.64E-07	Y	278.35
Benzo(b)fluoranthene	2.024	2.09E+01	1.49E-05	1.22E-06	Y	252.3
Benzo(a)pyrene	1.963	2.03E+01	1.45E-05	1.18E-06	Y	252.31
Indeno(1,2,3-cd)pyrene	1.113	1.26E+01	8.99E-06	7.33E-07	Y	276.33
Aroclor 1254	2.793	3.73E+01	2.66E-05	2.17E-06	Y	326.43
Aroclor 1260	0.14	2.07E+00	1.48E-06	1.20E-07	Y	360.88

Notes:

Calculated dosage is absorbed dose, not the intake dose

EC (ug/m3) = CA x ET x EF x ED / AT

Equation from RAGS Part F- Equation 6

EC = Exposure concentration (ug/m$^{3)}$

CS= Calculated EPC converted to ug/m$^{3\,(}$EPC X molecular weight X 0.0409) Assumes a pressure of 1 ATM and a temperature of 25 degrees Celsius

CA= Concentration of particulates in air; CS/PEF; PEF obtained from RSL Industrial Soil Table and was 1.4E9 m3/kg for all compounds.

ET = Exposure time (hours/day), Assume 8

EF= Exposure frequency (days per/year), Assume 250

ED= Exposure duration (years) , Assume 25

AT= Averaging Time (lifetime in years X 365 days/year X 24 hours/day)

EPC- Exposure Point Concentration

Table 12
Exposure Assessment
Subsurface Soil - Inhalation
USACE Niagara - Niagara Falls, New York

Inhalation of Soil Particulates from Subsurface Soil (Construction Worker Scenerio)						
Compound	EPC (mg/kg)	CS (mg/m^3)	CA(ug/m^3)	Exposure concentration(ug/m^3)	Carcinogen	Molecular Weight
Benzo(a)anthracene	1.55	1.45E+01	1.03E-05	2.43E-08	Y	228.29
Dibenz(a,h)anthracene	0.247	2.81E+00	2.01E-06	4.72E-09	Y	278.35
Benzo(b)fluoranthene	2.024	2.09E+01	1.49E-05	3.50E-08	Y	252.3
Benzo(a)pyrene	1.963	2.03E+01	1.45E-05	3.40E-08	Y	252.31
Indeno(1,2,3-cd)pyrene	1.113	1.26E+01	8.99E-06	2.11E-08	Y	276.33
Aroclor 1254	2.793	3.73E+01	2.66E-05	6.25E-08	Y	326.43
Aroclor 1260	0.14	2.07E+00	1.48E-06	3.47E-09	Y	360.88

Notes:

Calculated dosage is absorbed dose, not the intake dose

EC (ug/m3) = CA x ET x EF x ED / AT

Equation from RAGS Part F- Equation 6

EC = Exposure concentration ($ug/m^{3)}$

CS= Calculated EPC converted to $ug/m^{3\,(}$EPC X molecular weight X 0.0409) Assumes a pressure of 1 ATM and a temperature of 25 degrees Celsius

CA= Concentration of particulates in air; CS/PEF; PEF obtained from RSL Industrial Soil Table and was 1.4E9 m3/kg for all compounds.

ET = Exposure time (hours/day), Assume 8

EF= Exposure frequency (days per/year), Assume 180

ED= Exposure duration (years), Assume 1

AT= Averaging Time (lifetime in years X 365 days/year X 24 hours/day)

EPC- Exposure Point Concentration

Table 13
Exposure Assessment
Subsurface Soil - Ingestion
USACE Niagara - Niagara Falls, New York

Incidental Ingestion of Subsurface Soil (Commercial/Industrial Worker Scenario)

Compound	EPC (mg/kg)	Absorbed Dose (mg/kg-day)	Carcinogen
Benzo(a)anthracene	1.55	4.74E-07	Y
Dibenz(a,h)anthracene	0.247	7.55E-08	Y
Benzo(b)fluoranthene	2.024	6.19E-07	Y
Benzo(a)pyrene	1.963	6.00E-07	Y
Indeno(1,2,3-cd)pyrene	1.113	3.40E-07	Y
Aroclor 1254	2.793	8.54E-07	Y
Aroclor 1260	0.14	4.28E-08	Y

Notes:

Intake(mg/kg-day) = CS x IR x CF x FI x EF x ED / BW X AT

Equation from RAGS Part A- Chapter 6 (Exhibit 6-14)

CS = chemical concentration in soil (EPC) mg/kg (varies per compound)

IR= Ingestion rate (mg soil per day); For adults, assume 100 mg per day (EPA OSWER Directive 9200.1-120)

CF = Conversion factor, 10^{-6} kg/mg

FI= Fraction Ingested from Contaminated Source, Pathway-specific value, Assume 100%

EF= Exposure frequency, 250 days

ED= Exposure duration, 25 years

BW= Body weight, assume 80 kg (EPA OSWER Directive 9200.1-120)

AT= Averaging Time (period over which exposure is average, days) For carcinogens 70 years x 365 days/year

EPC- Exposure Point Concentration

Table 14
Exposure Assessment
Subsurface Soil - Ingestion
USACE Niagara - Niagara Falls, New York

Incidental Ingestion of Subsurface Soil (Construction Worker Scenario)			
Compound	EPC (mg/kg)	Absorbed Dose (mg/kg-day)	Carcinogen
Benzo(a)anthracene	1.55	4.50E-08	Y
Dibenz(a,h)anthracene	0.247	7.18E-09	Y
Benzo(b)fluoranthene	2.024	5.88E-08	Y
Benzo(a)pyrene	1.963	5.70E-08	Y
Indeno(1,2,3-cd)pyrene	1.113	3.23E-08	Y
Aroclor 1254	2.793	8.12E-08	Y
Aroclor 1260	0.14	4.07E-09	Y

Notes:

Intake(mg/kg-day) = CS x IR x CF x FI x EF x ED / BW X AT

Equation from RAGS Part A- Chapter 6 (Exhibit 6-14)

CS = chemical concentration in soil (EPC) mg/kg (varies per compound)

IR= Ingestion rate (mg soil per day); For construction workers, assume 330 mg per day (*Supplemental Guidance for Developing Soil Screening Levels*)

CF = Conversion factor, 10^{-6} kg/mg

FI= Fraction Ingested from Contaminated Source, Pathway-specific value, Assume 100%

EF= Exposure frequency, 180 days

ED= Exposure duration, 1 year

BW= Body weight, assume 80 kg (EPA OSWER Directive 9200.1-120)

AT= Averaging Time (period over which exposure is average, days) For carcinogens 70 years x 365 days/year

EPC- Exposure Point Concentration

Table 15
Exposure Assessment
Inhalation - Groundwater
USACE Niagara - Niagara Falls, New York

Inhalation of Volatiles from Exposed Groundwater (Construction Worker)					
Compound	CW (ug/L)	CT(ug/m^3)	Exposure concentration(ug/m^3)	Volatilization Factor	Carcinogen
Benzene	1.6	1.50E+01	3.51E-02	9.35E+00	Y
Trichloroethene	7.8	5.66E+01	1.33E-01	7.25E+00	Y

Notes:

Calculated dosage is absorbed dose, not the intake dose

EC (ug/m3) = CT x ET x EF x ED / AT

Equation from RAGS Part F- Equation 6

EC = Exposure concentration (ug/m^3)

CW= Water concentration (EPC)

CT= Concentration of contaminant in trench; calculated from VDEQ, Equation 3.1: Airborne Concentration of a Contaminant in a Trench (VF x CW)

ET = Exposure time (hours/day), Assume 8

EF= Exposure frequency (days per/year), Assume 180

ED= Exposure duration (years) , Assume 1

AT= Averaging Time (lifetime in years X 365 days/year X 24 hours/day)

EPC- Exposure Point Concentration

Volatilization Factor= Equation 3-4, VF for Groundwater Less Than or Equal to 15 feet; default values from Table 3.8 in VDEQ Guidance

Table 16
Exposure Assessment
Groundwater - Dermal
USACE Niagara - Niagara Falls, New York

Dermal Contact with Chemicals in Groundwater (Construction Worker Scenario)

Compound	EPC (ug/L)	CW (mg/cm^3)	FA	Kp	J_{event}	DA_{event}	Absorbed Dose	Carcinogen
Benzene	1.6	1.60E-06	1.00E+00	1.50E-02	2.90E-01	2.72E-08	8.32E-09	Y
Benzo(a)anthracene	0.85	8.50E-07	1.00E+00	4.70E-01	2.03E+00	1.20E-06	3.66E-07	Y
Benzo(b)fluoranthene	1.1	1.10E-06	1.00E+00	7.00E-01	2.77E+00	2.70E-06	8.25E-07	Y
Indeno(1,2,3-cd)pyrene	0.91	9.10E-07	6.00E-01	1.00E+00	3.78E+00	2.24E-06	6.83E-07	Y
Trichloroethene	7.8	7.80E-06	1.00E+00	1.20E-02	5.80E-01	1.50E-07	4.59E-08	Y
Aroclor 1254	2.0	2.00E-06	7.00E-01	4.50E-01	7.21E+00	3.56E-06	1.09E-06	Y
Aroclor 1260	13.0	1.30E-05	5.00E-01	3.84E-01	1.33E+01	1.92E-05	5.86E-06	Y

Notes:

Calculated dosage is absorbed dose, not the intake dose

Dermally Absorbed dose(mg/kg-day) = DA_{event} x EV x ED x EF x SA / BW x AT

Equation from RAGS Part E, Equation 3.1

DA_{event}= 2 x FA x Kp x CW √ [(6 x j_{event} x $t_{event)}$ / pi]

FA= Fraction absorbed water (chemical specific, obtained from RAGS Part E, Appendix B, Exhibit B-3)

Kp= Dermal permeability coefficient of compound in water (chemical specific, obtained from RAGS Part E, Appendix B, Exhibit B-2)

Cw= Chemical concentration in water (EPC converted to mg/cm^3)

J_{event}= Lag time per event (hr/event) Chemical specific, obtained from Rags Part E, Appendix B, Exhibit B-3

T_{event}= Event duration (hr/event) assume 0.58 (RAGS Part E Exhibit 3-2)

EV= Event frequency (events/day) assume 1 (RAGS Part E Exhibit 3-2)

EF= Exposure frequency (days per/year), assume 180

ED= Exposure duration, 1 years

SA= Skin surface area (cm^2), assume 3,470 (EPA OSWER Directive 9200.1-120)

BW= Body weight, assume 80kg (EPA OSWER Directive 9200.1-120)

AT= Averaging Time (period over which exposure is average, days). For carcinogens 70 years x 365 days / year;

EPC- Exposure Point Concentration

Table 17
Exposure Assessment
Groundwater- Ingestion
USACE Niagara - Niagara Falls, New York

Incidental Ingestion of Groundwater (Construction Worker Scenario)					
Compound	EPC (ug/L)	CW (mg/L)	IF (L/kg-day)	Intake (mg/kg per day)	Carcinogen
Benzene	1.6	1.60E-03	1.76E-06	2.82E-09	Y
Benzo(a)anthracene	0.85	8.50E-04	1.76E-06	1.50E-09	Y
Benzo(b)fluoranthene	1.1	1.10E-03	1.76E-06	1.94E-09	Y
Indeno(1,2,3-cd)pyrene	0.91	9.10E-04	1.76E-06	1.60E-09	Y
Trichloroethene	7.8	7.80E-03	1.76E-06	1.37E-08	Y
Aroclor 1254	2.0	2.00E-03	1.76E-06	3.52E-09	Y
Aroclor 1260	13.0	1.30E-02	1.76E-06	2.29E-08	Y

Notes:

Intake(mg/kg-day)= CW X IF

IF = IR x EF x ED / BW X AT

Equation from VDEQ Groundwater Ingestion for the Construction/Utility Worker (Table 3-11)

CW = chemical concentration in water (EPC) mg/L (varies per compound)

IF= Intake factor (L/kg per day)

IR= Ingestion rate of water (liters per day); For construction, assume 0.02 liters per day

EF= Exposure frequency, 180 (days per/year)

ED= Exposure duration, 1 year

BW= Body weight, assume 80 kg (USEPA, OSWER Directive 9200.1-120)

AT= Averaging Time; For carcinogens 70 years x 365 days/year

EPC- Exposure Point Concentration

Table 18
Carcinogenic Risk Calculations
Subsurface Soil - Dermal
USACE Niagara - Niagara Falls, New York

Cancer Risk Calculations for Subsurface Soil - Dermal (Commercial/Industrial Worker Scenario)							
Compound	Absorbed Dose (mg/kg-day)	Slope Factor (mg/kg-day)	Source	Oral Absorbed Efficiency (ABSderm)	Adjusted Slope Factor (mg/kg-day)	Carcinogen	Cancer Risk
Benzo(a)anthracene	2.57E-07	7.30E-01	ECAO	1.3E-01	5.62E+00	B2	1.4E-06
Dibenz(a,h)anthracene	4.09E-08	7.30E+00	ECAO	1.3E-01	5.62E+01	B2	2.3E-06
Benzo(b)fluoranthene	3.35E-07	7.30E-01	ECAO	1.3E-01	5.62E+00	B2	1.9E-06
Benzo(a)pyrene	3.25E-07	7.30E+00	IRIS	1.3E-01	5.62E+01	B2	1.8E-05
Indeno(1,2,3-cd)pyrene	1.84E-07	7.30E-01	ECAO	1.3E-01	5.62E+00	B2	1.0E-06
Aroclor 1254	4.98E-07	2.00E+00	S	1.4E-01	1.43E+01	B2	7.1E-06
Aroclor 1260	2.50E-08	2.00E+00	S	1.4E-01	1.43E+01	B2	3.6E-07
Total Cancer Risk							**3.24E-05**

Notes:

Absorbed dose calculated in Table 9

Equations and information obtained from RAGS Part E

Cancer Risk (Absorbed dose x adjusted slope factor)

Oral Absorbed Efficiency values obtained from Exhibit 3-4, RAGS Part E

Adjusted slope factor represents the absorbed amount and not the administered; (Slope factor / ABSderm)

Standard USEPA Cancer Classification

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

IRIS= Integrated Risk Information System

ECAO= Environmental Criteria and Assessment Office

S= The User's Guide for the RSL Screening Level Table states that the upper bound slope factor of 2.0 mg/kg per day should be used.

Table 19
Carcinogenic Risk Calculations
Subsurface Soil - Inhalation
USACE Niagara - Niagara Falls, New York

Cancer Risk Calculations for Subsurface Soil - Inhalation (Commercial/Industrial Worker Scenario)					
Compound	Exposure concentration(ug/m^3)	IUR(ug/m^3)$^{-1}$	Source	Carcinogen	Cancer Risk
Benzo(a)anthracene	8.43E-07	1.10E-04	CALEPA	B2	9.27E-11
Dibenz(a,h)anthracene	1.64E-07	1.20E-03	CALEPA	B2	1.97E-10
Benzo(b)fluoranthene	1.22E-06	1.10E-04	CALEPA	B2	1.34E-10
Benzo(a)pyrene	1.18E-06	1.10E-03	CALEPA	B2	1.30E-09
Indeno(1,2,3-cd)pyrene	7.33E-07	1.10E-04	CALEPA	B2	8.06E-11
Aroclor 1254	2.17E-06	5.70E-04	S	B2	1.24E-09
Aroclor 1260	1.20E-07	5.70E-04	S	B2	6.84E-11
Total Cancer Risk					**3.11E-09**

Notes:

Exposure concentration calculated in Table 11

Cancer Risk (Exposure concentration X IUR)

IUR= Slope factor for inhalation risk obtained from RSL Tables, source listed in "Source" column

Standard USEPA Cancer Classification

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

Cal EPA- California EPA

S- User's Guide to RSL Tables

Table 20
Carcinogenic Risk Calculations
Subsurface Soil - Ingestion
USACE Niagara - Niagara Falls, New York

Compound	Absorbed Dose (mg/kg-day)	Slope Factor (mg/kg-day)	Source	GI Absorption Value (ABSgi)	Absorbed Slope Factor (mg/kg-day)	Carcinogen	Cancer Risk
Cancer Risk Calculations for Subsurface Soil - Ingestion (Commercial/Industrial Scenario)							
Benzo(a)anthracene	4.74E-07	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	3.46E-07
Dibenz(a,h)anthracene	7.55E-08	7.30E+00	ECAO	1.0E+00	7.30E+00	B2	5.51E-07
Benzo(b)fluoranthene	6.19E-07	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	4.52E-07
Benzo(a)pyrene	6.00E-07	7.30E+00	IRIS	1.0E+00	7.30E+00	B2	4.38E-06
Indeno(1,2,3-cd)pyrene	3.40E-07	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	2.48E-07
Aroclor 1254	8.54E-07	2.00E+00	S	1.0E+00	2.00E+00	B2	1.71E-06
Aroclor 1260	4.28E-08	2.00E+00	S	1.0E+00	2.00E+00	B2	8.56E-08
Total Cancer Risk							**7.77E-06**

Notes:

Absorbed dose calculated in Table 13

Cancer Risk (Absorbed dose x adjusted slope factor)

ABSgi= GI absorption values , fraction of contaminant absorbed in GI tract obtained from RSL Tables

Absorbed slope factor represents the absorbed amount and not the administered; (Oral Slope factor / ABSgi)

Standard USEPA Cancer Classification

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

IRIS=   Integrated Risk Information System

ECAO= Environmental Criteria and Assessment Office

S= The User's Guide for the RSL Screening Level Table states that the upper bound slope factor of 2.0 mg/kg per day should be used.

Table 21
Carcinogenic Risk Calculations
Subsurface Soil - Dermal
USACE Niagara - Niagara Falls, New York

Cancer Risk Calculations for Subsurface Soil - Dermal (Construction Worker Scenario)

Compound	Absorbed Dose (mg/kg-day)	Slope Factor (mg/kg-day)	Source	Oral Absorbed Efficiency (ABSderm)	Adjusted Slope Factor (mg/kg-day)	Carcinogen	Cancer Risk
Benzo(a)anthracene	1.85E-08	7.30E-01	ECAO	1.3E-01	5.62E+00	B2	1.04E-07
Dibenz(a,h)anthracene	2.94E-09	7.30E+00	ECAO	1.3E-01	5.62E+01	B2	1.65E-07
Benzo(b)fluoranthene	2.41E-08	7.30E-01	ECAO	1.3E-01	5.62E+00	B2	1.35E-07
Benzo(a)pyrene	2.34E-08	7.30E+00	IRIS	1.3E-01	5.62E+01	B2	1.31E-06
Indeno(1,2,3-cd)pyrene	1.33E-08	7.30E-01	ECAO	1.3E-01	5.62E+00	B2	7.47E-08
Aroclor 1254	3.58E-08	2.00E+00	S	1.4E-01	1.43E+01	B2	5.11E-07
Aroclor 1260	1.80E-09	2.00E+00	S	1.4E-01	1.43E+01	B2	2.57E-08
Total Cancer Risk							**2.33E-06**

Notes:

Absorbed dose calculated in Table 10

Equations and information obtained from RAGS Part E

Cancer Risk (Absorbed dose x adjusted slope factor)

Oral Absorbed Efficiency values obtained from Exhibit 3-4, RAGS Part E

Adjusted slope factor represents the absorbed amount and not the administered; (Slope factor / ABSderm)

Standard USEPA Cancer Classification

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

IRIS= Integrated Risk Information System

ECAO= Environmental Criteria and Assessment Office

S= The User's Guide for the RSL Screening Level Table states that the upper bound slope factor of 2.0 mg/kg per day should be used.

Table 22
Carcinogenic Risk Calculations
Subsurface Soil - Inhalation
USACE Niagara - Niagara Falls, New York

Compound	Exposure concentration(ug/m^3)	IUR(ug/m^3)$^{-1}$	Source	Carcinogen	Cancer Risk
Cancer Risk Calculations for Subsurface Soil - Inhalation (Construction Worker Scenario)					
Benzo(a)anthracene	2.43E-08	1.10E-04	CALEPA	B2	2.67E-12
Dibenz(a,h)anthracene	4.72E-09	1.20E-03	CALEPA	B2	5.66E-12
Benzo(b)fluoranthene	3.50E-08	1.10E-04	CALEPA	B2	3.85E-12
Benzo(a)pyrene	3.40E-08	1.10E-03	CALEPA	B2	3.74E-11
Indeno(1,2,3-cd)pyrene	2.11E-08	1.10E-04	CALEPA	B2	2.32E-12
Aroclor 1254	6.25E-08	5.70E-04	S	B2	3.56E-11
Aroclor 1260	3.47E-09	5.70E-04	S	B2	1.98E-12
Total Cancer Risk					**8.95E-11**

Notes:

Exposure concentration calculated in Table 12

Cancer Risk (Exposure concentration X IUR)

IUR= Slope factor for inhalation risk obtained from RSL Tables, source listed in "Source" column

Standard USEPA Cancer Classification

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

Cal EPA- California EPA

S- User's Guide to RSL Tables

Table 23
Carcinogenic Risk Calculations
Subsurface Soil - Ingestion
USACE Niagara - Niagara Falls, New York

Cancer Risk Calculations for Subsurface Soil - Ingestion (Construction Worker Scenario)

Compound	Absorbed Dose (mg/kg-day)	Slope Factor (mg/kg-day)	Source	GI Absorption Value (ABSgi)	Absorbed Slope Factor (mg/kg-day)	Carcinogen	Cancer Risk
Benzo(a)anthracene	4.50E-08	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	3.29E-08
Dibenz(a,h)anthracene	7.18E-09	7.30E+00	ECAO	1.0E+00	7.30E+00	B2	5.24E-08
Benzo(b)fluoranthene	5.88E-08	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	4.29E-08
Benzo(a)pyrene	5.70E-08	7.30E+00	IRIS	1.0E+00	7.30E+00	B2	4.16E-07
Indeno(1,2,3-cd)pyrene	3.23E-08	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	2.36E-08
Aroclor 1254	8.12E-08	2.00E+00	S	1.0E+00	2.00E+00	B2	1.62E-07
Aroclor 1260	4.07E-09	2.00E+00	S	1.0E+00	2.00E+00	B2	8.14E-09
Total Cancer Risk							**7.38E-07**

Notes:

Absorbed dose calculated in Table 14

Cancer Risk (Absorbed dose x adjusted slope factor)

ABSgi= GI absorption values , fraction of contaminant absorbed in GI tract obtained from RSL Tables

Absorbed slope factor represents the absorbed amount and not the administered; (Oral Slope factor / ABSgi)

Standard USEPA Cancer Classification

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

IRIS= Integrated Risk Information System

ECAO= Environmental Criteria and Assessment Office

S= The User's Guide for the RSL Screening Level Table states that the upper bound slope factor of 2.0 mg/kg per day should be used.

Table 24
Carcinogenic Risk Calculations
Groundwater - Inhalation
USACE Niagara - Niagara Falls, New York

Cancer Risk Calculations for Groundwater- Inhalation- Construction Worker Scenario					
Compound	Exposure concentration(ug/m^3)	IUR(ug/m^3)$^{-1}$	Source	Carcinogen	Cancer Risk
Benzene	3.51E-02	7.80E-06	IRIS	A*	2.74E-07
Trichloroethene	1.33E-01	4.10E-06	IRIS	**	5.45E-07
Total Cancer Risk					**8.19E-07**

Notes:

Exposure concentration calculated in Table 15

Cancer Risk (Exposure concentration x IUR)

IUR= Slope factor for inhalation risk obtained from RSL Tables, sources are listed in the "Source" column.

Standard USEPA Cancer Classification

A-Human Carcinogen: There is enough evidence to conclude that it can cause cancer in humans.

Cal EPA- California EPA

IRIS- USEPA Integrated Risk Information System

* = Also classified as a known/likely human carcinogen under the Proposed Guidelines for Carcinogen Risk Assessment (USEPA, 1996)

**= Carcinogenic to humans under Guidelines for Carcinogen Risk Assessment (USEPA, 2005)

Table 25
Risk Characterization
Groundwater - Dermal
USACE Niagara - Niagara Falls, New York

Cancer Risk Calculations for Groundwater- Dermal- (Construction Worker Scenario)							
Compound	Absorbed Dose (mg/kg)	Slope Factor	Source	Oral Absorbed Efficiency (ABS_{GI})	Adjusted Slope Factor (mg/kg)	Carcinogen	Cancer Risk
Benzene	8.32E-09	5.5E-02	IRIS	100%	5.50E-02	A*	4.58E-10
Benzo(a)anthracene	3.66E-07	7.3E-01	ECAO	100%	NC	B2	2.67E-07
Benzo(b)fluoranthene	8.25E-07	7.3E-01	ECAO	100%	NC	B2	6.02E-07
Indeno(1,2,3-cd)pyrene	6.83E-07	7.3E-01	ECAO	100%	NC	B2	4.99E-07
Trichloroethene	4.59E-08	4.6E-02	IRIS	100%	4.60E-02	**	2.11E-09
Aroclor 1254	1.09E-06	2.0E+00	S	100%	NC	B2	2.18E-06
Aroclor 1260	5.86E-06	2.0E+00	S	100%	NC	B2	1.17E-05
Total Cancer Risk							**1.53E-05**

Notes:

Absorbed dose calculated in Table 16

Adjusted slope factor represents the absorbed amount and not administered; (Slope factor / ABS_{GI})

Cancer Risk (Absorbed dose x adjusted slope factor)

IRIS- Integrated Risk Information System

ECAO- Environmental Criteria and Assessment Office

USEPA Carcinogen Classification

A- Human Carcinogen: There is enough evidence to conclude that it can cause cancer in humans.

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

Total Cancer Risk is the sum of risk for individual compounds

NA= Not assessed under the IRIS Program

NC= In accordance with RAGS Part E, Exhibit 4-1, PAHs and PCBs should not be adjusted.

* = Also classified as a known/likely human carcinogen under the Proposed Guidelines for Carcinogen Risk Assessment (USEPA, 1996)

**= Carcinogenic to humans under Guidelines for Carcinogen Risk Assessment (USEPA, 2005)

Table 26
Carcinogenic Risk Calculations
Groundwater - Ingestion
USACE Niagara - Niagara Falls, New York

Cancer Risk Calculations for Groundwater - Ingestion (Construction Scenario)							
Compound	Intake Dose (mg/kg-day)	Slope Factor (mg/kg-day)	Source	GI Absorption Value (ABSgi)	Absorbed Slope Factor (mg/kg-day)	Carcinogen	Cancer Risk
Benzene	2.82E-09	5.50E-02	IRIS	1.0E+00	5.50E-02	A*	1.55E-10
Benzo(a)anthracene	1.50E-09	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	1.10E-09
Benzo(b)fluoranthene	1.94E-09	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	1.42E-09
Indeno(1,2,3-cd)pyrene	1.60E-09	7.30E-01	ECAO	1.0E+00	7.30E-01	B2	1.17E-09
Trichloroethene	1.37E-08	4.60E-02	IRIS	1.0E+00	4.60E-02	**	6.30E-10
Aroclor 1254	3.52E-09	2.00E+00	S	1.0E+00	2.00E+00	B2	7.04E-09
Aroclor 1260	2.29E-08	2.00E+00	S	1.0E+00	2.00E+00	B2	4.58E-08
Total Cancer Risk							**5.73E-08**

Notes:

Intake dose calculated in Table 17

Cancer Risk (Absorbed dose x adjusted slope factor)

ABSgi= GI absorption values , fraction of contaminant absorbed in GI tract obtained from RSL Tables

Absorbed slope factor represents the absorbed amount and not the administered; (Oral Slope factor / ABSgi)

Standard USEPA Cancer Classification

A= Human Carcinogen: There is enough evidence to conclude that it can cause cancer in humans.

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans but at present it is far from conclusive.

IRIS= Integrated Risk Information System

ECAO= Environmental Criteria and Assessment Office

S= The User's Guide for the RSL Screening Level Table states that the upper bound slope factor of 2.0 mg/kg per day should be used.

* = Also classified as a known/likely human carcinogen under the Proposed Guidelines for Carcinogen Risk Assessment (USEPA, 1996)

**= Carcinogenic to humans under Guidelines for Carcinogen Risk Assessment (USEPA, 2005)

Table 27
Risk Characterization Carcinogenic Summary Table
USACE Niagara - Niagara Falls, New York

Media	Population	Cancer Risk	Principal Contributing Pathway
Subsurface Soil	Commercial/Industrial Worker	3.24E-05	Dermal contact
Subsurface Soil	Commercial/Industrial Worker	3.11E-09	Inhalation
Subsurface Soil	Commercial/Industrial Worker	7.77E-06	Ingestion
Total Subsurface Soil Risk- Commercial/Industrial Worker		**4.02E-05**	
Subsurface Soil	Construction Worker	2.33E-06	Dermal contact
Subsurface Soil	Construction Worker	8.95E-11	Inhalation
Subsurface Soil	Construction Worker	7.38E-07	Ingestion
Total Subsurface Soil Risk- Construction Worker		**3.07E-06**	
Groundwater	Construction Worker	1.53E-05	Dermal contact
Groundwater	Construction Worker	8.19E-07	Inhalation
Groundwater	Construction Worker	5.73E-08	Ingestion
Total Groundwater Risk- Construction Worker		**1.62E-05**	

Table 28
Risk Characterization - Non Cancer
Groundwater - Dermal
USACE Niagara - Niagara Falls, New York

Non-Cancer Risk Calculations for Groundwater- Dermal (Construction Worker Scenario)

Compound	Absorbed Dose (mg/kg)	RfD	Source	Oral Absorbed Efficiency (ABS_{GI})	AbsorbedRfD(mg/kg)	Carcinogen	Non Cancer Risk
Aroclor 1254	1.09E-06	2.0E-05	IRIS	100%	NC	B2	5.45E-02

Notes:

Absorbed dose calculated in Table 16

Adjusted slope factor represents the absorbed amount and not administered; (Reference dose oral x ABS_{GI})

Non Cancer Risk (Absorbed dose / Absorbed reference dose)

IRIS- Integrated Risk Information System

ECAO- Environmental Criteria and Assessment Office

USEPA Carcinogen Classification

B2- Probable Human Carcinogen: There is inadequate evidence that it can cause cancer in humans, but at present it is far from conclusive.

NC- In accordance with RAGS Part E, Exhibit 4-1, PCBs should not be adjusted.

Table 29
Risk Characterization - Non Cancer
Subsurface Soil - Dermal
USACE Niagara - Niagara Falls, New York

Non-Cancer Risk Calculations for Subsurface Soil- Dermal (Commercial/Industrial Worker and Construction Worker)							
Compound	Exposed Population	Absorbed Dose (mg/kg)	RfD	Source	Oral Absorbed Efficiency (ABSderm)	AbsorbedRfD(mg/kg)	Non Cancer Risk
Aroclor 1254	Commerical/Industrial Worker	4.98E-07	2.0E-05	IRIS	1.40E-01	2.80E-06	1.78E-01
Aroclor 1254	Construction Worker	3.58E-08	2.0E-05	IRIS	1.40E-01	2.80E-06	1.28E-02

Notes:

Absorbed dose calculated in Tables 9 and 10

Adjusted slope factor represents the absorbed amount and not administered; (Reference dose oral (RfD) x ABS)

Non Cancer Risk (Absorbed dose / Absorbed reference dose)

IRIS- Integrated Risk Information System

Table 30
Risk Characterization Non-Carcinogenic Summary Table
USACE Niagara - Niagara Falls, New York

Media	Population	Non Cancer Risk	Principal Contributing Pathway
Subsurface Soil	Commercial/Industrial Worker	1.78E-01	Dermal contact
Total Subsurface Soil Risk- Commercial/Industrial Worker		**1.78E-01**	
Subsurface Soil	Construction Worker	1.28E-02	Dermal contact
Total Subsurface Soil Risk- Construction Worker		**1.28E-02**	
Groundwater	Construction Worker	5.45E-02	Dermal contact
Total Groundwater Risk- Construction Worker		**5.45E-02**	

APPENDIX A
Soil Probe Logs

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/26/11 END DATE: 9/26/11

BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	60	(FILL) Brown, fine to medium GRAVEL, some fine to coarse Sand,	Headspace result =	0
1				trace Silt, trace Brick fragments, moist.	0 ppm (0-4' bgs)	
2						
						0
3						
4						
	S-2	4-8	60	(FILL) Brown, fine to medium SAND, some Gravel, little Clay, wet.	Headspace result =	0
5					0 ppm (4-8' bgs)	
				(FILL) Brown, Silty CLAY, little fine to medium Sand, wet.		
6						
				(FILL) Brown, Silty SAND, wet.		0
7						
8						
	S-3	8-12	60		Headspace result =	0
9					0 ppm (8-12' bgs)	
10				(FILL) Brown fine SAND, trace Silt, wet.		
						0
11						
				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
12						
				End of SP-22 at 12.0 feet bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/26/11 END DATE: 9/26/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	60	(FILL) Brown, fine to medium GRAVEL, some fine to coarse Sand, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						0
3						
4	S-2	4-8	100		Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	100		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-23 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/26/11 END DATE: 9/26/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	75	(FILL) Brown, fine to medium GRAVEL, some fine to coarse Sand, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						0
3						
4	S-2	4-8	100		Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	100		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-24 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/26/11 END DATE: 9/26/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	75	(FILL) Brown, fine to medium GRAVEL, some fine to coarse Sand, little Silt, trace Clay, trace Brick fragments, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1						
2						0
3						
4	S-2	4-8	50	(FILL) Grayish brown, fine SAND, some Gravel, little Silt, moist.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7				Grades to:..wet.		
8	S-3	8-11.5	<5		Headspace result = 0 ppm (8-11.5' bgs)	0
9						
10						0
11						
12				Refusal at 11.5 feet bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GEOENVIRONMENTAL OF NEW YORK
535 WASHINGTON ST. 11TH FL.
BUFFALO, NEW YORK
ENGINEERS AND SCIENTISTS

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

FILE No. 21.0056522.20
CHECKED BY : CZB

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/26/11 END DATE: 9/26/11

BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	60	(FILL) Brown, fine to medium SAND and GRAVEL, some Silt,	Headspace result =	0
1				trace Clay, moist.	0 ppm (0-4' bgs)	
				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						
						0
3						
4						
	S-2	4-8	100		Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-12	100		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-26 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/26/11 END DATE: 9/26/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	40	(FILL) Brown, fine to medium SAND and GRAVEL, trace Silt,	Headspace result =	0
1				moist.	0 ppm (0-4' bgs)	
				(FILL) Light gray, some Silt. (Crushed Concrete)		
2						
						0
3				(FILL) Brown, fine to medium SAND, some Gravel, trace Silt,		
				moist.		
4						
	S-2	4-8	100	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
				Grades to:..wet.		
8						
	S-3	8-12	100		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-27 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/26/11 END DATE: 9/26/11
BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	40	(FILL) Brown, fine to medium SAND and GRAVEL, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1						
2						0
3				(FILL) Grades to:..gray, some Silt, wet. (Crushed Concrete)		
4	S-2	4-8	100	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	50		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-28 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR:	Matrix Environmental Technologies	BORING LOCATION:	See Location Plan
DRILLER:	Mark Janus	GROUND SURFACE ELEVATION:	NA DATUM NA
START DATE: 9/26/11	END DATE: 9/26/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	SAMPLE INFORMATION: Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	50	(FILL) Brown, fine to medium GRAVEL, some fine to coarse Sand, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1						
2						0
3						
4	S-2	4-8	100	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6				Reddish brown, Clayey SILT, trace fine to medium Sand, wet.		0
7				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
8	S-3	8-12	100		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-29 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies		BORING LOCATION:	See Location Plan
DRILLER: Mark Janus		GROUND SURFACE ELEVATION: NA	DATUM NA
START DATE: 9/27/11	END DATE: 9/27/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	25	(FILL) Gray, fine to medium SAND and GRAVEL, some Silt, trace Clay, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1						
2						0
3						
4						
	S-2	4-8	100	(FILL) Grayish brown, fine to coarse SAND, trace Gravel, trace Silt, moist.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
7						0
8						
	S-3	8-12	100		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						
11						0
12						
				End of SP-30 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/27/11 END DATE: 9/27/11

BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	45	(FILL) Gray, GRAVEL, some fine to medium Sand, moist.	Headspace result =	0
1					0 ppm (0-4' bgs)	
				(FILL) Brownish gray, fine to medium SAND, some Gravel, wet.		
2						
						0
3						
4				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
	S-2	4-8	90		Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-12	90		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-31 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR:	Matrix Environmental Technologies	BORING LOCATION:	See Location Plan
DRILLER:	Mark Janus	GROUND SURFACE ELEVATION:	NA DATUM NA
START DATE: 9/26/11	END DATE: 9/26/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	40	(FILL) Dark brown, fine to medium GRAVEL, some fine to coarse Sand, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1						
2				(FILL) Grades to:..brown.		0
3						
4	S-2	4-8	100	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6				Reddish brown, Clayey SILT, trace fine to medium Sand, wet.		0
7						
8	S-3	8-12	100	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-32 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/27/11 END DATE: 9/27/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	30	(FILL) Brown, fine to medium SAND and GRAVEL, some Silt,	Headspace result =	0
1				trace Clay, moist.	0 ppm (0-4' bgs)	
2						
				Grades to:..wet.		0
3						
4						
	S-2	4-8	90	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-12	90		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-33 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/26/11 END DATE: 9/26/11
BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	50	(FILL) Dark brown, fine to medium GRAVEL, some fine to coarse	Headspace result =	0
1				Sand, trace Silt, moist.	0 ppm (0-4' bgs)	
2				(FILL) Grades to:..gray, some Silt. (Crushed Concrete)		0
3						
4				(FILL) Grades to:..wet.		
	S-2	4-8	100		Headspace result =	0
5				Grayish brown to reddish brown, Silty CLAY, trace fine to medium Sand, moist.	0 ppm (4-8' bgs)	
6				Grades to:..reddish brown.		
						0
7				Reddish brown, Clayey SILT, trace fine to medium Sand, wet.		
8						
	S-3	8-12	100		Headspace result =	0
9				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	0 ppm (8-12' bgs)	
10						0
11						
12				End of SP-34 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/27/11 END DATE: 9/27/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	50	(FILL) Brown, fine to medium SAND and GRAVEL, some Silt,	Headspace result =	0
1				trace Clay, moist.	0 ppm (0-4' bgs)	
				(FILL) Reddish brown, Silty CLAY, trace fine Sand, moist.		
2						
						0
3						
				(FILL) Gray, fine to medium SAND, some Gravel, wet.		
4						
	S-2	4-8	90	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-12	90		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-35 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
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Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/27/11 END DATE: 9/27/11
BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	50	(FILL) Brown, fine to medium SAND and GRAVEL, some Silt,	Headspace result =	0
1				trace Clay, moist.	0 ppm (0-4' bgs)	
				(FILL) Brown, Silty CLAY, trace fine to medium Sand, moist.		
2						
						0
3						
				(FILL) Grades to:..dark brown to black.	Slight weathered	
4				(FILL) Brown, fine to medium SAND, trace Silt, wet.	petroleum odor.	
	S-2	4-8	90	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-10	100		Headspace result =	0
9					0 ppm (8-10' bgs)	
10						
				Refusal at 10.0' bgs.		0
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
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2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/27/11 END DATE: 9/27/11
BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	75	(FILL) Gray, GRAVEL, some fine to medium Sand, moist.	Headspace result =	0
1				(FILL) Reddish brown, Silty CLAY, some fine to medium Sand,	0 ppm (0-4' bgs)	
				trace Gravel, moist.		
2				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
						0
3						
4						
	S-2	4-6	100		Headspace result =	0
5					0 ppm (4-6' bgs)	
6					Concrete in end	
				Refusal at 6.0' bgs.	of sample.	
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/28/11 END DATE: 9/28/11

BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	50	Asphalt to 0.5' bgs.	Headspace result =	0
1				(FILL) Gray, GRAVEL, some fine to medium Sand, moist.	0 ppm (0-4' bgs)	
				(FILL) Brown, fine to medium SAND and GRAVEL, some Silt,		
2				trace Clay, moist.		
						0
3						
				(FILL) Tan, fine to medium SAND, trace Silt, moist.		
4				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
	S-2	4-8	100		Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-12	100		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-38 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR:	Matrix Environmental Technologies	BORING LOCATION:	See Location Plan
DRILLER:	Mark Janus	GROUND SURFACE ELEVATION:	NA DATUM NA
START DATE: 9/28/11	END DATE: 9/28/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	SAMPLE INFORMATION: Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	40	(FILL) Brown, fine to medium SAND and GRAVEL, some Silt, trace Clay, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						0
3						
4	S-2	4-8	100		Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	100		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-39 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/28/11 END DATE: 9/28/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	75	(FILL) Brown, fine to medium SAND and GRAVEL, trace Silt, trace Clay, wet.	Headspace result = 0 ppm (0-4' bgs)	0
1				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						0
3						
4	S-2	4-8	90		Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	90		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-40 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/28/11 END DATE: 9/28/11
BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	40	(FILL) Dark brown, fine to medium GRAVEL, some fine to coarse	Headspace result =	0
1				Sand, trace Silt, wet.	0 ppm (0-4' bgs)	
2						
3						0
4				Dark yellowish brown, Silty CLAY, trace fine to medium Sand,		
	S-2	4-8	100	moist.	Headspace result =	0
5				Grades to:..reddish brown.	0 ppm (4-8' bgs)	
6						
7						0
8						
	S-3	8-12	100	Grades to:..little fine to medium Sand, trace Gravel, wet.	Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
				Grades to:..trace fine to medium Sand, moist.		0
11						
12						
				End of SP-41 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
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GZA GEOENVIRONMENTAL OF NEW YORK
535 WASHINGTON ST. 11TH FL.
BUFFALO, NEW YORK
ENGINEERS AND SCIENTISTS

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

FILE No. 21.0056522.20
CHECKED BY : CZB

CONTRACTOR:	Matrix Environmental Technologies	BORING LOCATION:	See Location Plan
DRILLER:	Mark Janus	GROUND SURFACE ELEVATION:	NA DATUM NA
START DATE: 9/27/11	END DATE: 9/27/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	60	(FILL) Gray, GRAVEL, some fine to medium Sand, moist.	Headspace result =	0
1				Dark brown and gray, Silty CLAY, trace fine to medium Sand, moist.	0 ppm (0-4' bgs)	
2						0
3				Grades to:..light yellowish brown.		
4	S-2	4-8	100		Headspace result =	0
5					0 ppm (4-8' bgs)	
6						0
7				Grades to:..reddish brown, moist to wet.		
8	S-3	8-12	100		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						0
11						
12				End of SP-42 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

CONTRACTOR: Matrix Environmental Technologies		BORING LOCATION:	See Location Plan
DRILLER: Mark Janus		GROUND SURFACE ELEVATION: NA	DATUM NA
START DATE: 9/28/11	END DATE: 9/28/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	75	(FILL) Gray, GRAVEL, some fine to medium Sand, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1				Dark yellowish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						0
3						
4	S-2	4-8	100	Grades to:..reddish brown.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	75		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-43 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR:	Matrix Environmental Technologies	BORING LOCATION:	See Location Plan
DRILLER:	Mark Janus	GROUND SURFACE ELEVATION:	NA DATUM NA
START DATE: 9/28/11	END DATE: 9/28/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	SAMPLE INFORMATION: Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	60	(FILL) Gray, GRAVEL, some fine to medium Sand, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1				Dark yellowish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						0
3						
4	S-2	4-8	90	Grades to:..reddish brown.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	100		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-44 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
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2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GEOENVIRONMENTAL OF NEW YORK
535 WASHINGTON ST. 11TH FL.
BUFFALO, NEW YORK
ENGINEERS AND SCIENTISTS

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

FILE No. 21.0056522.20
CHECKED BY : CZB

CONTRACTOR:	Matrix Environmental Technologies	BORING LOCATION:	See Location Plan
DRILLER:	Mark Janus	GROUND SURFACE ELEVATION:	NA DATUM NA
START DATE: 9/28/11	END DATE: 9/28/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	SAMPLE INFORMATION: Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	50	(FILL) Gray, GRAVEL, some fine to medium Sand, trace Silt,	Headspace result =	0
1				moist.	0 ppm (0-4' bgs)	
				Dark yellowish brown, Silty CLAY, trace fine to medium Sand,		
2				moist.		
						0
3						
4						
	S-2	4-8	100	Grades to:..reddish brown.	Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-12	100		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-45 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
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2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/27/11 END DATE: 9/27/11
BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	50	Asphalt to 0.5' bgs.	Headspace result =	0
1				(FILL) Gray, GRAVEL, some fine to coarse Sand, moist.	0 ppm (0-4' bgs)	
2				(FILL) Brown, fine to coarse SAND, some Gravel, trace Silt, moist.		0
3						
4						
	S-2	4-8	100	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result =	0
5					0 ppm (4-8' bgs)	
6						0
7						
8						
	S-3	8-12	100		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						0
11						
12						
				End of SP-46 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GEOENVIRONMENTAL OF NEW YORK
535 WASHINGTON ST. 11TH FL.
BUFFALO, NEW YORK
ENGINEERS AND SCIENTISTS

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

FILE No. 21.0056522.20
CHECKED BY : CZB

CONTRACTOR: Matrix Environmental Technologies	BORING LOCATION: See Location Plan		
DRILLER: Mark Janus	GROUND SURFACE ELEVATION: NA	DATUM NA	
START DATE: 9/27/11	END DATE: 9/27/11	GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati	

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	60	(FILL) Gray, GRAVEL, some fine to medium Sand, moist.	Headspace result =	0
1				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	0 ppm (0-4' bgs)	
2						
3						0
4	S-2	4-8	100		Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
7						0
8	S-3	8-12	100		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
11						0
12				End of SP-47 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
BORING LOCATION: See Location Plan
DRILLER: Mark Janus
GROUND SURFACE ELEVATION: NA DATUM NA
START DATE: 9/28/11 END DATE: 9/28/11
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	80	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1						
2						0
3				Reddish brown, Clayey SILT, trace fine fo medium Sand, wet.		
4	S-2	4-8	100		Headspace result = 0 ppm (4-8' bgs)	0
5				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
6						0
7						
8	S-3	8-12	90	Reddish brown, Clayey SILT, trace fine fo medium Sand, wet.	Headspace result = 0 ppm (8-12' bgs)	0
9				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		
10						0
11						
12				End of SP-48 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR:	Matrix Environmental Technologies	BORING LOCATION:	See Location Plan
DRILLER:	Mark Janus	GROUND SURFACE ELEVATION:	NA DATUM NA
START DATE: 9/27/11	END DATE: 9/27/11	GZA GEOENVIRONMENTAL REPRESENTATIVE:	J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	SAMPLE INFORMATION: Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	60	(FILL) Gray, GRAVEL, some fine to medium Sand, moist.	Headspace result =	25.5
1				(FILL) Light brown, fine SAND, trace Silt, wet.	38.6 ppm (0-4' bgs)	
				(FILL) Dark brown, Sandy SILT, trace Gravel, moist.		
2						
				Reddish brown, Silty CLAY, trace fine to medium Sand, moist.		0
3						
4						
	S-2	4-8	90		Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
8						
	S-3	8-12	90		Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-49 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes:
1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

CONTRACTOR: Matrix Environmental Technologies
DRILLER: Mark Janus
START DATE: 9/28/11 END DATE: 9/28/11
BORING LOCATION: See Location Plan
GROUND SURFACE ELEVATION: NA DATUM NA
GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG: Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER: 2" diameter by 48" long
OVERBURDEN SAMPLING METHOD: Direct push
ROCK DRILLING METHOD: NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	80	(FILL) Gray, GRAVEL, some fine to medium Sand, trace Silt, moist.	Headspace result = 0 ppm (0-4' bgs)	0
1				Dark yellowish brown, Silty CLAY, trace fine to medium Sand, moist.		
2						0
3						
4	S-2	4-8	100	Grades to:..reddish brown.	Headspace result = 0 ppm (4-8' bgs)	0
5						
6						0
7						
8	S-3	8-12	100		Headspace result = 0 ppm (8-12' bgs)	0
9						
10						0
11						
12				End of SP-50 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GEOENVIRONMENTAL OF NEW YORK
535 WASHINGTON ST. 11TH FL.
BUFFALO, NEW YORK
ENGINEERS AND SCIENTISTS

Niagara Falls Armed Forces Reserve Center
Niagara Falls, NY

FILE No. 21.0056522.20
CHECKED BY : CZB

CONTRACTOR: Matrix Environmental Technologies	BORING LOCATION: See Location Plan		
DRILLER: Mark Janus	GROUND SURFACE ELEVATION: NA	DATUM	NA
START DATE: 9/28/11 END DATE: 9/28/11	GZA GEOENVIRONMENTAL REPRESENTATIVE: J. Beninati		

WATER LEVEL DATA

DATE	TIME	WATER	CASING

TYPE OF DRILL RIG:	Geoprobe 54 DT track mounted rig
CASING SIZE AND DIAMETER:	2" diameter by 48" long
OVERBURDEN SAMPLING METHOD:	Direct push
ROCK DRILLING METHOD:	NA

DEPTH	Sample Number	DEPTH (FT)	RECOVERY (%)	SAMPLE DESCRIPTION	NOTES	FIELD SCREENING RESULTS (ppm)
	S-1	0-4	40	Topsoil to 0.5' bgs.	Headspace result =	0
1				Dark gray, Silty CLAY, trace fine to medium Sand, moist.	0 ppm (0-4' bgs)	
2				Grades to:..reddish brown.		
						0
3						
4						
	S-2	4-8	100		Headspace result =	0
5					0 ppm (4-8' bgs)	
6						
						0
7						
				Reddish brown, Clayey SILT, trace fine fo medium Sand, wet.		
8						
	S-3	8-12	100	Reddish brown, Silty CLAY, trace fine to medium Sand, moist.	Headspace result =	0
9					0 ppm (8-12' bgs)	
10						
						0
11						
12						
				End of SP-51 at 12.0' bgs.		
13						
14						
15						
16						
17						
18						
19						
20						

S - Split Spoon Sample
C - Rock Core Sample

NOTES: 1) MiniRae 2000 organic vapor meter used to field screen and headspace soil samples.
2) bgs = below ground surface.

General Notes: 1) Stratification lines represent approximate boundary between soil types, transitions may be gradual.
2) Water level readings have been made at times and under conditions stated, fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

APPENDIX B

Photographs

Photograph 1 – Area of IRA prior to excavation as viewed from the west.

Photograph 2 – Excavation and 6” Fire Protection Main as viewed from the southeast.

Photograph 3 – Pumping of Fire Protection Main prior to removal.

Photograph 4 – Capped end of the Fire Protection Main.

Photograph 5 – Backfilled excavation as viewed from the west.

Photograph 6 – Stockpiled and covered soil as viewed from the east.

APPENDIX C
Waste Disposal Documentation

12885419

NIAGARA FALLS LANDFILL
56th Street & Niagara Falls Blvd
Niagara Falls, NY 14304 (716)282-6381

203061
ENSOL ENGINEERING
661 MAIN STREET
NIAGARA FALLS, NY 14301
Contract: 42151118910

SITE	TICKET	GRID
5B	459261	

WEIGHMASTER: AS00067 ALBERT S

DATE IN	TIME IN
8 December 2011	10:27 am

DATE OUT	TIME OUT
8 December 2011	10:55 am

VEHICLE	ROLL OFF
PAR12	

REFERENCE	ORIGIN
0568945	Inbound -NY-NIAGARA

00 Gross Weight 54,940.00 lb
Tare Weight 26,140.00 lb
Net Weight 28,800.00 lb

BASE 14.40 TN

NIAGARA FALLS ARMY RESERVE

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
14.40	TN	SW-CONST DEBRIS				
1.00	LD	ENVIRONMENTAL FEE				
1.00	LD	FUEL RECOVERY FEE				

HAVE A NICE DAY

NET AMOUNT

TENDERED

CHANGE

CHECK NO.

REPUBLIC SERVICES

REV 11/09

SIGNATURE

RS-F

REPUBLIC SERVICES, INC.

NON-HAZARDOUS WASTE MANIFEST

0568945

Please print or type

1. Generator's US EPA ID Number	Manifest Document Number	2. Page 1 of
3. Generator's Name and Mailing Address 99th Regional Support Command, Niagara Falls AFRC 5231 South Scott Plaza Fort Dix, NJ 08640 4. Phone ( )	5. Generating Location (if different) Same 9400 Porter Road Niagara Falls, NY 14304 6. Phone ( )	
7. Transporter #1 Company Name Pariso Trucking FL1 #12	8. US EPA ID Number	9. Transporter #1's Phone 716-875-6168
10. Transporter #2 Company Name	11. US EPA ID Number	12. Transporter #2's Phone
13. Designated T/S/D Facility Name and Site Address Allied Waste Niagara Falls NY 5600 Niagara Falls Boulevard Niagara Falls, NY 14304	14. US EPA ID Number	15. Facility's Phone 716-285-3344

16. Waste Shipping Name and Description	17. Allied Waste Approval # and Exp. Date	18. Containers No.	Type	19. Total Quantity	20. Unit Wt/Vol
Non Hazardous Asphalt & Gravel	421511 18910 Exp 6 30 2012				
a.					
b.					
c.					
d.					

21. Additional Descriptions for Materials Listed Above

22. Special Handling Instructions and Additional Information

23. **GENERATOR'S CERTIFICATION:** I certify the materials described on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
[illegible] (Contractor 99th DRC)	[illegible]	12	8	11

24. **Transporter #1:** Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
CLIFF KACZMAREK	Cliff Kaczmarek	12	8	11

25. **Transporter #2:** Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

26. Discrepancy Indication Space

27. **Facility Owner or Operator:** Certification of receipt of waste materials covered by this manifest (except as noted in Item 19)

Printed/Typed Name	Signature	Month	Day	Year
	[illegible]	12	8	11

GENERATOR — TRANSPORTER — T/S/D FACILITY

TRANSPORTER #2

COM000033

12885458

NIAGARA FALLS LANDFILL
56th Street & Niagara Falls Blvd
Niagara Falls, NY 14304 (716)282-6381

203061
ENSOL ENGINEERING
661 MAIN STREET
NIAGARA FALLS, NY 14301
Contract: 42151118910

SITE	TICKET	GRID
5B	459300	

WEIGHMASTER: AS00067 ALBERT S

DATE IN	TIME IN
8 December 2011	11:58 am

DATE OUT	TIME OUT
8 December 2011	12:20 pm

VEHICLE	ROLL OFF
FAR12	

REFERENCE	ORIGIN
0568946	Inbound -NY-NIAGARA

00 Gross Weight 37,980.00 lb
Tare Weight 26,100.00 lb
Net Weight 11,880.00 lb

NIAGARA FALLS ARMY RESERVE

BASE 5.94 TN

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
5.94	TN	SW-CONST DEBRIS				
1.00	LD	ENVIRONMENTAL FEE				
1.00	LD	FUEL RECOVERY FEE				

NET AMOUNT

TENDERED

CHANGE

CHECK NO.

HAVE A NICE DAY

REPUBLIC SERVICES

REV 11/09

SIGNATURE [signature]

RS-F

REPUBLIC SERVICES, INC.

NON-HAZARDOUS WASTE MANIFEST

Please print or type.

0568946

1. Generator's US EPA ID Number	Manifest Document Number	2. Page 1 of

3. Generator's Name and Mailing Address	5. Generating Location (if different)
99th Regional Support Command, Niagara Falls AFRC 5231 South Scott Plaza Fort Dix, NJ 08640	Same 9400 Porter Road Niagara Falls, NY 14304
4. Phone ( )	6. Phone ( )

7. Transporter #1 Company Name	8. US EPA ID Number	9. Transporter #1's Phone
Pariso Trucking PL1 #12		716-875-6168
10. Transporter #2 Company Name	**11. US EPA ID Number**	**12. Transporter #2's Phone**
13. Designated T/S/D Facility Name and Site Address	**14. US EPA ID Number**	**15. Facility's Phone**
Allied Waste Niagara Falls NY 5600 Niagara Falls Boulevard Niagara Falls, NY 14304		716-285-3344

16. Waste Shipping Name and Description	17. Allied Waste Approval # and Exp. Date	18. Containers No.	18. Containers Type	19. Total Quantity	20. Unit Wt/Vol
Non Hazardous Asphalt & Gravel	421511 18910 Exp 6 30 2012				
a.					
b.					
c.					
d.					

21. Additional Descriptions for Materials Listed Above

22. Special Handling Instructions and Additional Information

GENERATOR

23. **GENERATOR'S CERTIFICATION:** I certify the materials described on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name	Signature	Month	Day	Year
[illegible]	[signature]	12	8	11

TRANSPORTER

24. **Transporter #1:** Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
CLIFF KACZMAREK	Cliff Kaczmarek	12	8	11

25. **Transporter #2:** Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

T/S/D FACILITY

26. Discrepancy Indication Space

27. **Facility Owner or Operator:** Certification of receipt of waste materials covered by this manifest (except as noted in Item 19)

Printed/Typed Name	Signature	Month	Day	Year
	[signature]	12	8	11

TRANSPORTER #2

COM000033

APPENDIX D

Clean Fill Documentation

SEVEN SPRINGS GRAVEL PRODUCTS, LLC
8479 Seven Springs Road
Batavia, New York 14020

Telephone (585) 343-4336

No. 76874

CUSTOMER Pariso Logistic

BILLING ADDRESS

CITY	STATE	ZIP

DESTINATION ADDRESS

PRODUCT DESCRIPTION	CU. YARDS
Sc. Clay fill	

DATE: GROSS 72140 lb
GROSS: TARE 28500 lb
TARE: NET 43640 lb
NET: 08:42AM 09/29/2011

C.O.D.'S ONLY

PRODUCT COST $ ____ × 21.82 TONS = $ ____
FREIGHT CHG. $ ____ × ____ TONS = $ ____
OTHER: ____
SUBTOTAL ____
TAX ____
TOTAL $

CUSTOMER SIGNATURE	
Rio	
DRIVER SIGNATURE	TRUCK NO. 1
WEIGHMASTER SIGNATURE Karen	LICENSE # 18011 2

Seven Springs Gravel Products, LLC shall not be held liable for any loss after acceptance of a load.

SEVEN SPRINGS GRAVEL PRODUCTS, LLC
8479 Seven Springs Road
Batavia, New York 14020

Telephone (585) 343-4336

No. 76880

CUSTOMER Pariso Logistic

BILLING ADDRESS

CITY	STATE	ZIP

DESTINATION ADDRESS

PRODUCT DESCRIPTION	CU. YARDS
Sc. Clay fill	

DATE: GROSS 64600 lb
GROSS: TARE 26200 lb
TARE: NET 38400 lb
NET: 12:37PM 09/29/2011

C.O.D.'S ONLY

PRODUCT COST $ ____ × 19.20 TONS = $ ____
FREIGHT CHG. $ ____ × ____ TONS = $ ____
OTHER: ____
SUBTOTAL ____
TAX ____
TOTAL $

CUSTOMER SIGNATURE	
Rio	
DRIVER SIGNATURE	TRUCK NO. 2
WEIGHMASTER SIGNATURE Karen	LICENSE # 18012

Seven Springs Gravel Products, LLC shall not be held liable for any loss after acceptance of a load.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Facility DEC ID 8-1844-00020

PERMIT

Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
SEVEN SPRINGS GRAVEL PRODUCTS
8479 SEVEN SPRINGS RD
BATAVIA, NY 14020
(716) 343-4336

Facility:
SEVEN SPRINGS GRAVEL PRODUCTS
8472 SEVEN SPRINGS RD
BATAVIA, NY 14020

Facility Location: in STAFFORD in GENESEE COUNTY
Facility Principal Reference Point: NYTM-E: 244.8 NYTM-N: 4765.6
Latitude: 43°00'00.8" Longitude: 78°07'51.1"
Project Location: East of Seven Springs Road, 3,300 ft. south of Rt 33
Authorized Activity:

Permit to mine unconsolidated material from a 30-acre permit term area, within a 30-acre Life of Mine. Approved operations include screening and crushing.

Permit Authorizations

Mined Land Reclamation - Under Article 23, Title 27
Permit ID 8-1844-00020/00001 (Mined Land ID 80276)
Renewal Effective Date: 10/13/2006 Expiration Date: 10/12/2011

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: JOHN L COLE, Deputy Regional Permit Administrator
Address: NYSDEC REGION 8 HEADQUARTERS
6274 EAST AVON-LIMA RD
AVON, NY 14414

Authorized Signature: John L Cole Date 10 / 12 / 2006

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Facility DEC ID 8-1844-00020

Distribution List

Minerals
TOWN OF BATAVIA
Thomas Giles

Permit Components

MINED LAND RECLAMATION PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Permit Attachments

Permit Sign

MINED LAND RECLAMATION PERMIT CONDITIONS

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such plans were approved by Joseph G. Bucci Jr., Mined Land Reclamation Specialist 1, on August 31, 2006 and consist of the following items: see Conformance with Plans - Addenda

2. **Conformance with Plans - Addenda**

* Mining Permit Application dated January 24, 2006.
* Organizational Report Form dated February 7, 2005.
* Environmental Assessment Forms received September 9, 1987, February 19, 1998, September 14, 1999 and January 24, 2006.
* Mined Land Use Plan Renewal and Modification dated December 2005.
* Mining Plan Map dated December 2005.
* Reclamation Plan Map dated December 2005.
* Cross Sections dated December 2005.

* Mining and Reclamation Plan narratives dated September 8, 1998 with revisions received December 14, 1998 and September 14, 1999, including Appendix B (Pollution Prevention Plan), "Standard and Specifications for Dust Control" and Grassed Waterway Construction Details.

* December 18, 2000 Amendment - Mining permit term area and mining phases.

* September 14, 1999 letter from P. Bauter to M. Migliorc.

* December 31, 1998 letter from P. Bauter to S. Army.

* December 14, 1998 letter from P. Bauter to S. Army.

3. **Post Sign and Permit** The enclosed permit and permit sign must be conspicuously posted in a publicly accessible location at the project site. They must be visible, legible and protected from the elements at all times.

4. **Strip and Stockpile Soils for Reclamation** Prior to the excavation of previously undisturbed areas, topsoil and overburden shall be stripped, stockpiled separately, and used for reclamation of mined areas. These stockpiles shall be seeded to establish a vegetative cover within 30 days, or as soon as practicable following their construction. The permittee shall locate all overburden stockpiles within the permitted area of the approved Life of Mine. Sufficient quantities of topsoil must be retained on the site for use in reclamation, unless prior approval is granted by the department.

5. **No Unpermitted Discharge Outside Limits of Mine** There shall be no natural swales or channels or constructed features such as ditches, pipes, etc., that are capable of discharging waters to any offsite areas or to any areas outside the limits of the Life of Mine except those explicitly described and shown in the narrative and graphic portions of the approved Mined Land Use Plan. All silt laden water and storm water generated on, or running across, the site shall be retained within the approved project area. The permittee must comply with all applicable State Pollutant Discharge Elimination System (SPDES) permit requirements and provide necessary notifications for off-site point source discharges.

6. **Fueling of Equipment and Reporting of Spills** Fueling of equipment shall be controlled to prevent spillage. Any spillage of fuels, waste oils, other petroleum products or hazardous materials shall be reported to the department's Spill Hotline number (1-800-457-7362) within 2 hours. The permittee shall retain the department's Spill Response number for immediate access in the permittee's office and at the mine site.

7. **File Termination Notice** If the permittee decides to discontinue operation, a termination notice must be filed 60 days prior to the scheduled temporary or permanent cessation of mining.

8. **No Deviation From Approved Plan** The permittee shall not deviate or depart from the approved mined land use plan without approval by the department of an alteration or modification thereto.

9. **Archaeological or Structural Remains** If any archaeological or structural remains are encountered during excavation, the permittee must immediately cease, or cause to cease, all work in the area of the remains and notify

Regional Permit Administrator
NYSDEC REGION 8 HEADQUARTERS
6274 EAST AVON-LIMA RD
AVON, NY14414

Work shall not resume until written permission to do so has been received from the department.

10. **Bond, Surety to Remain in Force** Any required reclamation bond or other surety, in an amount determined by the department, shall be maintained in full force and effect. Such a bond or other surety shall not be terminated until the reclamation of the mined area is approved by the department in writing.

11. **Maintain Area Markers for Permit Term** The permittee shall provide permanent markers such as stakes, posts or other devices acceptable to the Department to identify and delineate the permit area, as outlined on the approved Mining Plan Map. These markers are to be installed prior to the start of mining and shall be maintained for the duration of the permit term.

12. **Minimum 25 ft. Separation from Property Line** No mining activity of any kind, including clearing and grubbing, shall occur within 25 feet of any adjacent property line or right-of-way. When mining is conducted lower than the adjacent property, the distance from the floor of the mine to the nearest property line shall be no closer than 25 feet plus1½ times the depth of the excavation, except where otherwise noted in the approved Mined Land Use Plan.

13. **Mining Operation Periods** All mining, reclamation and associated activities (including but not limited to: excavating, grading, processing operations, stockpiling operations, haulage operations, and maintenance operations) shall be limited to the following times: Monday through Friday 7 a.m. to 7 p.m., Saturdays 7 a.m. to 5 p.m. Operation of the mine is prohibited on Sundays and legal holidays.

14. **Dust Control** Water or other approved dust palliatives must be applied to haulageways and other parts of the mine, as often as necessary, to prevent visible dust from leaving the mine property.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. **Facility Inspection by The Department** The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. Relationship of this Permit to Other Department Orders and Determinations Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. Applications For Permit Renewals, Modifications or Transfers The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC REGION 8 HEADQUARTERS
6274 EAST AVON-LIMA RD
AVON, NY14414

4. Submission of Renewal Application The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Mined Land Reclamation.

5. Permit Modifications, Suspensions and Revocations by the Department The Department reserves the right to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

a. materially false or inaccurate statements in the permit application or supporting papers;

b. failure by the permittee to comply with any terms or conditions of the permit;

c. exceeding the scope of the project as described in the permit application;

d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;

e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. Permit Transfer Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification
The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in

compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit
The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits
The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights
This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

10/19/2009 MON 10:35 FAX 008/011

CARMEN M. PARISO, INC.
3649 River Road
Tonawanda, NY 14150
OFFICE 875-6168 FAX 875-4121

P 327888
JOB# 25638

CUSTOMER: MATRIX
DATE: 10/19/09
LOAD LOCATION: SEVEN SPRINGS
DUMP LOCATION: PORTER AVE
HIRED TRUCK COMPANY
TRUCK #/DRIVER: 1141 Mary

☒ DUMP TRUCK SERVICE
☐ DUMP TRAILER SERVICE
☐ OTHER

MATERIAL HAULED Clay Fill

JOB START ____
JOB FINISH ____
TRAVEL TIME ____
☐ LUNCH ☐ NO LUNCH
TOTAL ____

LD #	TICKET #	WEIGHT	WAIT TIME ON JOB IN - OUT	REMARKS SPECIFY: ON "HOLD" @ PLANT, TOLLS, DUMP LOCATIONS, ETC.
1		19.32	-	
2		22.70	-	
3			-	
4			-	
5			-	
6			-	
7			-	
8			-	
9			-	
10			-	
11			-	
12			-	2 GI TOLLS
13			-	
14			-	
15			-	

OUR RESPONSIBILITY ENDS AT THE CURB

CUSTOMER'S SIGNATURE: ____

RETURN THIS ORIGINAL TO PARISO

10/19/2009 MON 10:36 FAX ☒010/011

P 304718

CARMEN M. PARISO, INC.

3649 River Road
Tonawanda, NY 14150
OFFICE 875-6168 FAX 875-4121

JOB# 25638

CUSTOMER: MATRIX
DATE: 10/14/09
LOAD LOCATION: Seven Springs
DUMP LOCATION: Porter /N. Falls
HIRED TRUCK COMPANY:
TRUCK #/DRIVER: 238 LORI H.

☒ DUMP TRUCK SERVICE
☐ DUMP TRAILER SERVICE
☐ OTHER
MATERIAL HAULED: Clay Fill

JOB START: 7:30
JOB FINISH:
TRAVEL TIME: —
☐ LUNCH ☐ NO LUNCH
TOTAL: —

LD #	TICKET #	WEIGHT	WAIT TIME ON JOB IN - OUT	REMARKS SPECIFY: ON "HOLD" @ PLANT, TOLLS, DUMP LOCATIONS, ETC.
1	209327	23.06	8:15-8:20	
2	209352	19.90	-	
3	209370	20.66	-	
4			-	
5			-	
6			-	
7			-	
8			-	
9			-	
10			-	
11			-	
12			-	
13			-	
14			-	
15			-	

OUR RESPONSIBILITY ENDS AT THE CURB

CUSTOMER'S SIGNATURE:

RETURN THIS ORIGINAL TO PARISO

APPENDIX E

Analytical Result Summary Tables

Table 3
Post Excavation Soil Results
9400 Porter Road
Niagara Falls, New York

Sample Location		CS-1	CS-2	CS-3	CS-4	CS-5	CS-6	CS-6 (DUP)	CS-7
Laboratory Sample ID	Maximum	RSI0550-01	RSI0550-02	RSI0550-03	RSI0550-04	RSI0550-05	RSI0550-06	RSI0550-11	RSI0550-07
Sample Date	Contaminant	9/16/2009	9/16/2009	9/16/2009	9/16/2009	9/16/2009	9/16/2009	9/16/2009	9/16/2009
Sample Depth (ft bgs)	Level	1.0-1.5	1.0-1.5	1.0-1.5	1.0-1.5	1.0-1.5	1.0-1.5	1.0-1.5	1.0-1.5
PCBs (mg/kg) EPA Method 8082	1.0	0.33	0.27	0.17	0.39	**14**	**18**	**12**	**14**

Sample Location		CS-8	CS-9	CS-10
Laboratory Sample ID	Maximum	RSI0550-08	RSI0550-09	RSI0550-10
Sample Date	Contaminant	9/16/2009	9/16/2009	9/16/2009
Sample Depth (ft)	Level	1.0-1.5	1.0-1.5	1.0-1.5
PCBs (mg/kg) EPA Method 8082	1.0	**4.8**	**1.9**	0.33

Notes:

Samples detected at levels exceeding the Maximum Contaminant Level are shown in bold and underlined [**thus**].

mg/kg Milligrams per kilogram
ND Non-detect

Sampling Information:
Samples were collected in 8 oz glass containers.
Samples were placed in iced coolers at approximately 4^{o}C.

Table 2
Post-Excavation Soil Results - October 8, 2009
9400 Porter Road
Niagara Falls, New York

Sample Location Laboratory Sample ID Sample Date Sample Depth (ft bgs)	Maximum Contaminant Level	CS-11 RSJ0561-01 10/8/2009 2.0-2.5	CS-12 RSJ0561-02 10/8/2009 2.0-2.5	CS-13 RSJ0561-03 10/8/2009 2.0-2.5	CS-14 RSJ0561-04 10/8/2009 2.0-2.5	CS-14(DUP) RSJ0561-06 10/8/2009 2.0-2.5	CS-15 RSJ0561-05 10/8/2009 2.0-2.5
PCBs (mg/kg) EPA Method 8082	1.0	0.170	0.022	0.800	0.006	0.016	0.007

Notes:

mg/kg Milligrams per kilogram
ND Non-detect

Sampling Information:
Samples were collected in 8 oz glass containers.
Samples were placed in iced coolers at approximately 4^{o}C.

Table 2
Soil Analytical Testing Results Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Use Soil Cleanup Objectives	Restricted Residential Soil Cleanup Objectives	Restricted Commercial Soil Cleanup Objectives	SP-1-5-7 12/06/2010 Result	SP-2-6-8 12/06/2010 Result	SP-3-4-6 12/06/2010 Result	SP-4-2-4 12/06/2010 Result	SP-5-2-4 12/06/2010 Result	SP-6-2-4 12/06/2010 Result	SP-7-4-6 12/06/2010 Result	SP-8-4-6 12/06/2010 Result	SP-8 (DUP-1) 12/06/2010 Result	SP-9-2-4 12/06/2010 Result	SP-10-2-4 12/06/2010 Result	SP-11-2-4 12/06/2010 Result	SP-12-6-10 12/06/2010 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)																
Acetone	50	**100,000**	*500,000*	7.1 J	ND	31 J	38	70	120	38	38	49	100	45	48	44
Methylene Chloride	50	**100,000**	*500,000*	25	12	32	29	35	31	31	30	20	27	24	38	25
Toluene	700	**100,000**	*500,000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1,000	**41,000**	*390,000*	ND	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.3 J
Xylenes, total	260	**100,000**	*500,000*	ND	23	3.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	15
Isopropylbenzene	2,300	**NV**	*NV*	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5 J
Methylcyclohexane	NV	**NV**	*NV*	ND	66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3,900	**100,000**	*500,000*	ND	42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8,400	**52,000**	*190,000*	ND	29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.9 J
4-Isopropyltoluene	10,000 [11]	**NV**	*NV*	ND	7.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3,600	**52,000**	*190,000*	1.4 J	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11
sec-Butylbenzene	11,000	**100,000**	*500,000*	ND	5.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	100,000	**NV**	*NV*	ND	ND	ND	ND	16 J	28 J	ND	ND	ND	27 J	8.9 J	ND	ND
n-Butylbenzene	12,000	**NV**	*NV*	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12,000	**100,000**	*500,000*	ND	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	230
Total VOCs	NV	**NV**	*NV*	33.5	392.8	66.2	67.0	121.0	179.0	69.0	68.0	69.0	154.0	69.0	86.0	335
Total VOC TICs	NV	**NV**	*NV*	41.1	2140	14	11	17	14	12	12	8.1	12	10	14	51
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/kg)																
Naphthalene	12,000	**100,000**	*500,000*	ND	410	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	690
2-Methylnaphthalene	410 [11]	**NV**	*NV*	ND	410	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	**100,000**	*500,000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	**100,000**	*500,000*	ND	25 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	30,000	**100,000**	*500,000*	17 J	39 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	**100,000**	*500,000*	48 J	170 J	ND	ND	ND	66 J	ND	ND	ND	ND	ND	25 J	33 J
Anthracene	100,000	**100,000**	*500,000*	ND	50 J	ND	ND	ND	22 J	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	100,000	**100,000**	*500,000*	51 J	210	ND	ND	ND	190 J	ND	ND	ND	ND	22 J	33 J	33 J
Pyrene	100,000	**100,000**	*500,000*	46 J	180 J	ND	ND	ND	130 J	ND	ND	ND	ND	14 J	24 J	23 J
Benzo(a)anthracene	1,000	**1,000**	*5,600*	20 J	91 J	ND	ND	ND	89 J	ND	ND	ND	ND	ND	16 J	18 J
Dibenzo(a,h)anthracene	330	**330**	*560*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50000 [11]	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	100 J	ND	ND	ND
Carbazole	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1,000	**3,900**	*56,000*	27 J	94	ND	ND	ND	78 J	ND	ND	ND	ND	ND	ND	17 J
Benzo(b)fluoranthene	1,000	**1,000**	*5,600*	34 J	110 J	ND	ND	ND	120 J	ND	ND	ND	ND	13 J	14 J	ND
Benzo(k)fluoranthene	800	**3,900**	*56,000*	12 J	39 J	ND	ND	ND	37 J	ND	ND	ND	ND	ND	ND	ND
Biphenyl	NV	**NV**	*NV*	ND	32	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	**1,000**	*1,000*	23 J	85 J	ND	ND	ND	85 J	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	500	**500**	*5,600*	19 J	38 J	ND	ND	ND	40 J	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	100,000	**100,000**	*500,000*	26 J	51 J	ND	ND	ND	50 J	ND	ND	ND	ND	ND	ND	ND
Total SVOCs	NV	**NV**	*NV*	323	2,034	ND	ND	ND	908	ND	ND	ND	100	49	112	814
Total SVOC TICs	NV	**NV**	*NV*	1,550	19,150	ND	ND	3,000	7,350	ND	ND	ND	ND	220	1600	690
TAL Metals - EPA Method SW 846 (mg/kg)																
Aluminum	NV	**NV**	*NV*	2,290 B	2,460 B	17,600 B	21,200 B	27,600 B	21,000 B	20,500 B	17,400 B	15,300 B	23,500 B	9,870 B	13,600 B	21,110 B
Antimony	NV	**NV**	*NV*	ND	ND	ND	ND	ND	1.0 J	ND	ND	ND	ND	ND	ND	ND
Arsenic	13	**16**	*16*	2.0 J	4.8	6.4	2.8	7.1	5.7	7.6	5.7	3.7	3.4	1.9 J	2.1 J	4.8
Barium	350	**400**	*400*	11.6	14	105	151	171	130	179	41.2	89.4	106	71.9	84.2	152
Beryllium	7.2	**590**	*590*	0.115 J	0.105 J	0.950	1.39	1.95	1.14	1.12	0.903	0.771	1.15	0.456	0.583	1.27
Cadmium	2.5	**9.3**	*9.3*	0.186 J	0.169 J	0.221 J	0.109 J	0.156 J	0.251 J	0.185 J	0.182 J	0.151 J	0.153 J	0.157 J	0.169 J	0.146 J
Calcium	NV	**NV**	*NV*	95,000 B	78,300 B	16,800 B	2,020 B	2,090 B	5,850 B	10,700 B	49,300 B	44,100 B	1,570 B	3,040 B	4,300 B	18,900 B
Chromium	30	**180**	*1,500*	3.45	7.12	23.5	27.6	38	29.8	29.5	24.1	22.0	30.8	23.1	11.2	15	29.8
Cobalt	30 [11]	**NV**	*NV*	2.03	1.96	13.8	11.5	26.8	14.6	18.2	14.3	14.3	23.1	2.4	3.28	19.3
Copper	50	**270**	*270*	8.7	6.1	23.1	21.6	34.3	22.4	33	24.7	21.1	30.7	7.1	7.3	30.4
Iron	2000 [11]	**NV**	*NV*	5,690 B	5,360 B	26,800 B	31,900 B	44,600 B	37,900 B	35,300 B	29,300 B	25,100 B	31,600 B	8,600 B	16,100 B	34,500 B
Lead	63	**400**	*1,000*	8	6.3	13.4	15	14.9	17.8	14.4	9.7	8.0	7.5	11.7	8.5	16.6
Magnesium	NV	**NV**	*NV*	50,500	31,200	10,500	8,210	9,580	8,000	14,800	14,000	12,200	8,100	2,130	2,850	10,800
Manganese	1,600	**2,000**	*10,000*	298 B	222 B	291 B	186 B	476 B	266 B	**2,470 B**	475 B	587 B	432 B	84.0 B	162 B	782 B
Mercury	0.18	**0.81**	*2.8*	ND	ND	0.0132 J	0.0423	0.0451	0.0492	0.0341	ND	0.0100	0.0218 J	0.0685	0.0703	0.0394
Nickel	30	**310**	*310*	5.24 J	5.04 J	33.7	33.2	48.8	34.3	42.4	34.6	33.3	37.7	9.53	11.5	42.8
Potassium	NV	**NV**	*NV*	485	659	1,600	1,770	2,450	2,040	1,980	2,260	2,240	1,700	1,240	1,460	2,180
Selenium	3.9	**180**	*1,500*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	NV	**NV**	*NV*	151 J	134 J	136 J	298	347	141 J	294	322	278	150 J	111 J	112 J	341
Vanadium	100 [11]	**NV**	*NV*	6.11	5.96	29.7	33.9	47.4	39.6	38.7	32.1	26.8	32.3	9.58	12.5	38.1
Zinc	109	**10,000**	*10,000*	44.6 B	30.6 B	62.3 B	72.0 B	100	84.5 B	69.5 B	61.7 B	56.6 B	74.0 B	30.1 B	35.9 B	72.1 B
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)																
Aroclor 1248	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	51	ND
Aroclor 1254	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	29	ND	ND	ND	ND	25	ND
Total PCBs	100*	**1000***	*1,000**	ND	ND	ND	ND	ND	ND	29	ND	ND	ND	ND	76	ND

Table 2
Soil Analytical Testing Results Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Use Soil Cleanup Objectives	Restricted Residential Soil Cleanup Objectives	Restricted Commercial Soil Cleanup Objectives	SP-13-0-2 12/07/2010 Result	SP-14-2-4 12/07/2010 Result	SP-15-0-4 12/07/2010 Result	SP-16-0-2 12/07/2010 Result	SP-17-4-8 12/07/2010 Result	SP-17 (DUP-2) 12/07/2010 Result	SP-18-0-4 12/07/2010 Result	SP-19-0-4 12/07/2010 Result	SP-20-0-4 12/07/2010 Result	SP-21-0-4 12/07/2010 Result	TP-1-0-4* 12/07/2010 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)														
Acetone	50	**100,000**	*500,000*	10 J	19 J	19 J	ND	52	69	11 J	340	29	13	7.6 J
Methylene Chloride	50	**100,000**	*500,000*	5.9	5.2 J	6.6	4.6 J	5.9 J	4.1 J	7.8	5.4 J	4.1 J	4.7 J	4.6 J
Toluene	700	**100,000**	*500,000*	ND	ND	ND	ND	ND	ND	ND	ND	1.6 J	ND	ND
Ethylbenzene	1,000	**41,000**	*390,000*	ND	ND	ND	ND	ND	ND	ND	1.9 J	2.6 J	ND	ND
Xylenes, total	260	**100,000**	*500,000*	ND	ND	ND	ND	ND	ND	ND	5.2 J	8.3 J	ND	ND
Isopropylbenzene	2,300	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	3,900	**100,000**	*500,000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	8,400	**52,000**	*190,000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Isopropyltoluene	10,000 [11]	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	3,600	**52,000**	*190,000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	11,000	**100,000**	*500,000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	100,000	**NV**	*NV*	ND	ND	ND	ND	ND	7.1	ND	ND	ND	ND	ND
n-Butylbenzene	12,000	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	12,000	**100,000**	*500,000*	ND	1.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total VOCs	NV	**NV**	*NV*	15.9	25.5	25.6	4.6	57.9	84.3	18.8	352.5	45.6	13.0	12.2
Total VOC TICs	NV	**NV**	*NV*	10	8.9	9.8	8.6	12	8.4	9.5	8.1	7.1	7.3	6.5
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/kg)														
Naphthalene	12,000	**100,000**	*500,000*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	410 [11]	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	**100,000**	*500,000*	ND	32 J	ND	ND	ND	ND	ND	ND	ND	ND	3,000 J
Acenaphthene	20,000	**100,000**	*500,000*	ND	22 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	30,000	**100,000**	*500,000*	ND	47 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	**100,000**	*500,000*	ND	330	ND	ND	ND	ND	660 J	1,100 J	ND	ND	5,400 J
Anthracene	100,000	**100,000**	*500,000*	ND	92 J	ND	ND	ND	ND	160 J	200 J	ND	ND	1,900 J
Fluoranthene	100,000	**100,000**	*500,000*	1,300 J	510	ND	ND	27 J	25 J	800 J	1,600 J	ND	ND	16,000
Pyrene	100,000	**100,000**	*500,000*	1,200 J	480	14 J	ND	25 J	23 J	800 J	1,400 J	ND	ND	15,000
Benzo(a)anthracene	1,000	**1,000**	*5,600*	960 J	290	ND	ND	16 J	19 J	420 J	790 J	ND	ND	***10,000***
Dibenzo(a,h)anthracene	330	**330**	*560*	ND	38 J	ND	ND	ND	ND	ND	ND	ND	ND	***2,300 J***
Bis(2-ethylhexyl)phthalate	50000 [11]	**NV**	*NV*	6,600 JB	170 JB	150 JB	ND	160 JB	160 JB	1500 JB	1800 JB	1300 JB	7,500 JB	ND
Carbazole	NV	**NV**	*NV*	ND	24 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	1,000	**3,900**	*56,000*	690 J	230	ND	ND	ND	ND	420 J	690 J	ND	ND	**9,700**
Benzo(b)fluoranthene	1,000	**1,000**	*5,600*	1,000 J	260	ND	ND	16 J	ND	450 J	740 J	ND	ND	***14,000***
Benzo(k)fluoranthene	800	**3,900**	*56,000*	ND	110 J	ND	ND	ND	ND	ND	ND	ND	ND	**6,500 J**
Biphenyl	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	**1,000**	*1,000*	960 J	250	ND	ND	ND	15 J	390 J	680 J	ND	ND	***14,000***
Indeno(1,2,3-cd)pyrene	500	**500**	*5,600*	ND	110 J	ND	ND	ND	ND	210 J	320 J	ND	ND	***8,800 J***
Benzo(g,h,i)perylene	100,000	**100,000**	*500,000*	730 J	120 J	ND	ND	ND	ND	280 J	380 J	ND	ND	12,000
Total SVOCs	NV	**NV**	*NV*	13,440	3,075	164	ND	244	242	6,090	9,700	1,300	7,500	118,600
Total SVOC TICs	NV	**NV**	*NV*	ND	ND	580	9,400	ND	ND	ND	ND	ND	ND	7,600
TAL Metals - EPA Method SW 846 (mg/kg)														
Aluminum	NV	**NV**	*NV*	10,700	24,000	32,100	15,500	17,400	15,800	11,400	13,200	15,100	9,810	9,970
Antimony	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	13	**16**	*16*	6.0	6.5	2.4	6.1	6.3	2.7	8.1	6.8	5.0	6.1	4.1
Barium	350	**400**	*400*	98.6	194	249	107	***418***	168	104	133	90.3	81.3	153
Beryllium	7.2	**590**	*590*	1.38	4.71	8.21	1.96	0.926	0.800	1.38	0.81	1.27	0.637	1.23
Cadmium	2.5	**9.3**	*9.3*	0.48	0.353	0.061 J	0.216 J	0.152 J	0.114	0.554	0.25 J	0.168 J	0.791	0.800
Calcium	NV	**NV**	*NV*	168,000 B	203,000 B	268,000 B	225,000 B	50,700 B	49,500 B	173,000 B	157,000 B	44,000 B	138,000 B	116,000 B
Chromium	30	**180**	*1,500*	**682**	**379**	31.4	**1,040**	24.2	22.3	**797**	**969**	119	**720**	165
Cobalt	30 [11]	**NV**	*NV*	3.73	6.41	2.44	3.47	16.2	13.6	5.63	5.83	10.4	11.8	4.68
Copper	50	**270**	*270*	9.5	25.4	4.8	11	24.9	18.5	108	45.3	16	19.5	13
Iron	2000 [11]	**NV**	*NV*	6,750	24,700	4,360	4,140	31,000	23,800	22,200	10,900	16,200	20,900	11,200
Lead	63	**400**	*1,000*	27.3	18.3	3.6	11.2	9.5	8.5	42.4	17	7.8	31.5	39.4
Magnesium	NV	**NV**	*NV*	62,800 B	20,900 B	8,020 B	46,400 B	11,500 B	11,500 B	52,600 B	45,200 B	9,010 B	44,900 B	39,600 B
Manganese	1,600	**2,000**	*10,000*	1,090 B	**2,670 B**	**3,450 B**	1,130 B	722 B	576 B	**4,150 B**	1,230 B	845 B	679 B	771 B
Mercury	0.18	**0.81**	*2.8*	0.0205 J	0.0452	ND	ND	0.0109 J	ND	ND	0.0163 J	0.0146 J	0.0259	0.124
Nickel	30	**310**	*310*	13.8	20.7	1.66 J	19.8	35.8	32.0	41.7	29.9	25.1	32.6	12.8
Potassium	NV	**NV**	*NV*	874	1,650	2,440	635	2,420	2,790	722	885	1,710	716	1,210
Selenium	3.9	**180**	*1,500*	ND	1.4 J	2.1 J	ND	ND	ND	ND	ND	ND	ND	0.7 J
Sodium	NV	**NV**	*NV*	328 B	690 B	930 B	616 B	271 B	290 B	329 B	443 B	154 B	289 B	254 B
Vanadium	100 [11]	**NV**	*NV*	17.1	22.3	5.64	25.7	32.3	26.9	23.4	29.8	22.1	26.7	15.3
Zinc	109	**10,000**	*10,000*	79.2 B	36.8 B	0.6 B	30.5 B	55 B	51.5 B	124 B	40.5 B	43.9 B	170 B	124 B
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)														
Aroclor 1248	NV	**NV**	*NV*	ND	ND	ND	ND	ND	ND	ND	620	ND	ND	ND
Aroclor 1254	NV	**NV**	*NV*	1,700	230	9.8	1,400	21	15	1800	540	65	650	700
Aroclor 1260	NV	**NV**	*NV*	840	67	ND	1,600	ND	ND	760	190	40	410	210
Total PCBs	100*	**1000***	*1,000**	***2,540***	297	9.8	***3,000***	21	15	***2,560***	***1,350***	105	***1,060***	910

Table 2
Soil Analytical Testing Results Summary
Niagara Falls Armed Foreces Reserve Center
Niagara Falls, New York

Notes:

1. Compounds detected in one or more samples are presented on this table.
2. Analytical testing completed by Test America Laboratories.
3. ug/kg = micrograms per kilogram; mg/kg = milligrams per kilogram
4. ND indicates compound was not detected above method detection limits.
5. NV = no value.
6. Shading indicates value exceeds Unrestricted Use Soil Cleanup Objectives.
7. **Bold** indicates value exceeds the Restricted Residential Soil Cleanup Objectives.
8. *Italics* indicates value exceeds the Restricted Commercial Soil Cleanup Objectives.
9. A duplicate sample (DUP-1) was collected at soil probe location SP-8. Values shown are the higher of the two analytical results.
10. *Soil cleanup objective is for the sum of the Aroclor compound concentrations detected (Total PCBs).
11. Soil cleanup objective used is from NYSDEC Final Commissioners Policy, CP-51, dated October 21, 2010.
12. J= Analyte detected at a level less than the Reporting Limit, but greater than or equal to the Method Detection Limit.
13. B= Analyte was detected in the associated Method Blank.

Table 1
Analytical Results Summary Table
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Sample Identification	Date Collected	VOCs EPA Method 8260-TCL	SVOCs EPA Method 8270 - TCL	PCBs EPA Method 8082	Waste Characterization
Soil Probe Samples					
SP-22-2-4	9/26/2011	X	X	X	
SP-22-10-12	9/26/2011	X	X	X	
SP-23-2-4	9/26/2011	X	X	X	
SP-23-6-8	9/26/2011	X	X	X	
SP-24-2-4	9/26/2011	X	X	X	
SP-24-8-10	9/26/2011	X	X	X	
SP-25-2-4	9/26/2011	X	X	X	
SP-25-6-8	9/26/2011	X	X	X	
SP-26-1-3	9/26/2011	X	X	X	
SP-26-6-8	9/26/2011	X	X	X	
SP-27-2-4	9/26/2011	X	X	X	
SP-27-6-8	9/26/2011	X	X	X	
SP-28-1-3	9/26/2011	X	X	X	
SP-28-6-8	9/26/2011	X	X	X	
SP-29-1-3	9/26/2011	X	X	X	
SP-29-6-8	9/26/2011	X	X	X	
SP-30-1-3	9/27/2011	X	X	X	
SP-30-10-12	9/27/2011	X	X	X	
SP-31-1-3	9/27/2011	X	X	X	
SP-31-8-10	9/27/2011	X	X	X	
SP-32-2-4	9/26/2011	X	X	X	
SP-32-8-10	9/26/2011	X	X	X	
SP-33-0-2	9/27/2011	X	X	X	
SP-33-8-10	9/27/2011	X	X	X	
SP-34-2-4	9/26/2011	X	X	X	
SP-34-6-8	9/26/2011	X	X	X	
SP-35-1-3	9/27/2011	X	X	X	
SP-35-6-8	9/27/2011	X	X	X	
SP-36-1-3	9/27/2011	X	X	X	
SP-36-8-10	9/27/2011	X	X	X	
SP-37-1-3	9/27/2011	X	X	X	
SP-37-4-6	9/27/2011	X	X	X	
SP-41-1-3	9/28/2011		X	X	
SP-41-6-8	9/28/2011		X	X	
SP-47-1-3	9/27/2011			X	
SP-47-6-8	9/27/2011			X	
SP-50-1-3	9/28/2011		X	X	
SP-50-6-8	9/28/2011		X	X	
SP-51-1-3	9/28/2011		X	X	
SP-51-6-8	9/28/2011		X	X	
OUTFALL 004	9/27/2011	X	X	X	
Soil Excavation Samples					
EX-NORTH	9/29/2011	X	X	X	
EX-SOUTH	9/29/2011	X	X	X	
EX-EAST	9/29/2011	X	X	X	
EX-WEST	9/29/2011	X	X	X	
EX-FLOOR	9/29/2011	X	X	X	
WC-1-SOIL	9/29/2011				X[7]
Groundwater Samples					
SP-22-110926	9/26/2011	X	X	X	
SP-25-110926	9/26/2011	X	X	X	
SP-30-110927	9/27/2011	X	X	X	
SP-32-110926	9/26/2011	X	X	X	
SP-34-110926	9/26/2011	X	X	X	
SP-36-110927	9/27/2011	X	X	X	
SP-42-110927	9/27/2011	X			
SP-49-110927	9/27/2011	X			

Notes:
1. SP-22-2-4 = (SP-22), type of sample and number from which sample was obtained, (2-4) depth of sample below ground surface. SP = soil probe.
2. VOCs = Volatile Organic Compounds
3. SVOCs = Semi-Volatile Organic Compounds
4. TCL = Target Compound List
5. TAL = Target Analyte List
6. PCBs = Polychlorinated Biphenyls
7. Waste characterization sample (WC-1-SOIL) was analyzed for the following parameters TCLP VOCs, SVOCs, RCRA Metals, PCBs, pH, and Ignitability.

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-22-2-4 Result	SP-22-10-12 Result	SP-23-2-4 Result	SP-23-6-8 Result	SP-24-2-4 Result	SP-24-8-10 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	7.1 J	60	22 J	28 J	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	4.9 J	5.6 J	4.8 J	5.1 J	5.1 J	3.9 J
2-Butanone (MEK)	100,000	*NV*	ND	ND	7.5 J	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	51 J	ND	ND	ND	ND
2-Methylnaphthalene	410 [3]	*NV*	ND	12 J	ND	ND	ND	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	*500,000*	ND	68 J	ND	ND	ND	ND
Fluorene	30,000	*500,000*	ND	96 J	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	500 J	210 J	ND	ND	ND	ND
Anthracene	100,000	*500,000*	ND	97 J	ND	ND	ND	ND
Fluoranthene	100,000	*500,000*	830 J	250	ND	ND	ND	ND
Pyrene	100,000	*500,000*	590 J	160 J	ND	ND	ND	ND
Benzo(a)anthracene	1,000	*5,600*	650 J	110 J	12 J	ND	21 J	ND
Dibenzo(a,h)anthracene	330	*560*	ND	14 J	ND	ND	30 J	ND
Dibenzofuran	7,000	*NV*	ND	31 J	ND	ND	ND	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [3]	*NV*	ND	ND	ND	88 J	ND	ND
Carbazole	NV	*NV*	ND	17 J	ND	ND	ND	ND
Chrysene	1,000	*56,000*	670 JB	100 JB	11 JB	ND	29 JB	ND
Benzo(b)fluoranthene	1,000	*5,600*	590 J	91 J	16 J	11 J	ND	11 J
Benzo(k)fluoranthene	800	*56,000*	420 J	64 J	13 J	11 J	ND	13 J
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	550 J	90 J	13 J	9.5 J	ND	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	280 J	32 J	ND	ND	30 J	ND
Benzo(g,h,i)perylene	100,000	*500,000*	310 J	33 J	ND	ND	35 J	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-25-2-4 Result	SP-25-6-8 Result	SP-26-1-3 Result	SP-26-6-8 Result	SP-27-2-4 Result	SP-27-6-8 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	ND	27 J	6.7 J	ND	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	5.1 J	5.6 J	4.6 J	4.8 J	4.9 J	5.0 J
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	410	*NV*	ND	ND	ND	ND	ND	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	ND	ND
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	ND	ND
Fluorene	30,000	*500,000*	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	5100 J	3300 J	ND	ND	83 J	ND
Anthracene	100,000	*500,000*	1300 J	ND	ND	ND	ND	ND
Fluoranthene	100,000	*500,000*	7100 J	7000 J	16 J	ND	80 J	ND
Pyrene	100,000	*500,000*	4900 J	6100 J	11 J	ND	40 J	ND
Benzo(a)anthracene	1,000	*5,600*	3600 J	5600 J	14 J	ND	37 J	ND
Dibenzo(a,h)anthracene	330	*560*	**630 J**	**1200 J**	ND	ND	10 J	ND
Dibenzofuran	7,000	*NV*	ND	ND	ND	ND	ND	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	ND	ND	ND
Chrysene	1,000	*56,000*	3500 JB	5400 JB	14 JB	ND	45 JB	ND
Benzo(b)fluoranthene	1,000	*5,600*	4100 J	5600 J	19 J	12 J	59 J	15 J
Benzo(k)fluoranthene	800	*56,000*	1700 J	3100 J	16 J	12 J	27 J	9.1 J
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	**3200 J**	**5800 J**	15 J	9.9 J	39 J	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	1200 J	2100 J	9.3 J	8.8 J	23 J	ND
Benzo(g,h,i)perylene	100,000	*500,000*	1400 J	2500 J	ND	9.8 J	26 J	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-28-1-3 Result	SP-28-6-8 Result	SP-29-1-3 Result	SP-29-6-8 Result	SP-30-1-3 Result	SP-30-10-12 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	9.7 J	7.3 J	ND	12 J	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	3.0 J	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	<
Methylene Chloride	50	*500,000*	4.7 J	5.8 J	7.8	5.6 J	3.8 JB	2.9 JB
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	ND	ND	ND	17 J	ND
2-Methylnaphthalene	410 [g]	*NV*	ND	ND	ND	ND	9.3 J	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	32 J	22 J	ND
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	25 J	ND
Fluorene	30,000	*500,000*	ND	ND	ND	33 J	26 J	ND
Phenanthrene	100,000	*500,000*	15 J	18 J	1800 J	360	320 B	8.8 JB
Anthracene	100,000	*500,000*	ND	ND	ND	97 J	52 J	ND
Fluoranthene	100,000	*500,000*	36 J	77 J	3100 J	570	630 B	17 JB
Pyrene	100,000	*500,000*	25 J	57 J	2000 J	350	430 B	12 JB
Benzo(a)anthracene	1,000	*5,600*	27 J	46 J	1700 J	210 J	260 B	14 JB
Dibenzo(a,h)anthracene	330	*560*	ND	12 J	ND	29 J	ND	ND
Dibenzofuran	7,000	*NV*	ND	ND	ND	19 J	16 J	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	14 JB	12 JB
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	32 J	32 J
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [g]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	15 J	53 J	4.1 J
Chrysene	1,000	*56,000*	25 JB	47 JB	2300 JB	200 J	290 B	17 JB
Benzo(b)fluoranthene	1,000	*5,600*	40 J	72 J	3500 J	210 J	440 B	18 JB
Benzo(k)fluoranthene	800	*56,000*	19 J	35 J	1700 J	110 J	180 JB	16 JB
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	26 J	54 J	**2900 J**	160 J	290 B	15 JB
Indeno(1,2,3-cd)pyrene	500	*5,600*	16 J	27 J	1400 J	86 J	120 JB	10 JB
Benzo(g,h,i)perylene	100,000	*500,000*	15 J	28 J	1800 J	91 J	120 JB	7.8 JB
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	1,100	ND	320	ND	150 J	ND
Total PCBs	100*	*1,000**	1,100	ND	320	ND	150	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-31-1-3 Result	SP-31-8-10 Result	SP-32-2-4 Result	SP-32-8-10 Result	SP-33-0-2 Result	SP-33-8-10 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	ND	ND	30	ND	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	4.3 JB	3.2 JB	5.6 J	5.2 J	ND	ND
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	7.7 J	ND	ND	ND	ND	ND
2-Methylnaphthalene	410 [9]	*NV*	ND	ND	ND	ND	52 J	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	15 J	ND	ND	ND	68 J	ND
Acenaphthene	20,000	*500,000*	3.0 J	ND	ND	ND	ND	ND
Fluorene	30,000	*500,000*	ND	ND	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	96 JB	6.6 JB	88 J	ND	190 JB	ND
Anthracene	100,000	*500,000*	28 J	ND	22 J	ND	88 J	ND
Fluoranthene	100,000	*500,000*	250 B	13 JB	180 J	ND	560 JB	5.5 JB
Pyrene	100,000	*500,000*	170 JB	11 JB	120 J	ND	440 JB	4.9 JB
Benzo(a)anthracene	1,000	*5,600*	150 JB	15 JB	97 J	11 J	330 JB	9.1 JB
Dibenzo(a,h)anthracene	330	*560*	ND	ND	20 J	ND	ND	ND
Dibenzofuran	7,000	*NV*	6.4 J	ND	ND	ND	28 J	ND
Diethyl phthalate	NV	*NV*	16 JB	11 JB	ND	ND	ND	9.8 JB
Di-n-octyl phthalate	NV	*NV*	38 J	30 J	ND	ND	310 J	31 J
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [9]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	14 J	3.7 J	ND	ND	74 J	3.6 J
Chrysene	1,000	*56,000*	140 JB	14 JB	110 JB	10 JB	380 JB	7.9 JB
Benzo(b)fluoranthene	1,000	*5,600*	190 JB	20 JB	140 J	14 J	740 JB	12 JB
Benzo(k)fluoranthene	800	*56,000*	82 JB	15 JB	64 J	13 J	360 JB	10 JB
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	130 JB	15 JB	98 J	14 J	490 JB	7.0 JB
Indeno(1,2,3-cd)pyrene	500	*5,600*	56 JB	10 JB	45 J	ND	210 JB	7.6 JB
Benzo(g,h,i)perylene	100,000	*500,000*	57 JB	11 JB	52 J	ND	400 JB	8.8 JB
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	410	ND	940	ND
Total PCBs	100*	*1,000**	ND	ND	410	ND	940	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-34-2-4 Result	SP-34-6-8 Result	SP-34-6-8 (DUP) Result	SP-35-1-3 Result	SP-35-6-8 Result	SP-36-1-3 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	ND	6.7 J	ND	ND	ND	27 J
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	ND	ND	ND
Methylene Chloride	50	*500,000*	6.9	5.9 J	3.9 J	ND	ND	2.9 JB
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	5.2 J
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	33 J	ND	ND	ND	ND	5.7 J
2-Methylnaphthalene	410 [g]	*NV*	38 J	ND	ND	ND	ND	4.1 J
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	ND	9.0 J
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	ND	4.3 J
Fluorene	30,000	*500,000*	ND	ND	ND	ND	ND	12 J
Phenanthrene	100,000	*500,000*	120 J	ND	ND	7.7 JB	ND	89 JB
Anthracene	100,000	*500,000*	ND	ND	ND	ND	ND	22 J
Fluoranthene	100,000	*500,000*	140 J	ND	ND	27 JB	7.9 JB	130 JB
Pyrene	100,000	*500,000*	89 J	ND	ND	20 JB	6.0 JB	98 JB
Benzo(a)anthracene	1,000	*5,600*	66 J	15 J	15 J	23 JB	8.9 JB	55 JB
Dibenzo(a,h)anthracene	330	*560*	13 J	ND	ND	ND	ND	ND
Dibenzofuran	7,000	*NV*	24 J	ND	ND	ND	ND	6.1 J
Diethyl phthalate	NV	*NV*	ND	ND	ND	11 JB	7.4 JB	13 JB
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	30 J	28 J	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [g]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	3.6 J	ND	14 J
Chrysene	1,000	*56,000*	78 J	14 JB	13 JB	24 JB	10 JB	62 JB
Benzo(b)fluoranthene	1,000	*5,600*	81 J	16 J	19 J	46 JB	20 JB	97 JB
Benzo(k)fluoranthene	800	*56,000*	40 J	14 J	12 J	24 JB	11 JB	43 JB
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	59 J	14 J	14 J	30 JB	11 JB	63 JB
Indeno(1,2,3-cd)pyrene	500	*5,600*	38 J	ND	ND	17 JB	7.4 JB	30 JB
Benzo(g,h,i)perylene	100,000	*500,000*	52 J	ND	ND	19 JB	6.9 JB	32 JB
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-36-8-10 Result	SP-37-1-3 Result	SP-37-4-6 Result	SP-41-1-3 Result	SP-41-6-8 Result	SP-47-1-3 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	17 J	19 J	29 J	NT	NT	NT
Methylcyclohexane	NV	*NV*	ND	ND	ND	NT	NT	NT
Tetrachloroethene	1,300	*150,000*	ND	ND	ND	NT	NT	NT
Methylene Chloride	50	*500,000*	ND	2.9 J	ND	NT	NT	NT
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	NT	NT	NT
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	45 J	ND	ND	ND	NT
2-Methylnaphthalene	410 [9]	*NV*	ND	28 J	ND	ND	ND	NT
4-Methylphenol	NV	*NV*	ND	ND	ND	17 J	ND	NT
Acenaphthylene	100,000	*500,000*	ND	9.8 J	ND	ND	ND	NT
Acenaphthene	20,000	*500,000*	ND	160 J	ND	ND	ND	NT
Fluorene	30,000	*500,000*	ND	320	ND	ND	ND	NT
Phenanthrene	100,000	*500,000*	4.5 JB	2,400 B	10 JB	ND	ND	NT
Anthracene	100,000	*500,000*	ND	690	ND	ND	ND	NT
Fluoranthene	100,000	*500,000*	5.8 JB	2,700 B	17 JB	ND	ND	NT
Pyrene	100,000	*500,000*	5.1 JB	1,700 B	9.8 JB	ND	ND	NT
Benzo(a)anthracene	1,000	*5,600*	9.4 JB	950 B	13 JB	ND	21 J	NT
Dibenzo(a,h)anthracene	330	*560*	ND	64 J	ND	ND	19 JB	NT
Dibenzofuran	7,000	*NV*	ND	190 J	ND	ND	ND	NT
Diethyl phthalate	NV	*NV*	12 JB	7.9 JB	10 JB	ND	ND	NT
Di-n-octyl phthalate	NV	*NV*	31 J	31 J	ND	ND	ND	NT
Di-n-butyl phthalate	NV	*NV*	ND	380	ND	ND	ND	NT
Bis(2-ethylhexyl)phthalate	50,000 [9]	*NV*	ND	ND	ND	ND	ND	NT
Carbazole	NV	*NV*	4.4 J	230	ND	ND	ND	NT
Chrysene	1,000	*56,000*	9.6 JB	940 B	9.7 JB	ND	24 J	NT
Benzo(b)fluoranthene	1,000	*5,600*	8.8 JB	1,200 B	18 JB	ND	24 J	NT
Benzo(k)fluoranthene	800	*56,000*	8.1 JB	620 B	16 JB	ND	29 J	NT
Biphenyl	NV	*NV*	ND	17 J	ND	ND	ND	NT
Benzo(a)pyrene	1,000	*1,000*	7.3 JB	920 B	11 JB	ND	17 J	NT
Indeno(1,2,3-cd)pyrene	500	*5,600*	6.2 JB	270 B	9.0 JB	ND	19 JB	NT
Benzo(g,h,i)perylene	100,000	*500,000*	6.0 JB	290 B	7.9 JB	ND	15 JB	NT
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	SP-47-6-8 Result	SP-50-1-3 Result	SP-50-6-8 Result	SP-51-1-3 Result	SP-51-6-8 Result	EX-NORTH Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	NT	NT	NT	NT	NT	44
Methylcyclohexane	NV	*NV*	NT	NT	NT	NT	NT	ND
Tetrachloroethene	1,300	*150,000*	NT	NT	NT	NT	NT	2.4 JB
Methylene Chloride	50	*500,000*	NT	NT	NT	NT	NT	ND
2-Butanone (MEK)	100,000	*NV*	NT	NT	NT	NT	NT	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	NT	ND	ND	ND	ND	ND
2-Methylnaphthalene	410 [9]	*NV*	NT	ND	ND	ND	ND	ND
4-Methylphenol	NV	*NV*	NT	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	NT	ND	ND	ND	ND	ND
Acenaphthene	20,000	*500,000*	NT	21 J	ND	ND	ND	ND
Fluorene	30,000	*500,000*	NT	ND	ND	ND	ND	ND
Phenanthrene	100,000	*500,000*	NT	750 J	160 J	ND	ND	ND
Anthracene	100,000	*500,000*	NT	160 J	ND	ND	ND	ND
Fluoranthene	100,000	*500,000*	NT	1,000 J	260 J	ND	19 J	ND
Pyrene	100,000	*500,000*	NT	740 J	200 J	ND	ND	ND
Benzo(a)anthracene	1,000	*5,600*	NT	410 J	140 J	ND	ND	ND
Dibenzo(a,h)anthracene	330	*560*	NT	ND	ND	ND	ND	ND
Dibenzofuran	7,000	*NV*	NT	ND	ND	ND	ND	ND
Diethyl phthalate	NV	*NV*	NT	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	NT	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	NT	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [9]	*NV*	NT	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	NT	ND	ND	ND	ND	ND
Chrysene	1,000	*56,000*	NT	390 J	120 J	ND	ND	ND
Benzo(b)fluoranthene	1,000	*5,600*	NT	420 J	150 J	ND	ND	4.8 J
Benzo(k)fluoranthene	800	*56,000*	NT	280 J	89 J	ND	ND	4.2 J
Biphenyl	NV	*NV*	NT	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	NT	380 J	130 J	ND	ND	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	NT	230 JB	93 JB	ND	ND	ND
Benzo(g,h,i)perylene	100,000	*500,000*	NT	230 JB	97 JB	ND	17 JB	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	ND	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	ND	ND
Total PCBs	100*	*1,000**	ND	ND	ND	ND	ND	ND

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Restricted Commmercial Soil Cleanup Objectives	EX-SOUTH Result	EX-EAST Result	EX-WEST Result	EX-FLOOR Result	OUTFALL 004 Result	RINSATE-SOIL Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)								
Acetone	50	*500,000*	17 J	17 J	29	ND	ND	ND
Methylcyclohexane	NV	*NV*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1,300	*150,000*	2.4 JB	2 JB	1.8 JB	2 JB	ND	ND
Methylene Chloride	50	*500,000*	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	100,000	*NV*	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)								
Naphthalene	12,000	*500,000*	ND	ND	ND	ND	390 J	ND
2-Methylnaphthalene	410 [g]	*NV*	ND	ND	ND	ND	460 J	ND
4-Methylphenol	NV	*NV*	ND	ND	ND	ND	ND	ND
Acenaphthylene	100,000	*500,000*	ND	ND	ND	ND	180 J	ND
Acenaphthene	20,000	*500,000*	ND	ND	ND	ND	4,500	ND
Fluorene	30,000	*500,000*	ND	ND	ND	ND	5,400	ND
Phenanthrene	100,000	*500,000*	ND	ND	ND	85 J	56,000 B	ND
Anthracene	100,000	*500,000*	ND	ND	ND	41 J	19,000	ND
Fluoranthene	100,000	*500,000*	18 J	ND	ND	580	190,000	ND
Pyrene	100,000	*500,000*	18 J	ND	ND	550	160,000	ND
Benzo(a)anthracene	1,000	*5,600*	26 J	ND	ND	320	**120,000**	ND
Dibenzo(a,h)anthracene	330	*560*	20 J	ND	ND	47 J	ND	ND
Dibenzofuran	7,000	*NV*	ND	ND	ND	ND	2,400 J	ND
Diethyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	NV	*NV*	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	50,000 [g]	*NV*	ND	ND	ND	ND	ND	ND
Carbazole	NV	*NV*	ND	ND	ND	ND	8,600	ND
Chrysene	1,000	*56,000*	15 J	ND	ND	290	**120,000**	ND
Benzo(b)fluoranthene	1,000	*5,600*	32 J	ND	ND	290	**120,000**	ND
Benzo(k)fluoranthene	800	*56,000*	22 J	ND	ND	170 J	49,000 B	ND
Biphenyl	NV	*NV*	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	1,000	*1,000*	28 J	ND	ND	270	**82,000 B**	ND
Indeno(1,2,3-cd)pyrene	500	*5,600*	26 J	ND	ND	130 J	**28,000 B**	ND
Benzo(g,h,i)perylene	100,000	*500,000*	27 J	ND	ND	140 J	29,000 B	ND
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)								
Aroclor 1254	NV	*NV*	ND	ND	ND	70 J	ND	ND
Aroclor 1260	NV	*NV*	ND	ND	ND	ND	210	ND
Total PCBs	100*	*1,000**	ND	ND	ND	70	210	ND

Table 3
Groundwater Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Class GA Criteria	SP-22-110926	SP-25-110926	SP-30-110927	SP-32-110926	SP-34-110926	SP-34-110926 (DUP)	SP-36-110927	SP-42-110927
Volatile Organic Compounds - EPA Method 8260 TCL (ug/L)									
2-Butanone (MEK)	50	ND	ND	ND	ND	ND	ND	ND	3.8 J
Acetone	50	ND	5.8 J	ND	3.0 J	3.4 J	3.8 J	6.6 J	23
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	NV	0.32 J	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	NV	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylcyclohexane	NV	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	0.58 J	ND	ND	ND	ND
Trichlorofluoromethane	5	6.3	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	5	ND	ND	ND	ND	ND	ND	ND	ND
Total VOCs	NV	6.6	5.8	ND	3.6	3.4	3.8	0.0	26.8
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/L)									
2,4-Dimethylphenol	1	ND	ND	ND	ND	ND	ND	ND	NT
2-Methylnaphthalene	NV	ND	ND	ND	ND	ND	ND	ND	NT
4-Methylphenol	1	ND	ND	ND	ND	ND	ND	ND	NT
Acenaphthene	20	3.3 J	ND	ND	ND	ND	ND	ND	NT
Anthracene	50	0.91 J	0.43 J	ND	ND	ND	ND	ND	NT
Benzo [a] anthracene	0.002*	0.49 J	0.85 J	ND	ND	0.44 J	0.35 J	ND	NT
Benzo [a] pyrene	ND	ND	0.95 J	ND	ND	ND	ND	ND	NT
Benzo [b] fluoranthene	0.002*	ND	1.1 J	ND	ND	ND	ND	ND	NT
Benzo(g,h,i)perylene	NV	ND	0.79 J	ND	ND	ND	ND	ND	NT
Carbazole	5	1.9 J	0.41 J	ND	ND	ND	ND	ND	NT
Chrysene	0.002*	0.39 J	0.77 J	ND	ND	0.43 J	0.47 J	ND	NT
Dibenzofuran	NV	1.2 J	ND	ND	ND	ND	ND	ND	NT
Diethyl phthalate	50	4.0 J	ND	ND	ND	ND	ND	ND	NT
Di-n-butyl-phthalate	NV	0.5 JB	0.46 JB	ND	0.47 JB	0.33 JB	0.44 JB	0.74 J	NT
Dibenz(a,h)anthracene	NV	ND	0.67 J	ND	ND	ND	ND	ND	NT
Fluoranthene	50	1.7 J	1.2 J	0.45 J	ND	0.90 J	0.77 J	ND	NT
Fluorene	50	2.8 J	ND	ND	ND	ND	ND	ND	NT
Indeno(1,2,3-cd)pyrene	0.002	ND	0.91 J	ND	ND	ND	ND	ND	NT
Naphthalene	10 *	3.8 J	ND	ND	ND	ND	ND	ND	NT
Phenanthrene	50 *	3.7 J	0.59 J	ND	ND	0.44 J	0.44 JB	ND	NT
Pyrene	50	1.5 J	1.2 J	ND	ND	0.99 J	0.83 J	ND	NT
Total SVOCs	NV	26.2	10.3	0.5	0.5	3.5	3.3	0.7	NT
PCBs - EPA Method 8082 (ug/L)									
Aroclor 1254	NV	ND	ND	ND	2	ND	ND	ND	NT
Aroclor 1260	NV	ND	ND	0.77	1	D	ND	13	NT
Total PCBs	0.09 [11]	0.0	0.0	0.77	3.0	0.0	0.0	13.0	NT

Table 3
Groundwater Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Class GA Criteria	SP-49-110927	RINSATE	TRIP BLANK 1	TRIP BLANK 2
Volatile Organic Compounds - EPA Method 8260 TCL (ug/L)					
2-Butanone (MEK)	50	ND	ND	ND	ND
Acetone	50	ND	ND	ND	ND
Benzene	1	1.6	ND	ND	ND
Carbon disulfide	NV	ND	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND	ND
Cyclohexane	NV	0.95 J	ND	ND	ND
Ethylbenzene	5	1.3	ND	ND	ND
Methylcyclohexane	NV	1.1	ND	ND	ND
Methylene chloride	5	ND	ND	0.62 J	0.66 J
Toluene	5	2.7	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND
Trichlorofluoromethane	5	ND	ND	ND	ND
Total Xylenes	5	1.8 J	ND	ND	ND
Total VOCs	NV	6.7	ND	0.62	0.66
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/L)					
2,4-Dimethylphenol	1	NT	ND	NT	NT
2-Methylnaphthalene	NV	NT	ND	NT	NT
4-Methylphenol	1	NT	ND	NT	NT
Acenaphthene	20	NT	ND	NT	NT
Anthracene	50	NT	ND	NT	NT
Benzo [a] anthracene	0.002*	NT	ND	NT	NT
Benzo [a] pyrene	ND	NT	ND	NT	NT
Benzo [b] fluoranthene	0.002*	NT	ND	NT	NT
Benzo(g,h,i)perylene	NV	NT	ND	NT	NT
Carbazole	5	NT	ND	NT	NT
Chrysene	0.002*	NT	ND	NT	NT
Dibenzofuran	NV	NT	ND	NT	NT
Diethyl phthalate	50	NT	ND	NT	NT
Di-n-butyl-phthalate	NV	NT	ND	NT	NT
Dibenz(a,h)anthracene	NV	NT	ND	NT	NT
Fluoranthene	50	NT	ND	NT	NT
Fluorene	50	NT	ND	NT	NT
Indeno(1,2,3-cd)pyrene	0.002	NT	ND	NT	NT
Naphthalene	10 *	NT	ND	NT	NT
Phenanthrene	50 *	NT	ND	NT	NT
Pyrene	50	NT	ND	NT	NT
Total SVOCs	NV	NT	0.0	0.0	0.0
PCBs - EPA Method 8082 (ug/L)					
Aroclor 1254	NV	NT	ND	NT	NT
Aroclor 1260	NV	NT	ND	NT	NT
Total PCBs	0.09 [11]	NT	0.0	0.0	0.0

Table 2
Soil Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Notes:
1. Compounds detected in one or more samples are presented on this table. Refer to Attachment C for list of all compounds included in analysis.
2. Analytical testing completed by Test America Laboratories.
3. ug/kg = part per billion; mg/kg = parts per million
4. < indicates compound was not detected above method detection limits.
5. B = Compound was found in the blank and sample.
6. J = Result is less than the reporting limit but greater or equal to the method detection limit and the concentration is an approximate value.
7. NV = no value.
8. NT = not tested.
9. Shading indicates value exceeds Unrestricted Use Soil Cleanup Objectives.
10. **Bold** indicates value exceeds Restricted Commercial Use Soil Cleanup Objectives.
11. A duplicate sample (DUP-1) was collected at soil probe location SP-34, 6 to 8 feet.
12. *Soil cleanup objective is for the sum of the Aroclor compound concentrations detected (Total PCBs).
13. Soil cleanup objectives (SCOs) are from NYSDEC Part 375, Subpart 375-6: Unrestricted Use Soil Cleanup Objectives and the Supplemetal Soil Cleanup Objectives (SSCOs) are from NYSDEC Final Commissioners P

Table 3
Groundwater Analytical Results
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Notes:
1. Compounds detected in one or more samples are presented on this table.
2. Analytical testing completed by Test America Laboratories.
3. NYSDEC Class GA criteria obtained from Division of Water Technical and Operational Guidance Series (TOGS 1.1.1)
4. ug/L = part per billion (ppb); mg/L = part per million (ppm)
5. Shading indicates values exceeding NYSDEC Class GA groundwater criteria.
6. Class GA criteria shown is for total xylene concentration.
7. < = compound was not detected.
8. * indicates a Guidance Value instead of a Standard Value.
9. NT= not tested
10. NV = no value.
11. ND = non-detectable concentration by approved analytical methods.
12. Groundwater criteria is for the sum of the Aroclor compound concentrations detected (Total PCBs).

Table 1
Analytical Sample Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Sample Identification	Date Collected	VOCs EPA Method 8260-TCL	SVOCs EPA Method 8270 - TCL	PCBs EPA Method 8082	Waste Characterization Sample
Soil Samples					
MW-5-4-6	11/13/2012	X			
MW-5-2-6	11/13/2012		X	X	
Drum Characterization Sample	11/20/2012				X[6]
Groundwater Samples					
TW-1	11/7/2012	X	X	X	
TW-2	11/7/2012	X	X	X	
TW-3	11/7/2012	X	X	X	
TW-4	11/8/2012	X	X	X	
TW-5	11/8/2012	X	X	X	
MW-1	11/19/2012	X	X	X	
MW-2	11/19/2012	X	X	X	
MW-3	11/19/2012	X	X	X	
MW-4	11/19/2012; 11/20/2012	X	X	X	
MW-5	11/20/2012	X	X	X	
MW-6	11/20/2012; 11/21/2012; 11/26/2012	X	X	X	

Notes:
1. MW-5-4-6 = (MW-5), location of sample; (4-6) depth of sample below ground surface. MW = monitoring well.
2. VOCs = Volatile Organic Compounds
3. SVOCs = Semi-Volatile Organic Compounds
4. TCL = Target Compound List
5. PCBs = Polychlorinated Biphenyls
6. Waste characterization sample (Drum Characterization Sample) was analyzed for the following parameters:
   Toxicity Characteristic Leachate Procedure (TCLP) VOCs, SVOCs, RCRA Metals; and PCBs.

TABLE 2

Soil Analytical Testing Results Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Unrestricted Soil Cleanup Objectives	Commmercial Soil Cleanup Objectives	MW-5-4-6 Result	MW-5-2-6 Result
Volatile Organic Compounds - EPA Method 8260 TCL (ug/kg)				
Benzene	**60**	44,000	8.9	NT
Toluene	**700**	500,000	2.0 J	NT
Xylenes, Total	**260**	500,000	1.1 J	NT
Semi-Volatile Organic Compounds - EPA Method 8270 TCL (ug/kg)				
Phenanthrene	**100,000**	500,000	NT	6.1 J
Anthracene	**100,000**	500,000	NT	
Fluoranthene	**100,000**	500,000	NT	9.8 J
Pyrene	**100,000**	500,000	NT	9.8 J
Bis(2-ethylhexyl)phthalate	**50,000** [9]	NV	NT	110 J
Acetophenone	**NV**	NV	NT	130 J
Chrysene	**1,000**	56,000	NT	7.8 J
Benzo(a)pyrene	**1,000**	1,000	NT	110 J
Benzo(b)fluoranthene	**1,000**	5,600	NT	150 J
Benzo(k)fluoranthene	**800**	56,000	NT	9.8 J
Polychlorinated Biphenyls - EPA Method 8082 (ug/kg)				
Aroclor 1254	**NV**	NV	<	<
Aroclor 1260	**NV**	NV	<	<
Total PCBs	**100***	1,000*		

Notes:
1. Compounds detected in one or more samples are presented on this table. Refer to Attachment C for list of all compounds included in analysis.
2. Analytical testing completed by Test America Laboratories.
3. ug/kg = part per billion; mg/kg = parts per million
4. < indicates compound was not detected above method detection limits.
5. B = Compound was found in the blank and sample.
6. J = Result is less than the reporting limit but greater or equal to the method detection limit and the concentration is an approximate value.
7. NV = no value.
8. NT = not tested.
9. **Bold** indicates value exceeds Unrestricted Use Soil Cleanup Objectives.
10. Shading indicates value exceeds Restricted Commercial Use Soil Cleanup Objectives.
11. *Soil cleanup objective is for the sum of the Aroclor compound concentrations detected (Total PCBs).
12. Soil cleanup objectives (SCOs) are from NYSDEC Part 375, Subpart 375-6: Unrestricted Use Soil Cleanup Objectives and the Supplemetal Soil Cleanup Objectives (SSCOs) are from NYSDEC Final Commissioners Policy, CP-51, Dated October 21, 2010.

Table 3
Groundwater Analytical Testing Results Summary
Niagara Falls Armed Forces Reserve Center
Niagara Falls, New York

Parameter	Class GA Criteria	TW-1	TW-2	TW-3	TW-4	TW-5	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
Volatile Organic Compounds - EPA Method 8260 TCL (ug/L)												
2-Butanone (MEK)	50	<	<	<	<	1.6 J	<	<	<	3.7 J	5.5 J	<
Acetone	50	4.5 J	5.7 J	4.3 J	<	7.6 J	<	<	6.5 J	28	43	<
Benzene	1	1.6	<	<	<	0.51 J	<	<	<	<	<	<
Carbon disulfide	NV	<	<	<	<	0.88 J	<	1.6 J	2.2	4.7	<	<
Cyclohexane	NV	1.6	<	<	<	0.46 J	<	<	<	<	<	<
Dichlorodifluoromethane	5*	<	<	4.4	<	<	<	<	<	<	<	<
Methylcyclohexane	NV	1.2	0.59 J	<	<	0.5 J	0.42 J	<	<	<	<	<
Toluene	5	2.2	<	<	<	0.78 J	<	<	<	<	<	<
Trichloroethene	5	<	<	<	<	7.8	<	<	<	<	<	<
Xylenes (total)	5 [6]	0.75 J	<	<	<	<	<	<	<	<	<	<
Semi-Volatile Organic Compounds - EPA Method 8270 (ug/L)												
Acetophenone	NV	<	<	<	<	<	<	<	0.60 J	1.8 J	<	<
Caprolactam	NV	34	4.3 J	4.2 J	6.6 H	<	<	3.6 J	21.0	12	67.0	<
Di-n-butyl-phthalate	NV	<	<	<	<	<	0.37 J	0.73 J	0.43 J	0.40 J	0.75 J	<
Phenanthrene	50 *	<	<	<	<	<	<	0.58 J	0.76 J	1.0 J	<	<
PCBs - EPA Method 8082 (ug/L)												
Aroclor 1254	NV	<	<	<	<	<	<	<	<	<	<	<
Aroclor 1260	NV	<	<	<	<	<	<	<	<	<	<	<
Total PCBs	0.09 [13]	<	<	<	<	<	<	<	<	<	<	<

Notes:
1. Compounds detected in one or more samples are presented on this table.
2. Analytical testing completed by Test America Laboratories.
3. NYSDEC Class GA criteria obtained from Division of Water Technical and Operational Guidance Series (TOGS 1.1.1), June 1998, dated October 1993, revised June 1998, January 1999 errata sheet and April 2000 addendum.
4. ug/L = part per billion (ppb); mg/L = part per million (ppm)
5. Shading indicates values exceeding NYSDEC Class GA groundwater criteria.
6. Class GA criteria shown is for total xylene concentration.
7. J = Result is less than the reporting limit but greater or equal to the method detection limit and the concentration is an approximate value.
8. H = Indicates sample was prepped or analyzed beyond the specified holding time.
9. < = compound was not detected.
10. * indicates a Guidance Value instead of a Standard Value.
11. NV = no value.
12. A duplicate sample (GW-Duplicate-110712) was collected at TW-3. Values shown are the higher of the two analytical results.
13. Groundwater criteria is for the sum of the Aroclor compound concentrations detected (Total PCBs).

APPENDIX F

Pro UCL 5.0.00 Software Outputs

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1		Benzene	D_Be	Trichloroflu	D_Tricl	Benzo(a)an	D_Ben	Benzo(b)flu	D_Benz	Chrysene	D_Chr	Indeno(1,2,3	D_Ind	Aroclor 125	D_Ar	Aroclor 126	D_Aro	Trichloroeth	D_Trichloroethene	
2	RI SP-22-110926	0.205	0	6.3	1	0.49	1	0.17	0	0.39	1	0.235	0	0.12	0	0.12	0	0.23	0	
3	RI SP-25-110926	0.205	0	0.44	0	0.85	1	1.1	1	0.77	1	0.91	1	0.12	0	0.12	0	0.23	0	
4	RI SP-30-110927	0.205	0	0.44	0	0.18	0	0.17	0	0.165	0	0.235	0	0.125	0	0.77	1	0.23	0	
5	RI SP-32-110926	0.205	0	0.44	0	0.18	0	0.17	0	0.165	0	0.235	0	2	1	1	1	0.58	1	
6	RI SP-34-110926	0.205	0	0.44	0	0.44	1	0.16	0	0.47	1	0.225	0	0.12	0	0.12	0	0.23	0	
7	RI SP-36-110927	0.205	0	0.44	0	0.17	0	0.16	0	0.155	0	0.22	0	0.12	0	13	1	0.23	0	
8	RI SP-42-110927	0.205	0	0.44	0	NS		NS		NS		NS		NS		NS		0.23	0	
9	RI SP-49-110927	1.6	1	0.44	0	NS		NS		NS		NS		NS		NS		0.23	0	
10	SI 2012, TW-1	1.6	1	0.44	0	0.195	0	0.185	0	0.175	0	0.255	0	0.12	0	0.12	0	0.23	0	
11	SI 2012, TW-2	0.205	0	0.44	0	0.17	0	0.16	0	0.155	0	0.22	0	0.12	0	0.12	0	0.23	0	
12	SI 2012, TW-3	0.205	0	0.44	0	0.22	0	0.21	0	0.205	0	0.265	0	0.12	0	0.12	0	0.23	0	
13	SI 2012, TW-4	0.205	0	0.44	0	0.17	0	0.16	0	0.155	0	0.22	0	0.125	0	0.125	0	0.23	0	
14	SI 2012, TW-5	0.51	1	0.44	0	0.18	0	0.17	0	0.165	0	0.235	0	0.125	0	0.125	0	7.8	1	
15	SI 2012, MW-1	0.41	0	0.9	0	0.17	0	0.16	0	0.155	0	0.22	0	0.12	0	0.12	0	0.46	0	
16	SI 2012, MW-2	0.41	0	0.9	0	0.18	0	0.17	0	0.165	0	0.235	0	0.13	0	0.13	0	0.46	0	
17	SI 2012, MW-3	0.41	0	0.9	0	0.18	0	0.17	0	0.165	0	0.235	0	0.13	0	0.13	0	0.46	0	
18	SI 2012, MW-4	0.41	0	0.9	0	0.185	0	0.175	0	0.17	0	0.24	0	0.135	0	0.135	0	0.46	0	
19	SI 2012, MW-5	0.41	0	0.9	0	0.19	0	0.175	0	0.17	0	0.245	0	0.125	0	0.125	0	0.46	0	
20	SI 2012, MW-6	0.41	0	0.9	0	0.17	0	0.16	0	0.155	0	0.22	0	0.125	0	0.125	0	0.46	0	

UCL Statistics for Data Sets with Non-Detects			
User Selected Options			
Date/Time of Computation	7/1/2014 5:16:56 PM		
From File	Groundwater Input.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Benzene			
General Statistics			
Total Number of Observations	19	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	16
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.51	Minimum Non-Detect	0.205
Maximum Detect	1.6	Maximum Non-Detect	0.41
Variance Detects	0.396	Percent Non-Detects	84.21%
Mean Detects	1.237	SD Detects	0.629
Median Detects	1.6	CV Detects	0.509
Skewness Detects	-1.732	Kurtosis Detects	N/A
Mean of Logged Detects	0.0889	SD of Logged Detects	0.66
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
Mean	0.368	Standard Error of Mean	0.12
SD	0.428	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.576	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.566	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.729	95% KM Chebyshev UCL	0.892
97.5% KM Chebyshev UCL	1.119	99% KM Chebyshev UCL	1.565
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	4.207	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.294	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	25.24	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
Gamma Kaplan-Meier (KM) Statistics			

k hat (KM)	0.739	nu hat (KM)	28.07
		Adjusted Level of Significance (β)	0.0369
Approximate Chi Square Value (28.07, α)	16.98	Adjusted Chi Square Value (28.07, β)	16.23
95% Gamma Approximate KM-UCL (use when n>=50)	0.608	95% Gamma Adjusted KM-UCL (use when n<50)	0.636

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.267	Mean in Log Scale	-2.532
SD in Original Scale	0.486	SD in Log Scale	1.607
95% t UCL (assumes normality of ROS data)	0.46	95% Percentile Bootstrap UCL	0.465
95% BCA Bootstrap UCL	0.517	95% Bootstrap t UCL	0.975
95% H-UCL (Log ROS)	1.118		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.32	95% H-UCL (KM -Log)	0.458
KM SD (logged)	0.647	95% Critical H Value (KM-Log)	2.161
KM Standard Error of Mean (logged)	0.182		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.314	Mean in Log Scale	-1.685
SD in Original Scale	0.463	SD in Log Scale	0.878
95% t UCL (Assumes normality)	0.498	95% H-Stat UCL	0.452

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.576	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Trichlorofluoromethane

General Statistics

Total Number of Observations	19	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	18
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Trichlorofluoromethane was not processed!

Benzo(a)anthracene

General Statistics

Total Number of Observations	17	Number of Distinct Observations	9
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	14
Number of Distinct Detects	3	Number of Distinct Non-Detects	6
Minimum Detect	0.44	Minimum Non-Detect	0.17
Maximum Detect	0.85	Maximum Non-Detect	0.22
Variance Detects	0.05	Percent Non-Detects	82.35%
Mean Detects	0.593	SD Detects	0.224
Median Detects	0.49	CV Detects	0.377
Skewness Detects	1.635	Kurtosis Detects	N/A
Mean of Logged Detects	-0.566	SD of Logged Detects	0.353

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.245	Standard Error of Mean	0.0531
SD	0.179	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.337	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.332	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.404	95% KM Chebyshev UCL	0.476
97.5% KM Chebyshev UCL	0.576	99% KM Chebyshev UCL	0.773

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	11.63	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.051	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	69.76	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.875	nu hat (KM)	63.76
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (63.76, α)	46.39	Adjusted Chi Square Value (63.76, β)	44.84
95% Gamma Approximate KM-UCL (use when n>=50)	0.336	95% Gamma Adjusted KM-UCL (use when n<50)	0.348

Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.869	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.329	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.186	Mean in Log Scale	-2.122
SD in Original Scale	0.215	SD in Log Scale	0.905
95% t UCL (assumes normality of ROS data)	0.277	95% Percentile Bootstrap UCL	0.273
95% BCA Bootstrap UCL	0.313	95% Bootstrap t UCL	0.341
95% H-UCL (Log ROS)	0.32		
UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed			
KM Mean (logged)	-1.559	95% H-UCL (KM -Log)	0.299
KM SD (logged)	0.476	95% Critical H Value (KM-Log)	2.011
KM Standard Error of Mean (logged)	0.141		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.179	Mean in Log Scale	-2.078
SD in Original Scale	0.213	SD in Log Scale	0.735
95% t UCL (Assumes normality)	0.27	95% H-Stat UCL	0.25
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.337	95% KM (Percentile Bootstrap) UCL	N/A
Warning: One or more Recommended UCL(s) not available!			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo(b)fluoranthene			
General Statistics			
Total Number of Observations	17	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	16
Number of Distinct Detects	1	Number of Distinct Non-Detects	5
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable Benzo(b)fluoranthene was not processed!			

Chrysene

General Statistics

Total Number of Observations	17	Number of Distinct Observations	8
		Number of Missing Observations	2
Number of Detects	3	Number of Non-Detects	14
Number of Distinct Detects	3	Number of Distinct Non-Detects	5
Minimum Detect	0.39	Minimum Non-Detect	0.155
Maximum Detect	0.77	Maximum Non-Detect	0.205
Variance Detects	0.0401	Percent Non-Detects	82.35%
Mean Detects	0.543	SD Detects	0.2
Median Detects	0.47	CV Detects	0.369
Skewness Detects	1.427	Kurtosis Detects	N/A
Mean of Logged Detects	-0.653	SD of Logged Detects	0.351

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.224	Standard Error of Mean	0.0485
SD	0.163	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.308	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.303	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.369	95% KM Chebyshev UCL	0.435
97.5% KM Chebyshev UCL	0.526	99% KM Chebyshev UCL	0.706

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	11.89	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0457	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	71.35	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.876	nu hat (KM)	63.78
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (63.78, α)	46.4	Adjusted Chi Square Value (63.78, β)	44.85
95% Gamma Approximate KM-UCL (use when n>=50)	0.307	95% Gamma Adjusted KM-UCL (use when n<50)	0.318

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**

5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.169	Mean in Log Scale	-2.24
SD in Original Scale	0.197	SD in Log Scale	0.934
95% t UCL (assumes normality of ROS data)	0.252	95% Percentile Bootstrap UCL	0.249
95% BCA Bootstrap UCL	0.282	95% Bootstrap t UCL	0.329
95% H-UCL (Log ROS)	0.3		
UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed			
KM Mean (logged)	-1.651	95% H-UCL (KM -Log)	0.274
KM SD (logged)	0.477	95% Critical H Value (KM-Log)	2.013
KM Standard Error of Mean (logged)	0.142		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.164	Mean in Log Scale	-2.168
SD in Original Scale	0.194	SD in Log Scale	0.737
95% t UCL (Assumes normality)	0.246	95% H-Stat UCL	0.229
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.308	95% KM (Percentile Bootstrap) UCL	N/A
Warning: One or more Recommended UCL(s) not available!			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Indeno(1,2,3-cd)pyrene			
General Statistics			
Total Number of Observations	17	Number of Distinct Observations	8
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	16
Number of Distinct Detects	1	Number of Distinct Non-Detects	7
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable Indeno(1,2,3-cd)pyrene was not processed!			
Aroclor 1254			

	A B C D E	F	G H I J K	L
313	General Statistics			
314	Total Number of Observations	17	Number of Distinct Observations	5
315			Number of Missing Observations	2
316	Number of Detects	1	Number of Non-Detects	16
317	Number of Distinct Detects	1	Number of Distinct Non-Detects	4
318				
319	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
320	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
321				
322	The data set for variable Aroclor 1254 was not processed!			
323				
324				
325	Aroclor 1260			
326				
327	General Statistics			
328	Total Number of Observations	17	Number of Distinct Observations	7
329			Number of Missing Observations	2
330	Number of Detects	3	Number of Non-Detects	14
331	Number of Distinct Detects	3	Number of Distinct Non-Detects	4
332	Minimum Detect	0.77	Minimum Non-Detect	0.12
333	Maximum Detect	13	Maximum Non-Detect	0.135
334	Variance Detects	48.94	Percent Non-Detects	82.35%
335	Mean Detects	4.923	SD Detects	6.996
336	Median Detects	1	CV Detects	1.421
337	Skewness Detects	1.73	Kurtosis Detects	N/A
338	Mean of Logged Detects	0.768	SD of Logged Detects	1.562
339				
340	Warning: Data set has only 3 Detected Values.			
341	This is not enough to compute meaningful or reliable statistics and estimates.			
342				
343				
344	Normal GOF Test on Detects Only			
345	Shapiro Wilk Test Statistic	0.764	Shapiro Wilk GOF Test	
346	5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
347	Lilliefors Test Statistic	0.379	Lilliefors GOF Test	
348	5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level	
349	Detected Data appear Approximate Normal at 5% Significance Level			
350				
351	Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
352	Mean	0.968	Standard Error of Mean	0.897
353	SD	3.018	95% KM (BCA) UCL	N/A
354	95% KM (t) UCL	2.533	95% KM (Percentile Bootstrap) UCL	N/A
355	95% KM (z) UCL	2.442	95% KM Bootstrap t UCL	N/A
356	90% KM Chebyshev UCL	3.657	95% KM Chebyshev UCL	4.876
357	97.5% KM Chebyshev UCL	6.567	99% KM Chebyshev UCL	9.889
358				
359	Gamma GOF Tests on Detected Observations Only			
360	Not Enough Data to Perform GOF Test			
361				
362	Gamma Statistics on Detected Data Only			
363	k hat (MLE)	0.728	k star (bias corrected MLE)	N/A
364	Theta hat (MLE)	6.766	Theta star (bias corrected MLE)	N/A

nu hat (MLE)	4.366	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.103	nu hat (KM)	3.494
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (3.49, α)	0.533	Adjusted Chi Square Value (3.49, β)	0.431
95% Gamma Approximate KM-UCL (use when n>=50)	6.346	95% Gamma Adjusted KM-UCL (use when n<50)	7.849

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.819	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.355	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.873	Mean in Log Scale	-6.003
SD in Original Scale	3.139	SD in Log Scale	4.083
95% t UCL (assumes normality of ROS data)	2.202	95% Percentile Bootstrap UCL	2.387
95% BCA Bootstrap UCL	3.244	95% Bootstrap t UCL	14.79
95% H-UCL (Log ROS)	55553		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.611	95% H-UCL (KM -Log)	1.065
KM SD (logged)	1.224	95% Critical H Value (KM-Log)	3.02
KM Standard Error of Mean (logged)	0.364		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.92	Mean in Log Scale	-2.155
SD in Original Scale	3.125	SD in Log Scale	1.501
95% t UCL (Assumes normality)	2.243	95% H-Stat UCL	1.321

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.533	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Trichloroethene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	17

Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.58	Minimum Non-Detect	0.23
Maximum Detect	7.8	Maximum Non-Detect	0.46
Variance Detects	26.06	Percent Non-Detects	89.47%
Mean Detects	4.19	SD Detects	5.105
Median Detects	4.19	CV Detects	1.218
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.755	SD of Logged Detects	1.838

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.647	Standard Error of Mean	0.548
SD	1.688	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.596	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.548	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.29	95% KM Chebyshev UCL	3.034
97.5% KM Chebyshev UCL	4.067	99% KM Chebyshev UCL	6.095

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.866	k star (bias corrected MLE)	N/A
Theta hat (MLE)	4.836	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.466	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.147	nu hat (KM)	5.581
		Adjusted Level of Significance (β)	0.0369
Approximate Chi Square Value (5.58, α)	1.43	Adjusted Chi Square Value (5.58, β)	1.256
95% Gamma Approximate KM-UCL (use when n>=50)	2.525	95% Gamma Adjusted KM-UCL (use when n<50)	2.875

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.442	Mean in Log Scale	-11.78
SD in Original Scale	1.787	SD in Log Scale	6.716
95% t UCL (assumes normality of ROS data)	1.152	95% Percentile Bootstrap UCL	1.233
95% BCA Bootstrap UCL	1.735	95% Bootstrap t UCL	445.6
95% H-UCL (Log ROS)	5.394E+13		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.58	Mean in Log Scale	-1.637

	A	B	C	D	E	F	G	H	I	J	K	L
469	SD in Original Scale					1.752	SD in Log Scale					1.001
470	95% t UCL (Assumes normality)					1.277	95% H-Stat UCL					0.595
471	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
472												
473	Nonparametric Distribution Free UCL Statistics											
474	**Data do not follow a Discernible Distribution at 5% Significance Level**											
475												
476	Suggested UCL to Use											
477	97.5% KM (Chebyshev) UCL					4.067						
478												
479	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
480	Recommendations are based upon data size, data distribution, and skewness.											
481	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
482	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
483												

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Sample	Acetone	D_Ac	Benzo(a)an	D_Be	Dibenzo(a,h	D_Dib	Chrysene	D_Chr	Benzo(b)flu	D_Be	Benzo(k)flu	D_Be	Benzo(a)pyr	D_Ben	Indeno(1,2,3	D_Inde	Aroclor 125	D_Aro	Aroclor 126	D_Ar
2	IRA EX North	0.044	1	0.0018	0	0.0012	0	0.00105	0	0.0048	1	0.0042	1	0.0025	0	0.00285	0	0.029	0	0.065	0
3	IRA Ex South	0.017	1	0.026	1	0.02	1	0.015	1	0.032	1	0.022	1	0.028	1	0.026	1	0.0305	0	0.065	0
4	IRA Ex East	0.017	1	0.00175	0	0.0012	0	0.001	0	0.00195	0	0.0011	0	0.00245	0	0.0028	0	0.0245	0	0.055	0
5	IRA Ex West	0.029	1	0.00175	0	0.0012	0	0.001	0	0.00195	0	0.0011	0	0.00245	0	0.0028	0	0.026	0	0.055	0
6	IRA Ex Floor	0.0024	0	0.32	1	0.047	1	0.29	1	0.29	1	0.17	1	0.27	1	0.13	1	0.07	1	0.055	0
7	RAR CS-1	NS		NS		NS		NS		NS		NS		NS		NS		0.33	1	0.0022	0
8	RAR CS-2	NS		NS		NS		NS		NS		NS		NS		NS		0.27	1	0.00215	0
9	RAR CS-3	NS		NS		NS		NS		NS		NS		NS		NS		0.17	1	0.0022	0
10	RAR CS-4	NS		NS		NS		NS		NS		NS		NS		NS		0.39	1	0.002	0
11	RAR CS-5	NS		NS		NS		NS		NS		NS		NS		NS		14	1	0.115	0
12	RAR CS-6	NS		NS		NS		NS		NS		NS		NS		NS		18	1	0.125	0
13	RAR CS-7	NS		NS		NS		NS		NS		NS		NS		NS		14	1	0.11	0
14	RAR CS-8	NS		NS		NS		NS		NS		NS		NS		NS		4.8	1	0.1	0
15	RAR CS-9	NS		NS		NS		NS		NS		NS		NS		NS		1.9	1	0.0105	0
16	RAR CS-10	NS		NS		NS		NS		NS		NS		NS		NS		0.33	1	0.00215	0
17	RAR CS-11	NS		NS		NS		NS		NS		NS		NS		NS		0.17	1	0.00225	0
18	RAR CS-12	NS		NS		NS		NS		NS		NS		NS		NS		0.022	1	0.0022	0
19	RAR CS-13	NS		NS		NS		NS		NS		NS		NS		NS		0.8	1	0.011	0
20	RAR CS-14	NS		NS		NS		NS		NS		NS		NS		NS		0.016	1	0.00225	0
21	RAR CS-15	NS		NS		NS		NS		NS		NS		NS		NS		0.007	1	0.00225	0
22	SI 2012, MW-5-4-6	0.029	0	NS		NS		NS		NS		NS		NS		NS		NS		NS	
23	SI 2012, MW-5-2-6	NS		0.00205	0	0.0014	0	0.0078	1	0.15	1	0.0098	1	0.11	1	0.00325	0	0.07	0	0.07	0
24	RI SP-22-2-4	0.00225	0	0.65	1	0.026	0	0.67	1	0.59	1	0.42	1	0.55	1	0.28	1	0.0255	0	0.055	0
25	RI SP-22-10-12	0.0071	1	0.11	1	0.014	1	0.1	1	0.091	1	0.064	1	0.09	1	0.032	1	0.028	0	0.06	0
26	RI SP-23-2-4	0.06	1	0.012	1	0.0013	0	0.011	1	0.016	1	0.013	1	0.013	1	0.00305	0	0.028	0	0.06	0
27	RI SP-23-6-8	0.022	1	0.00175	0	0.0012	0	0.001	0	0.011	1	0.011	1	0.0095	1	0.0028	0	0.026	0	0.06	0
28	RI SP-24-2-4	0.028	1	0.021	1	0.03	1	0.029	1	0.002	0	0.0011	0	0.00245	0	0.03	1	0.024	0	0.055	0
29	RI SP-24-8-10	0.0025	0	0.00175	0	0.0012	0	0.001	0	0.011	1	0.013	1	0.0024	0	0.00275	0	0.024	0	0.055	0
30	RI SP-25-2-4	0.0023	0	3.6	1	0.63	1	3.5	1	4.1	1	1.7	1	3.2	1	1.2	1	0.022	0	0.048	0
31	RI SP 25-6-8	0.00245	0	5.6	1	1.2	1	5.4	1	5.6	1	3.1	1	5.8	1	2.1	1	0.023	0	0.05	0
32	RI SP 26-1-3	0.027	1	0.014	1	0.0012	0	0.014	1	0.019	1	0.016	1	0.015	1	0.0093	1	0.0225	0	0.05	0
33	RI SP-26-6-8	0.0067	1	0.0017	0	0.0015	0	0.001	0	0.012	1	0.012	1	0.0099	1	0.0088	1	0.026	0	0.06	0
34	RI SP-27-2-4	0.0027	0	0.037	1	0.01	1	0.045	1	0.059	1	0.027	1	0.039	1	0.023	1	0.0285	0	0.065	0
35	RI SP-27-6-8	0.00255	0	0.00185	0	0.00125	0	0.00105	0	0.015	1	0.0091	1	0.00255	0	0.00295	0	0.0235	0	0.055	0
36	RI SP-28-1-3	0.0025	0	0.027	1	0.0012	0	0.025	1	0.04	1	0.019	1	0.026	1	0.016	1	0.0235	0	1.1	1
37	RI SP-28-6-8	0.0097	1	0.046	1	0.012	1	0.047	1	0.072	1	0.035	1	0.054	1	0.027	1	0.0255	0	0.055	0
38	RI SP-29-1-3	0.0073	1	1.7	1	0.065	0	2.3	1	3.5	1	1.7	1	2.9	1	1.4	1	0.027	0	0.32	1
39	RI SP-29-6-8	0.00245	0	0.21	1	0.029	1	0.2	1	0.21	1	0.11	1	0.16	1	0.086	1	0.0275	0	0.06	0
40	RI SP-30-1-3	0.012	1	0.26	1	0.00115	0	0.29	1	0.44	1	0.18	1	0.29	1	0.12	1	0.024	0	0.15	1
41	RI SP-30-10-12	0.00245	0	0.014	1	0.00115	0	0.017	1	0.018	1	0.016	1	0.015	1	0.01	1	0.0245	0	0.055	0

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
42	RI SP-31-1-3	0.00225	0	0.15	1	0.0013	0	0.14	1	0.19	1	0.082	1	0.13	1	0.056	1	0.0285	0	0.065	0
43	RI SP-31-8-10	0.00235	0	0.015	1	0.0011	0	0.014	1	0.02	1	0.015	1	0.015	1	0.01	1	0.022	0	0.049	0
44	RI SP-32-2-4	0.0028	0	0.097	1	0.02	1	0.11	1	0.14	1	0.064	1	0.098	1	0.045	1	0.0275	0	0.41	1
45	RI SP-32-8-10	0.03	1	0.011	1	0.00115	0	0.01	1	0.014	1	0.013	1	0.014	1	0.0027	0	0.023	0	0.05	0
46	RI SP-33-0-2	0.00235	0	0.33	1	0.011	0	0.38	1	0.74	1	0.36	1	0.49	1	0.21	1	0.027	0	0.94	1
47	RI SP-33-8-10	0.00245	0	0.0091	1	0.00115	0	0.0079	1	0.012	1	0.01	1	0.007	1	0.0076	1	0.022	0	0.049	0
48	RI SP-34-2-4	0.0029	0	0.066	1	0.013	1	0.078	1	0.081	1	0.04	1	0.059	1	0.038	1	0.029	0	0.065	0
49	RI SP-34-6-8	0.0067	1	0.015	1	0.0012	0	0.014	1	0.019	1	0.014	1	0.014	1	0.0029	0	0.0225	0	0.05	0
50	RI SP-35-1-3	0.00245	0	0.023	1	0.00115	0	0.024	1	0.046	1	0.024	1	0.03	1	0.017	1	0.0285	0	0.065	0
51	RI SP-35-6-8	0.0023	0	0.0089	1	0.0011	0	0.01	1	0.02	1	0.011	1	0.011	1	0.0074	1	0.024	0	0.055	0
52	RI SP-36-1-3	0.027	1	0.055	1	0.00115	0	0.062	1	0.097	1	0.043	1	0.063	1	0.03	1	0.0285	0	0.065	0
53	RI SP-36-8-10	0.017	1	0.0094	1	0.00105	0	0.0096	1	0.0088	1	0.0081	1	0.0073	1	0.0062	1	0.0225	0	0.0495	0
54	RI SP-37-1-3	0.019	1	0.95	1	0.064	1	0.94	1	1.2	1	0.62	1	0.92	1	0.27	1	0.0265	0	0.06	0
55	RI SP-37-4-6	0.029	1	0.013	1	0.0013	0	0.0097	1	0.018	1	0.016	1	0.011	1	0.009	1	0.0265	0	0.06	0
56	RI SP-41-1-3	NS		0.0018	0	0.00125	0	0.00105	0	0.00205	0	0.00115	0	0.00255	0	0.0029	0	0.0305	0	0.065	0
57	RI SP-41-6-8	NS		0.021	1	0.019	1	0.024	1	0.024	1	0.029	1	0.017	1	0.019	1	0.0285	0	0.065	0
58	RI SP-47-1-3	NS		NS		NS		NS		NS		NS		NS		NS		0.0275	0	0.06	0
59	RI SP-47-6-8	NS		NS		NS		NS		NS		NS		NS		NS		0.028	0	0.06	0
60	RI SP-50-1-3	NS		0.41	1	0.0065	0	0.39	1	0.42	1	0.28	1	0.38	1	0.23	1	0.028	0	0.06	0
61	RI SP-50-6-8	NS		0.14	1	0.006	0	0.12	1	0.15	1	0.089	1	0.13	1	0.093	1	0.0295	0	0.065	0
62	RI SP-51-1-3	NS		0.00175	0	0.0012	0	0.001	0	0.002	0	0.0011	0	0.00245	0	0.00285	0	0.029	0	0.065	0
63	RI SP-51-6-8	NS		0.0018	0	0.006	0	0.00105	0	0.00205	0	0.00115	0	0.00255	0	0.0029	0	0.03	0	0.065	0
64	SI 2010 SP-1-5-7	0.00713	1	0.02	1	0.0011	0	0.027	1	0.034	1	0.012	1	0.023	1	0.019	1	0.00195	0	0.0043	0
65	SI 2010 SP-2-6-8	0.00255	0	0.091	1	0.0012	0	0.094	1	0.11	1	0.039	1	0.085	1	0.038	1	0.00215	0	0.0047	0
66	SI 2010 SP-3-4-6	0.031	1	0.0019	0	0.0013	0	0.0011	0	0.00215	0	0.0012	0	0.002625	0	0.00305	0	0.00235	0	0.005	0
67	SI 2010 SP-4-2-4	0.038	1	0.0185	0	0.0125	0	0.0105	0	0.0205	0	0.0115	0	0.0255	0	0.0295	0	0.0022	0	0.00485	0
68	SI 2010 SP-5-2-4	0.07	1	0.024	0	0.0165	0	0.014	0	0.027	0	0.0155	0	0.0335	0	0.0385	0	0.0029	0	0.0065	0
69	SI 2010 SP 6-2-4	0.12	1	0.089	1	0.00135	0	0.078	1	0.12	1	0.037	1	0.085	1	0.04	1	0.00235	0	0.0055	0
70	SI 2010 SP-7-4-6	0.038	1	0.0018	0	0.00125	0	0.00105	0	0.002	0	0.00115	0	0.0025	0	0.0029	0	0.00225	0	0.029	1
71	SI 2010 SP-8-4-6	0.049	1	0.00175	0	0.0012	0	0.00105	0	0.002	0	0.00115	0	0.0025	0	0.00285	0	0.0021	0	0.00465	0
72	SI 2010 SP-9-2-4	0.1	1	0.00185	0	0.00125	0	0.00105	0	0.00205	0	0.00115	0	0.00255	0	0.00295	0	0.0022	0	0.0049	0
73	SI 2010 SP-10-2-4	0.045	1	0.0018	0	0.0012	0	0.00105	0	0.013	1	0.00115	0	0.0025	0	0.00285	0	0.00215	0	0.0048	0
74	SI 2010 SP-11-2-4	0.048	1	0.016	1	0.0013	0	0.0011	0	0.014	1	0.0012	0	0.0026	0	0.003	0	0.051	1	0.025	1
75	SI 2010 SP-12-6-10	0.044	1	0.018	1	0.00135	0	0.017	1	0.00225	0	0.00125	0	0.00275	0	0.00315	0	0.0024	0	0.0055	0
76	SI 2010 SP-13-0-2	0.01	1	0.96	1	0.055	0	0.69	1	1	1	0.055	0	0.96	1	0.135	0	1.7	1	0.84	1
77	SI 2010 SP-14-2-4	0.019	1	0.29	1	0.038	1	0.23	1	0.26	1	0.11	1	0.25	1	0.11	1	0.23	1	0.067	1
78	SI 2010 SP-15-0-4	0.019	1	0.0017	0	0.00115	0	0.001	0	0.0019	0	0.0011	0	0.00235	0	0.0027	0	0.0098	1	0.00455	0
79	SI 2010 SP-16-0-2	0.0029	0	0.1	0	0.07	0	0.06	0	0.11	0	0.115	0	0.14	0	0.16	0	1.4	1	1.6	1
80	SI 2010 SP-17-4-8	0.069	1	0.019	1	0.00125	0	0.00105	0	0.016	1	0.00115	0	0.015	1	0.0029	0	0.021	1	0.00485	0
81	SI 2010 SP-18-0-4	0.011	1	0.42	1	0.012	0	0.42	1	0.45	1	0.0115	0	0.39	1	0.21	1	1.8	1	0.76	1
82	SI 2010 SP-19-0-4	0.34	1	0.79	1	0.0145	0	0.69	1	0.74	1	0.0135	0	0.68	1	0.32	1	0.54	1	0.19	1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
83	SI 2010 SP 20-0-4	0.029	1	0.0155	0	0.0115	0	0.009	0	0.0175	0	0.01	0	0.022	0	0.025	0	0.065	1	0.04	1
84	SI 2010 SP-21-0-4	0.013	1	0.095	0	0.115	0	0.055	0	0.105	0	0.11	0	0.135	0	0.155	0	0.65	1	0.41	1
85	TP-1-0-4	0.0076	1	10	1	2.3	1	9.7	1	14	1	6.5	1	14	1	8.8	1	0.7	1	0.21	1

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	7/2/2014 1:18:19 PM
From File	Subsurface Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

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General Statistics

Total Number of Observations	60	Number of Distinct Observations	38
		Number of Missing Observations	24
Number of Detects	39	Number of Non-Detects	21
Number of Distinct Detects	28	Number of Distinct Non-Detects	11
Minimum Detect	0.0067	Minimum Non-Detect	0.00225
Maximum Detect	0.34	Maximum Non-Detect	0.029
Variance Detects	0.00309	Percent Non-Detects	35%
Mean Detects	0.0391	SD Detects	0.0555
Median Detects	0.027	CV Detects	1.422
Skewness Detects	4.484	Kurtosis Detects	23.53
Mean of Logged Detects	-3.696	SD of Logged Detects	0.89

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.522	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.939	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.28	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.142	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0263	Standard Error of Mean	0.00622
SD	0.0475	95% KM (BCA) UCL	0.0399
95% KM (t) UCL	0.0367	95% KM (Percentile Bootstrap) UCL	0.037
95% KM (z) UCL	0.0365	95% KM Bootstrap t UCL	0.0465
90% KM Chebyshev UCL	0.0449	95% KM Chebyshev UCL	0.0534
97.5% KM Chebyshev UCL	0.0651	99% KM Chebyshev UCL	0.0881

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.128	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.772	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.143	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.145	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.243	k star (bias corrected MLE)	1.165
Theta hat (MLE)	0.0314	Theta star (bias corrected MLE)	0.0335
nu hat (MLE)	96.99	nu star (bias corrected)	90.86
MLE Mean (bias corrected)	0.0391	MLE Sd (bias corrected)	0.0362

	A–E	F	G–K	L
53	**Gamma Kaplan-Meier (KM) Statistics**			
54	k hat (KM)	0.306	nu hat (KM)	36.69
55	Approximate Chi Square Value (36.69, α)	23.83	Adjusted Chi Square Value (36.69, β)	23.57
56	95% Gamma Approximate KM-UCL (use when n>=50)	0.0405	95% Gamma Adjusted KM-UCL (use when n<50)	0.0409
57				
58	**Gamma ROS Statistics using Imputed Non-Detects**			
59	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
60	GROS may not be used when kstar of detected data is small such as < 0.1			
61	For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
62	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
63	Minimum	0.0067	Mean	0.0289
64	Maximum	0.34	Median	0.0115
65	SD	0.0467	CV	1.617
66	k hat (MLE)	1.204	k star (bias corrected MLE)	1.155
67	Theta hat (MLE)	0.024	Theta star (bias corrected MLE)	0.025
68	nu hat (MLE)	144.4	nu star (bias corrected)	138.5
69	MLE Mean (bias corrected)	0.0289	MLE Sd (bias corrected)	0.0269
70			Adjusted Level of Significance (β)	0.046
71	Approximate Chi Square Value (138.54, α)	112.3	Adjusted Chi Square Value (138.54, β)	111.8
72	95% Gamma Approximate UCL (use when n>=50)	0.0356	95% Gamma Adjusted UCL (use when n<50)	0.0358
73				
74	**Lognormal GOF Test on Detected Observations Only**			
75	Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**	
76	5% Shapiro Wilk Critical Value	0.939	Detected Data appear Lognormal at 5% Significance Level	
77	Lilliefors Test Statistic	0.0761	**Lilliefors GOF Test**	
78	5% Lilliefors Critical Value	0.142	Detected Data appear Lognormal at 5% Significance Level	
79	**Detected Data appear Lognormal at 5% Significance Level**			
80				
81	**Lognormal ROS Statistics Using Imputed Non-Detects**			
82	Mean in Original Scale	0.0266	Mean in Log Scale	-4.404
83	SD in Original Scale	0.0478	SD in Log Scale	1.227
84	95% t UCL (assumes normality of ROS data)	0.0369	95% Percentile Bootstrap UCL	0.038
85	95% BCA Bootstrap UCL	0.0421	95% Bootstrap t UCL	0.0477
86	95% H-UCL (Log ROS)	0.0406		
87				
88	**UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed**			
89	KM Mean (logged)	-4.521	95% H-UCL (KM -Log)	0.0449
90	KM SD (logged)	1.339	95% Critical H Value (KM-Log)	2.993
91	KM Standard Error of Mean (logged)	0.176		
92				
93	**DL/2 Statistics**			
94	**DL/2 Normal**		**DL/2 Log-Transformed**	
95	Mean in Original Scale	0.026	Mean in Log Scale	-4.703
96	SD in Original Scale	0.0481	SD in Log Scale	1.589
97	95% t UCL (Assumes normality)	0.0364	95% H-Stat UCL	0.0636
98	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
99				
100	**Nonparametric Distribution Free UCL Statistics**			
101	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**			
102				
103	**Suggested UCL to Use**			
104	95% KM (Percentile Bootstrap) UCL	0.037	95% GROS Approximate Gamma UCL	0.0356

	A–E	F	G–K	L
105	95% Approximate Gamma KM-UCL	0.0405		
106				
107	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
108	Recommendations are based upon data size, data distribution, and skewness.			
109	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
110	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
111				
112	Benzo(a)anthracene			
113				
114	**General Statistics**			
115	Total Number of Observations	66	Number of Distinct Observations	52
116			Number of Missing Observations	18
117	Number of Detects	44	Number of Non-Detects	22
118	Number of Distinct Detects	41	Number of Distinct Non-Detects	11
119	Minimum Detect	0.0089	Minimum Non-Detect	0.0017
120	Maximum Detect	10	Maximum Non-Detect	0.1
121	Variance Detects	3.105	Percent Non-Detects	33.33%
122	Mean Detects	0.629	SD Detects	1.762
123	Median Detects	0.0605	CV Detects	2.801
124	Skewness Detects	4.306	Kurtosis Detects	20.09
125	Mean of Logged Detects	-2.44	SD of Logged Detects	1.899
126				
127	**Normal GOF Test on Detects Only**			
128	Shapiro Wilk Test Statistic	0.401	**Shapiro Wilk GOF Test**	
129	5% Shapiro Wilk Critical Value	0.944	Detected Data Not Normal at 5% Significance Level	
130	Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**	
131	5% Lilliefors Critical Value	0.134	Detected Data Not Normal at 5% Significance Level	
132	**Detected Data Not Normal at 5% Significance Level**			
133				
134	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
135	Mean	0.421	Standard Error of Mean	0.181
136	SD	1.453	95% KM (BCA) UCL	0.773
137	95% KM (t) UCL	0.723	95% KM (Percentile Bootstrap) UCL	0.765
138	95% KM (z) UCL	0.718	95% KM Bootstrap t UCL	1.228
139	90% KM Chebyshev UCL	0.963	95% KM Chebyshev UCL	1.209
140	97.5% KM Chebyshev UCL	1.55	99% KM Chebyshev UCL	2.22
141				
142	**Gamma GOF Tests on Detected Observations Only**			
143	A-D Test Statistic	3.542	**Anderson-Darling GOF Test**	
144	5% A-D Critical Value	0.851	Detected Data Not Gamma Distributed at 5% Significance Level	
145	K-S Test Statistic	0.193	**Kolmogrov-Smirnoff GOF**	
146	5% K-S Critical Value	0.144	Detected Data Not Gamma Distributed at 5% Significance Level	
147	**Detected Data Not Gamma Distributed at 5% Significance Level**			
148				
149	**Gamma Statistics on Detected Data Only**			
150	k hat (MLE)	0.341	k star (bias corrected MLE)	0.333
151	Theta hat (MLE)	1.842	Theta star (bias corrected MLE)	1.887
152	nu hat (MLE)	30.05	nu star (bias corrected)	29.34
153	MLE Mean (bias corrected)	0.629	MLE Sd (bias corrected)	1.09
154				
155	**Gamma Kaplan-Meier (KM) Statistics**			
156	k hat (KM)	0.0839	nu hat (KM)	11.07

Approximate Chi Square Value (11.07, α)	4.624	Adjusted Chi Square Value (11.07, β)	4.531
95% Gamma Approximate KM-UCL (use when n>=50)	1.008	95% Gamma Adjusted KM-UCL (use when n<50)	1.028
Gamma (KM) may not be used when k hat (KM) is < 0.1			
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			
For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.0089	Mean	0.423
Maximum	10	Median	0.017
SD	1.463	CV	3.461
k hat (MLE)	0.3	k star (bias corrected MLE)	0.296
Theta hat (MLE)	1.411	Theta star (bias corrected MLE)	1.427
nu hat (MLE)	39.56	nu star (bias corrected)	39.1
MLE Mean (bias corrected)	0.423	MLE Sd (bias corrected)	0.777
		Adjusted Level of Significance (β)	0.0464
Approximate Chi Square Value (39.10, α)	25.77	Adjusted Chi Square Value (39.10, β)	25.53
95% Gamma Approximate UCL (use when n>=50)	0.641	95% Gamma Adjusted UCL (use when n<50)	0.647
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.944	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.134	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.42	Mean in Log Scale	-3.804
SD in Original Scale	1.464	SD in Log Scale	2.549
95% t UCL (assumes normality of ROS data)	0.721	95% Percentile Bootstrap UCL	0.742
95% BCA Bootstrap UCL	0.891	95% Bootstrap t UCL	1.144
95% H-UCL (Log ROS)	1.581		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.422	Mean in Log Scale	-3.737
SD in Original Scale	1.463	SD in Log Scale	2.528
95% t UCL (Assumes normality)	0.722	95% H-Stat UCL	1.579
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	1.55		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

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General Statistics			
Total Number of Observations	66	Number of Distinct Observations	35
		Number of Missing Observations	18
Number of Detects	15	Number of Non-Detects	51
Number of Distinct Detects	14	Number of Distinct Non-Detects	22
Minimum Detect	0.01	Minimum Non-Detect	0.00105
Maximum Detect	2.3	Maximum Non-Detect	0.115
Variance Detects	0.416	Percent Non-Detects	77.27%
Mean Detects	0.296	SD Detects	0.645
Median Detects	0.029	CV Detects	2.175
Skewness Detects	2.638	Kurtosis Detects	6.95
Mean of Logged Detects	-3	SD of Logged Detects	1.743
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.521	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.441	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.229	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
Mean	0.0686	Standard Error of Mean	0.041
SD	0.322	95% KM (BCA) UCL	0.156
95% KM (t) UCL	0.137	95% KM (Percentile Bootstrap) UCL	0.138
95% KM (z) UCL	0.136	95% KM Bootstrap t UCL	0.29
90% KM Chebyshev UCL	0.192	95% KM Chebyshev UCL	0.247
97.5% KM Chebyshev UCL	0.325	99% KM Chebyshev UCL	0.476
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.264	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.82	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.37	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.238	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.373	k star (bias corrected MLE)	0.343
Theta hat (MLE)	0.794	Theta star (bias corrected MLE)	0.864
nu hat (MLE)	11.19	nu star (bias corrected)	10.29
MLE Mean (bias corrected)	0.296	MLE Sd (bias corrected)	0.506
Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.0454	nu hat (KM)	5.995
Approximate Chi Square Value (6.00, α)	1.637	Adjusted Chi Square Value (6.00, β)	1.588
95% Gamma Approximate KM-UCL (use when n>=50)	0.251	95% Gamma Adjusted KM-UCL (use when n<50)	0.259
Gamma (KM) may not be used when k hat (KM) is < 0.1			
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			

For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.0751
Maximum	2.3	Median	0.01
SD	0.323	CV	4.298
k hat (MLE)	0.399	k star (bias corrected MLE)	0.391
Theta hat (MLE)	0.188	Theta star (bias corrected MLE)	0.192
nu hat (MLE)	52.63	nu star (bias corrected)	51.57
MLE Mean (bias corrected)	0.0751	MLE Sd (bias corrected)	0.12
		Adjusted Level of Significance (β)	0.0464
Approximate Chi Square Value (51.57, α)	36.08	Adjusted Chi Square Value (51.57, β)	35.79
95% Gamma Approximate UCL (use when n>=50)	0.107	95% Gamma Adjusted UCL (use when n<50)	0.108
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.783	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.229	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0677	Mean in Log Scale	-7.468
SD in Original Scale	0.324	SD in Log Scale	2.958
95% t UCL (assumes normality of ROS data)	0.134	95% Percentile Bootstrap UCL	0.138
95% BCA Bootstrap UCL	0.18	95% Bootstrap t UCL	0.299
95% H-UCL (Log ROS)	0.18		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0709	Mean in Log Scale	-5.821
SD in Original Scale	0.324	SD in Log Scale	2.099
95% t UCL (Assumes normality)	0.137	95% H-Stat UCL	0.0599
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	0.247		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Chrysene			
General Statistics			
Total Number of Observations	66	Number of Distinct Observations	42
		Number of Missing Observations	18
Number of Detects	43	Number of Non-Detects	23
Number of Distinct Detects	35	Number of Distinct Non-Detects	8

Minimum Detect	0.0078	Minimum Non-Detect	0.001
Maximum Detect	9.7	Maximum Non-Detect	0.06
Variance Detects	3.015	Percent Non-Detects	34.85%
Mean Detects	0.634	SD Detects	1.736
Median Detects	0.078	CV Detects	2.74
Skewness Detects	4.176	Kurtosis Detects	18.99
Mean of Logged Detects	-2.434	SD of Logged Detects	1.925
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.412	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.943	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.371	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.135	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
Mean	0.414	Standard Error of Mean	0.177
SD	1.417	95% KM (BCA) UCL	0.767
95% KM (t) UCL	0.708	95% KM (Percentile Bootstrap) UCL	0.734
95% KM (z) UCL	0.704	95% KM Bootstrap t UCL	1.234
90% KM Chebyshev UCL	0.943	95% KM Chebyshev UCL	1.183
97.5% KM Chebyshev UCL	1.516	99% KM Chebyshev UCL	2.17
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.227	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.851	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.196	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.146	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.341	k star (bias corrected MLE)	0.333
Theta hat (MLE)	1.856	Theta star (bias corrected MLE)	1.902
nu hat (MLE)	29.36	nu star (bias corrected)	28.65
MLE Mean (bias corrected)	0.634	MLE Sd (bias corrected)	1.098
Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.0851	nu hat (KM)	11.24
Approximate Chi Square Value (11.24, α)	4.729	Adjusted Chi Square Value (11.24, β)	4.634
95% Gamma Approximate KM-UCL (use when n>=50)	0.983	95% Gamma Adjusted KM-UCL (use when n<50)	1.003
Gamma (KM) may not be used when k hat (KM) is < 0.1			
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			
For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.0078	Mean	0.416
Maximum	9.7	Median	0.0145
SD	1.428	CV	3.429
k hat (MLE)	0.298	k star (bias corrected MLE)	0.295
Theta hat (MLE)	1.396	Theta star (bias corrected MLE)	1.412

	A–E	F	G–K	L
365	nu hat (MLE)	39.37	nu star (bias corrected)	38.91
366	MLE Mean (bias corrected)	0.416	MLE Sd (bias corrected)	0.767
367			Adjusted Level of Significance (β)	0.0464
368	Approximate Chi Square Value (38.91, α)	25.63	Adjusted Chi Square Value (38.91, β)	25.38
369	95% Gamma Approximate UCL (use when n>=50)	0.632	95% Gamma Adjusted UCL (use when n<50)	0.638
370				
371	**Lognormal GOF Test on Detected Observations Only**			
372	Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
373	5% Shapiro Wilk Critical Value	0.943	Detected Data Not Lognormal at 5% Significance Level	
374	Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**	
375	5% Lilliefors Critical Value	0.135	Detected Data Not Lognormal at 5% Significance Level	
376	**Detected Data Not Lognormal at 5% Significance Level**			
377				
378	**Lognormal ROS Statistics Using Imputed Non-Detects**			
379	Mean in Original Scale	0.413	Mean in Log Scale	-3.973
380	SD in Original Scale	1.428	SD in Log Scale	2.707
381	95% t UCL (assumes normality of ROS data)	0.707	95% Percentile Bootstrap UCL	0.737
382	95% BCA Bootstrap UCL	0.88	95% Bootstrap t UCL	1.235
383	95% H-UCL (Log ROS)	2.275		
384				
385	**DL/2 Statistics**			
386	**DL/2 Normal**		**DL/2 Log-Transformed**	
387	Mean in Original Scale	0.414	Mean in Log Scale	-3.993
388	SD in Original Scale	1.428	SD in Log Scale	2.759
389	95% t UCL (Assumes normality)	0.707	95% H-Stat UCL	2.694
390	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
391				
392	**Nonparametric Distribution Free UCL Statistics**			
393	**Data do not follow a Discernible Distribution at 5% Significance Level**			
394				
395	**Suggested UCL to Use**			
396	97.5% KM (Chebyshev) UCL	1.516		
397				
398	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
399	Recommendations are based upon data size, data distribution, and skewness.			
400	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
401	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
402				
403	**Benzo(b)fluoranthene**			
404				
405	**General Statistics**			
406	Total Number of Observations	66	Number of Distinct Observations	50
407			Number of Missing Observations	18
408	Number of Detects	49	Number of Non-Detects	17
409	Number of Distinct Detects	40	Number of Distinct Non-Detects	11
410	Minimum Detect	0.0048	Minimum Non-Detect	0.0019
411	Maximum Detect	14	Maximum Non-Detect	0.11
412	Variance Detects	4.915	Percent Non-Detects	25.76%
413	Mean Detects	0.719	SD Detects	2.217
414	Median Detects	0.072	CV Detects	3.083
415	Skewness Detects	5	Kurtosis Detects	27.96
416	Mean of Logged Detects	-2.427	SD of Logged Detects	1.926

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.365	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.127	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.535	Standard Error of Mean	0.238
SD	1.916	95% KM (BCA) UCL	1.028
95% KM (t) UCL	0.933	95% KM (Percentile Bootstrap) UCL	0.943
95% KM (z) UCL	0.927	95% KM Bootstrap t UCL	1.554
90% KM Chebyshev UCL	1.25	95% KM Chebyshev UCL	1.574
97.5% KM Chebyshev UCL	2.024	99% KM Chebyshev UCL	2.906

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.198	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.856	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.214	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.137	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.325	k star (bias corrected MLE)	0.318
Theta hat (MLE)	2.216	Theta star (bias corrected MLE)	2.259
nu hat (MLE)	31.81	nu star (bias corrected)	31.19
MLE Mean (bias corrected)	0.719	MLE Sd (bias corrected)	1.275

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.078	nu hat (KM)	10.3
Approximate Chi Square Value (10.30, α)	4.13	Adjusted Chi Square Value (10.30, β)	4.043
95% Gamma Approximate KM-UCL (use when n>=50)	1.335	95% Gamma Adjusted KM-UCL (use when n<50)	1.364

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0048	Mean	0.536
Maximum	14	Median	0.0195
SD	1.931	CV	3.598
k hat (MLE)	0.293	k star (bias corrected MLE)	0.289
Theta hat (MLE)	1.833	Theta star (bias corrected MLE)	1.853
nu hat (MLE)	38.64	nu star (bias corrected)	38.21
MLE Mean (bias corrected)	0.536	MLE Sd (bias corrected)	0.997
		Adjusted Level of Significance (β)	0.0464
Approximate Chi Square Value (38.21, α)	25.06	Adjusted Chi Square Value (38.21, β)	24.82
95% Gamma Approximate UCL (use when n>=50)	0.818	95% Gamma Adjusted UCL (use when n<50)	0.826

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.147	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.127	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.535	Mean in Log Scale	-3.41
SD in Original Scale	1.931	SD in Log Scale	2.413
95% t UCL (assumes normality of ROS data)	0.931	95% Percentile Bootstrap UCL	0.99
95% BCA Bootstrap UCL	1.165	95% Bootstrap t UCL	1.537
95% H-UCL (Log ROS)	1.571		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.536	Mean in Log Scale	-3.351
SD in Original Scale	1.931	SD in Log Scale	2.403
95% t UCL (Assumes normality)	0.933	95% H-Stat UCL	1.619
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	2.024		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo(k)fluoranthene			
General Statistics			
Total Number of Observations	66	Number of Distinct Observations	43
		Number of Missing Observations	18
Number of Detects	43	Number of Non-Detects	23
Number of Distinct Detects	34	Number of Distinct Non-Detects	11
Minimum Detect	0.0042	Minimum Non-Detect	0.0011
Maximum Detect	6.5	Maximum Non-Detect	0.115
Variance Detects	1.251	Percent Non-Detects	34.85%
Mean Detects	0.374	SD Detects	1.118
Median Detects	0.029	CV Detects	2.993
Skewness Detects	4.526	Kurtosis Detects	22.6
Mean of Logged Detects	-2.995	SD of Logged Detects	1.761
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.378	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.943	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.383	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.135	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
Mean	0.245	Standard Error of Mean	0.113
SD	0.909	95% KM (BCA) UCL	0.428
95% KM (t) UCL	0.434	95% KM (Percentile Bootstrap) UCL	0.46
95% KM (z) UCL	0.431	95% KM Bootstrap t UCL	0.785
90% KM Chebyshev UCL	0.585	95% KM Chebyshev UCL	0.738
97.5% KM Chebyshev UCL	0.952	99% KM Chebyshev UCL	1.372
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	5.049	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.852	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.265	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.146	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.337	k star (bias corrected MLE)	0.329
Theta hat (MLE)	1.11	Theta star (bias corrected MLE)	1.137
nu hat (MLE)	28.94	nu star (bias corrected)	28.26
MLE Mean (bias corrected)	0.374	MLE Sd (bias corrected)	0.652
Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.0724	nu hat (KM)	9.561
Approximate Chi Square Value (9.56, α)	3.669	Adjusted Chi Square Value (9.56, β)	3.588
95% Gamma Approximate KM-UCL (use when n>=50)	0.638	95% Gamma Adjusted KM-UCL (use when n<50)	0.652
Gamma (KM) may not be used when k hat (KM) is < 0.1			
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			
For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.0042	Mean	0.247
Maximum	6.5	Median	0.013
SD	0.916	CV	3.709
k hat (MLE)	0.317	k star (bias corrected MLE)	0.312
Theta hat (MLE)	0.78	Theta star (bias corrected MLE)	0.79
nu hat (MLE)	41.81	nu star (bias corrected)	41.24
MLE Mean (bias corrected)	0.247	MLE Sd (bias corrected)	0.442
		Adjusted Level of Significance (β)	0.0464
Approximate Chi Square Value (41.24, α)	27.53	Adjusted Chi Square Value (41.24, β)	27.28
95% Gamma Approximate UCL (use when n>=50)	0.37	95% Gamma Adjusted UCL (use when n<50)	0.373
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.943	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.135	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			

573	Mean in Original Scale	0.244	Mean in Log Scale	-4.257
574	SD in Original Scale	0.916	SD in Log Scale	2.323
575	95% t UCL (assumes normality of ROS data)	0.432	95% Percentile Bootstrap UCL	0.445
576	95% BCA Bootstrap UCL	0.558	95% Bootstrap t UCL	0.733
577	95% H-UCL (Log ROS)	0.525		
578				
579	**DL/2 Statistics**			
580	**DL/2 Normal**		**DL/2 Log-Transformed**	
581	Mean in Original Scale	0.246	Mean in Log Scale	-4.176
582	SD in Original Scale	0.916	SD in Log Scale	2.355
583	95% t UCL (Assumes normality)	0.434	95% H-Stat UCL	0.622
584	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
585				
586	**Nonparametric Distribution Free UCL Statistics**			
587	**Data do not follow a Discernible Distribution at 5% Significance Level**			
588				
589	**Suggested UCL to Use**			
590	97.5% KM (Chebyshev) UCL	0.952		
591				
592	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
593	Recommendations are based upon data size, data distribution, and skewness.			
594	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
595	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
596				
597	Benzo(a)pyrene			
598				
599	**General Statistics**			
600	Total Number of Observations	66	Number of Distinct Observations	50
601			Number of Missing Observations	18
602	Number of Detects	44	Number of Non-Detects	22
603	Number of Distinct Detects	37	Number of Distinct Non-Detects	13
604	Minimum Detect	0.007	Minimum Non-Detect	0.00235
605	Maximum Detect	14	Maximum Non-Detect	0.14
606	Variance Detects	5.296	Percent Non-Detects	33.33%
607	Mean Detects	0.738	SD Detects	2.301
608	Median Detects	0.074	CV Detects	3.119
609	Skewness Detects	4.951	Kurtosis Detects	26.96
610	Mean of Logged Detects	-2.432	SD of Logged Detects	1.944
611				
612	**Normal GOF Test on Detects Only**			
613	Shapiro Wilk Test Statistic	0.359	**Shapiro Wilk GOF Test**	
614	5% Shapiro Wilk Critical Value	0.944	Detected Data Not Normal at 5% Significance Level	
615	Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**	
616	5% Lilliefors Critical Value	0.134	Detected Data Not Normal at 5% Significance Level	
617	**Detected Data Not Normal at 5% Significance Level**			
618				
619	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
620	Mean	0.494	Standard Error of Mean	0.235
621	SD	1.889	95% KM (BCA) UCL	0.953
622	95% KM (t) UCL	0.886	95% KM (Percentile Bootstrap) UCL	0.918
623	95% KM (z) UCL	0.881	95% KM Bootstrap t UCL	1.66
624	90% KM Chebyshev UCL	1.199	95% KM Chebyshev UCL	1.519

97.5% KM Chebyshev UCL	1.963	99% KM Chebyshev UCL	2.834
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.727	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.856	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.22	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.144	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.321	k star (bias corrected MLE)	0.314
Theta hat (MLE)	2.302	Theta star (bias corrected MLE)	2.351
nu hat (MLE)	28.21	nu star (bias corrected)	27.62
MLE Mean (bias corrected)	0.738	MLE Sd (bias corrected)	1.317
Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.0683	nu hat (KM)	9.01
Approximate Chi Square Value (9.01, α)	3.333	Adjusted Chi Square Value (9.01, β)	3.256
95% Gamma Approximate KM-UCL (use when n>=50)	1.334	95% Gamma Adjusted KM-UCL (use when n<50)	1.366
Gamma (KM) may not be used when k hat (KM) is < 0.1			
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			
For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.007	Mean	0.495
Maximum	14	Median	0.015
SD	1.904	CV	3.844
k hat (MLE)	0.284	k star (bias corrected MLE)	0.281
Theta hat (MLE)	1.746	Theta star (bias corrected MLE)	1.763
nu hat (MLE)	37.44	nu star (bias corrected)	37.07
MLE Mean (bias corrected)	0.495	MLE Sd (bias corrected)	0.934
		Adjusted Level of Significance (β)	0.0464
Approximate Chi Square Value (37.07, α)	24.13	Adjusted Chi Square Value (37.07, β)	23.9
95% Gamma Approximate UCL (use when n>=50)	0.761	95% Gamma Adjusted UCL (use when n<50)	0.768
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.944	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.119	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.134	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.493	Mean in Log Scale	-3.8
SD in Original Scale	1.904	SD in Log Scale	2.578
95% t UCL (assumes normality of ROS data)	0.884	95% Percentile Bootstrap UCL	0.903
95% BCA Bootstrap UCL	1.15	95% Bootstrap t UCL	1.773
95% H-UCL (Log ROS)	1.741		
UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed			

KM Mean (logged)	-3.556	95% H-UCL (KM -Log)	0.919
KM SD (logged)	2.272	95% Critical H Value (KM-Log)	3.162
KM Standard Error of Mean (logged)	0.286		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.495	Mean in Log Scale	-3.619
SD in Original Scale	1.904	SD in Log Scale	2.44
95% t UCL (Assumes normality)	0.886	95% H-Stat UCL	1.375

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	1.963

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	66	Number of Distinct Observations	49
		Number of Missing Observations	18
Number of Detects	38	Number of Non-Detects	28
Number of Distinct Detects	33	Number of Distinct Non-Detects	16
Minimum Detect	0.0062	Minimum Non-Detect	0.0027
Maximum Detect	8.8	Maximum Non-Detect	0.16
Variance Detects	2.133	Percent Non-Detects	42.42%
Mean Detects	0.423	SD Detects	1.46
Median Detects	0.038	CV Detects	3.451
Skewness Detects	5.424	Kurtosis Detects	31.22
Mean of Logged Detects	-2.833	SD of Logged Detects	1.738

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.31	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.938	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.246	Standard Error of Mean	0.139
SD	1.113	95% KM (BCA) UCL	0.507
95% KM (t) UCL	0.478	95% KM (Percentile Bootstrap) UCL	0.502
95% KM (z) UCL	0.474	95% KM Bootstrap t UCL	1.336
90% KM Chebyshev UCL	0.662	95% KM Chebyshev UCL	0.851
97.5% KM Chebyshev UCL	1.113	99% KM Chebyshev UCL	1.627

729	**Gamma GOF Tests on Detected Observations Only**			
730	A-D Test Statistic	3.918	**Anderson-Darling GOF Test**	
731	5% A-D Critical Value	0.848	Detected Data Not Gamma Distributed at 5% Significance Level	
732	K-S Test Statistic	0.232	**Kolmogrov-Smirnoff GOF**	
733	5% K-S Critical Value	0.155	Detected Data Not Gamma Distributed at 5% Significance Level	
734	**Detected Data Not Gamma Distributed at 5% Significance Level**			
735				
736	**Gamma Statistics on Detected Data Only**			
737	k hat (MLE)	0.342	k star (bias corrected MLE)	0.333
738	Theta hat (MLE)	1.237	Theta star (bias corrected MLE)	1.272
739	nu hat (MLE)	26	nu star (bias corrected)	25.28
740	MLE Mean (bias corrected)	0.423	MLE Sd (bias corrected)	0.734
741				
742	**Gamma Kaplan-Meier (KM) Statistics**			
743	k hat (KM)	0.0488	nu hat (KM)	6.447
744	Approximate Chi Square Value (6.45, α)	1.872	Adjusted Chi Square Value (6.45, β)	1.818
745	95% Gamma Approximate KM-UCL (use when n>=50)	0.847	95% Gamma Adjusted KM-UCL (use when n<50)	0.872
746	Gamma (KM) may not be used when k hat (KM) is < 0.1			
747				
748	**Gamma ROS Statistics using Imputed Non-Detects**			
749	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
750	GROS may not be used when kstar of detected data is small such as < 0.1			
751	For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
752	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
753	Minimum	0.0062	Mean	0.248
754	Maximum	8.8	Median	0.01
755	SD	1.121	CV	4.521
756	k hat (MLE)	0.313	k star (bias corrected MLE)	0.309
757	Theta hat (MLE)	0.793	Theta star (bias corrected MLE)	0.803
758	nu hat (MLE)	41.28	nu star (bias corrected)	40.74
759	MLE Mean (bias corrected)	0.248	MLE Sd (bias corrected)	0.446
760			Adjusted Level of Significance (β)	0.0464
761	Approximate Chi Square Value (40.74, α)	27.11	Adjusted Chi Square Value (40.74, β)	26.86
762	95% Gamma Approximate UCL (use when n>=50)	0.373	95% Gamma Adjusted UCL (use when n<50)	0.376
763				
764	**Lognormal GOF Test on Detected Observations Only**			
765	Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**	
766	5% Shapiro Wilk Critical Value	0.938	Detected Data Not Lognormal at 5% Significance Level	
767	Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**	
768	5% Lilliefors Critical Value	0.144	Detected Data appear Lognormal at 5% Significance Level	
769	**Detected Data appear Approximate Lognormal at 5% Significance Level**			
770				
771	**Lognormal ROS Statistics Using Imputed Non-Detects**			
772	Mean in Original Scale	0.245	Mean in Log Scale	-4.444
773	SD in Original Scale	1.122	SD in Log Scale	2.385
774	95% t UCL (assumes normality of ROS data)	0.475	95% Percentile Bootstrap UCL	0.503
775	95% BCA Bootstrap UCL	0.678	95% Bootstrap t UCL	1.26
776	95% H-UCL (Log ROS)	0.517		
777				
778	**UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed**			
779	KM Mean (logged)	-4.054	95% H-UCL (KM -Log)	0.252
780	KM SD (logged)	1.974	95% Critical H Value (KM-Log)	2.97

KM Standard Error of Mean (logged)	0.25		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.248	Mean in Log Scale	-4.118
SD in Original Scale	1.121	SD in Log Scale	2.185
95% t UCL (Assumes normality)	0.479	95% H-Stat UCL	0.414

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	1.113

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Aroclor 1254

General Statistics

Total Number of Observations	83	Number of Distinct Observations	48
		Number of Missing Observations	1
Number of Detects	27	Number of Non-Detects	56
Number of Distinct Detects	24	Number of Distinct Non-Detects	26
Minimum Detect	0.007	Minimum Non-Detect	0.00195
Maximum Detect	18	Maximum Non-Detect	0.07
Variance Detects	23.41	Percent Non-Detects	67.47%
Mean Detects	2.313	SD Detects	4.839
Median Detects	0.33	CV Detects	2.092
Skewness Detects	2.528	Kurtosis Detects	5.309
Mean of Logged Detects	-1.076	SD of Logged Detects	2.192

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.518	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.386	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.171	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.756	Standard Error of Mean	0.326
SD	2.916	95% KM (BCA) UCL	1.352
95% KM (t) UCL	1.298	95% KM (Percentile Bootstrap) UCL	1.31
95% KM (z) UCL	1.292	95% KM Bootstrap t UCL	1.706
90% KM Chebyshev UCL	1.734	95% KM Chebyshev UCL	2.178
97.5% KM Chebyshev UCL	2.793	99% KM Chebyshev UCL	4.001

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.202	**Anderson-Darling GOF Test**

5% A-D Critical Value	0.841	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.185	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.181	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.351	k star (bias corrected MLE)	0.337
Theta hat (MLE)	6.587	Theta star (bias corrected MLE)	6.867
nu hat (MLE)	18.96	nu star (bias corrected)	18.19
MLE Mean (bias corrected)	2.313	MLE Sd (bias corrected)	3.985
Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.0672	nu hat (KM)	11.15
Approximate Chi Square Value (11.15, α)	4.673	Adjusted Chi Square Value (11.15, β)	4.599
95% Gamma Approximate KM-UCL (use when n>=50)	1.803	95% Gamma Adjusted KM-UCL (use when n<50)	1.832
Gamma (KM) may not be used when k hat (KM) is < 0.1			
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			
For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.007	Mean	0.759
Maximum	18	Median	0.01
SD	2.933	CV	3.864
k hat (MLE)	0.227	k star (bias corrected MLE)	0.227
Theta hat (MLE)	3.347	Theta star (bias corrected MLE)	3.35
nu hat (MLE)	37.65	nu star (bias corrected)	37.62
MLE Mean (bias corrected)	0.759	MLE Sd (bias corrected)	1.595
		Adjusted Level of Significance (β)	0.0471
Approximate Chi Square Value (37.62, α)	24.58	Adjusted Chi Square Value (37.62, β)	24.39
95% Gamma Approximate UCL (use when n>=50)	1.162	95% Gamma Adjusted UCL (use when n<50)	1.171
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.923	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0796	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.171	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.754	Mean in Log Scale	-5.092
SD in Original Scale	2.934	SD in Log Scale	3.328
95% t UCL (assumes normality of ROS data)	1.29	95% Percentile Bootstrap UCL	1.345
95% BCA Bootstrap UCL	1.546	95% Bootstrap t UCL	2.413
95% H-UCL (Log ROS)	10.27		
UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed			
KM Mean (logged)	-4.241	95% H-UCL (KM -Log)	1.461
KM SD (logged)	2.615	95% Critical H Value (KM-Log)	4.163
KM Standard Error of Mean (logged)	0.327		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.76	Mean in Log Scale	-3.591
SD in Original Scale	2.933	SD in Log Scale	2.299
95% t UCL (Assumes normality)	1.295	95% H-Stat UCL	1.002

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	2.793

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Aroclor 1260

General Statistics

Total Number of Observations	83	Number of Distinct Observations	42
		Number of Missing Observations	1
Number of Detects	15	Number of Non-Detects	68
Number of Distinct Detects	14	Number of Distinct Non-Detects	28
Minimum Detect	0.025	Minimum Non-Detect	0.002
Maximum Detect	1.6	Maximum Non-Detect	0.125
Variance Detects	0.224	Percent Non-Detects	81.93%
Mean Detects	0.473	SD Detects	0.473
Median Detects	0.32	CV Detects	1.001
Skewness Detects	1.129	Kurtosis Detects	0.631
Mean of Logged Detects	-1.409	SD of Logged Detects	1.364

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.864	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.219	Lilliefors GOF Test
5% Lilliefors Critical Value	0.229	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.089	Standard Error of Mean	0.0302
SD	0.265	95% KM (BCA) UCL	0.141
95% KM (t) UCL	0.139	95% KM (Percentile Bootstrap) UCL	0.14
95% KM (z) UCL	0.139	95% KM Bootstrap t UCL	0.162
90% KM Chebyshev UCL	0.179	95% KM Chebyshev UCL	0.22
97.5% KM Chebyshev UCL	0.277	99% KM Chebyshev UCL	0.389

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.268	Anderson-Darling GOF Test
5% A-D Critical Value	0.768	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.13	Kolmogorov-Smirnoff GOF

	A–E	F	G–K	L
937	5% K-S Critical Value	0.229	Detected data appear Gamma Distributed at 5% Significance Level	
938	**Detected data appear Gamma Distributed at 5% Significance Level**			
939				
940	**Gamma Statistics on Detected Data Only**			
941	k hat (MLE)	0.887	k star (bias corrected MLE)	0.754
942	Theta hat (MLE)	0.533	Theta star (bias corrected MLE)	0.627
943	nu hat (MLE)	26.62	nu star (bias corrected)	22.63
944	MLE Mean (bias corrected)	0.473	MLE Sd (bias corrected)	0.544
945				
946	**Gamma Kaplan-Meier (KM) Statistics**			
947	k hat (KM)	0.113	nu hat (KM)	18.69
948	Approximate Chi Square Value (18.69, α)	9.891	Adjusted Chi Square Value (18.69, β)	9.777
949	95% Gamma Approximate KM-UCL (use when n>=50)	0.168	95% Gamma Adjusted KM-UCL (use when n<50)	0.17
950				
951	**Gamma ROS Statistics using Imputed Non-Detects**			
952	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
953	GROS may not be used when kstar of detected data is small such as < 0.1			
954	For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
955	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
956	Minimum	0.01	Mean	0.0936
957	Maximum	1.6	Median	0.01
958	SD	0.265	CV	2.832
959	k hat (MLE)	0.397	k star (bias corrected MLE)	0.391
960	Theta hat (MLE)	0.236	Theta star (bias corrected MLE)	0.24
961	nu hat (MLE)	65.92	nu star (bias corrected)	64.87
962	MLE Mean (bias corrected)	0.0936	MLE Sd (bias corrected)	0.15
963			Adjusted Level of Significance (β)	0.0471
964	Approximate Chi Square Value (64.87, α)	47.34	Adjusted Chi Square Value (64.87, β)	47.07
965	95% Gamma Approximate UCL (use when n>=50)	0.128	95% Gamma Adjusted UCL (use when n<50)	0.129
966				
967	**Lognormal GOF Test on Detected Observations Only**			
968	Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**	
969	5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
970	Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**	
971	5% Lilliefors Critical Value	0.229	Detected Data appear Lognormal at 5% Significance Level	
972	**Detected Data appear Lognormal at 5% Significance Level**			
973				
974	**Lognormal ROS Statistics Using Imputed Non-Detects**			
975	Mean in Original Scale	0.0892	Mean in Log Scale	-5.52
976	SD in Original Scale	0.267	SD in Log Scale	2.458
977	95% t UCL (assumes normality of ROS data)	0.138	95% Percentile Bootstrap UCL	0.142
978	95% BCA Bootstrap UCL	0.158	95% Bootstrap t UCL	0.163
979	95% H-UCL (Log ROS)	0.241		
980				
981	**UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed**			
982	KM Mean (logged)	-5.172	95% H-UCL (KM -Log)	0.0814
983	KM SD (logged)	1.97	95% Critical H Value (KM-Log)	3.328
984	KM Standard Error of Mean (logged)	0.255		
985				
986	**DL/2 Statistics**			
987	**DL/2 Normal**		**DL/2 Log-Transformed**	
988	Mean in Original Scale	0.103	Mean in Log Scale	-3.874

	A	B	C	D	E	F	G	H	I	J	K	L
989	SD in Original Scale					0.262	SD in Log Scale					1.788
990	95% t UCL (Assumes normality)					0.151	95% H-Stat UCL					0.19
991	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
992												
993	**Nonparametric Distribution Free UCL Statistics**											
994	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
995												
996	**Suggested UCL to Use**											
997	95% KM (t) UCL					0.139	95% KM (Percentile Bootstrap) UCL					0.14
998												
999	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1000	Recommendations are based upon data size, data distribution, and skewness.											
1001	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1002	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1003												

APPENDIX G

Vapor Intrusion Groundwater to Indoor Air Calculations

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^oC)	Tgw	13.52	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

	CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ
x	71-43-2	Benzene	1.6E+00	2.10E-01	1.3E-07	1.6E-03
x	79-01-6	Trichloroethylene	7.8E+00	1.77E+00	5.9E-07	2.0E-01

Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
7.80E-06	I	3.00E-02	I	
see note	I	2.00E-03	I	TCE

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected Value
Averaging time for carcinogens	(yrs)	ATc_R_GW	70	ATc_C_GW	70	ATc_GW	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_GW	26	ATnc_C_GW	25	Atnc_GW	25
Exposure duration	(yrs)	ED_R_GW	26	ED_C_GW	25	ED_GW	25
Exposure frequency	(days/yr)	EF_R_GW	350	EF_C_GW	250	EF_GW	250
Exposure time	(hr/day)	ET_R_GW	24	ET_C_GW	8	ET_GW	8

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected Value
Groundwater	(-)	AFgw_R_GW	0.001	AFgw_C_GW	0.001	AFgw_GW	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_GW	0.1	AFss_C_GW	0.1	AFss_GW	0.1

(3) **Formulas**
Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected Value
Trichloroethylene	mIURTCE_R_GW	1.00E-06	mIURTCE_C_GW	0.00E+00	mIURTCE_GW	0.00E+00
	IURTCE_R_GW	3.10E-06	IURTCE_C_GW	4.10E-06	IURTCE_GW	4.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 25 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:
I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user

OSWER VAPOR INTRUSION ASSESSMENT

Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.3.1, May 2014 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Commercial	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	13.52	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i

Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.

Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

APPENDIX H

ATSDR ToxFAQs™

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE

CAS # 71-43-2

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 1,000 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and other synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include emissions from volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

❏ Industrial processes are the main source of benzene in the environment.
❏ Benzene can pass into the air from water and soil.
❏ It reacts with other chemicals in the air and breaks down within a few days.
❏ Benzene in the air can attach to rain or snow and be carried back down to the ground.
❏ It breaks down more slowly in water and soil, and can pass through the soil into underground water.
❏ Benzene does not build up in plants or animals.

How might I be exposed to benzene?

❏ Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
❏ Vapors (or gases) from products that contain benzene, such as glues, paints, furniture wax, and detergents, can also be a source of exposure.
❏ Air around hazardous waste sites or gas stations will contain higher levels of benzene.
❏ Working in industries that make or use benzene.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries, but we do not know for certain that benzene caused the effects. It is not known whether benzene will affect fertility in men.

How likely is benzene to cause cancer?

Long-term exposure to high levels of benzene in the air can cause leukemia, particularly acute myelogenous leukemia, often referred to as AML. This is a cancer of the blood-forming organs. The Department of Health and Human Services (DHHS) has determined that benzene is a known carcinogen. The International Agency for Research on Cancer (IARC) and the EPA have determined that benzene is carcinogenic to humans.

How can benzene affect children?

Children can be affected by benzene exposure in the same ways as adults. It is not known if children are more susceptible to benzene poisoning than adults.

Benzene can pass from the mother's blood to a fetus. Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How can families reduce the risks of exposure to benzene?

Benzene exposure can be reduced by limiting contact with gasoline and cigarette smoke. Families are encouraged not to smoke in their house, in enclosed environments, or near their children.

Is there a medical test to determine whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is a test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood; however, since benzene disappears rapidly from the blood, this test is only useful for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. The metabolite S-phenylmercapturic acid in urine is a sensitive indicator of benzene exposure. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 5 parts benzene per billion parts of water (5 ppb).

The Occupational Safety and Health Administration (OSHA) has set limits of 1 part benzene per million parts of workplace air (1 ppm) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Benzene (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Agency for Toxic Substances and Disease Registry ToxFAQs **September 1996**

This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl′ĭ-sī′klĭk ăr′ə-măt′ĭk hī′drə-kar′bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.
- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smokehouses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their off-spring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in labora-tory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air (0.2 mg/m^3). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is 5 mg/m^3 averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed 0.1 mg/m^3 for a 10-hour workday, within a 40-hour workweek. There are other limits for work-place exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocar-bons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

POLYCHLORINATED BIPHENYLS

Division of Toxicology ToxFAQs™ **February 2001**

This fact sheet answers the most frequently asked health questions (FAQs) about polychlorinated biphenyls. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are polychlorinated biphenyls?

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

What happens to PCBs when they enter the environment?

❑ PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

❑ PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.

❑ PCBs do not readily break down in the environment and thus may remain there for very long periods of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

❑ PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.

How might I be exposed to PCBs?

❑ Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.

❑ Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.

❑ Breathing air near hazardous waste sites and drinking contaminated well water.

❑ In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.

How can PCBs affect my health?

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

How likely are PCBs to cause cancer?

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

How can PCBs affect children?

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

How can families reduce the risk of exposure to PCBs?

❏ You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

❏ Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.

❏ Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.

❏ If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

TRICHLOROETHYLENE

CAS # 79-01-6

Division of Toxicology ToxFAQs™ July 2003

This fact sheet answers the most frequently asked health questions (FAQs) about trichloroethylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Trichloroethylene is a colorless liquid which is used as a solvent for cleaning metal parts. Drinking or breathing high levels of trichloroethylene may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, and possibly death. Trichloroethylene has been found in at least 852 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is trichloroethylene?

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a somewhat sweet odor and a sweet, burning taste. It is used mainly as a solvent to remove grease from metal parts, but it is also an ingredient in adhesives, paint removers, typewriter correction fluids, and spot removers.

Trichloroethylene is not thought to occur naturally in the environment. However, it has been found in underground water sources and many surface waters as a result of the manufacture, use, and disposal of the chemical.

What happens to trichloroethylene when it enters the environment?

- Trichloroethylene dissolves a little in water, but it can remain in ground water for a long time.
- Trichloroethylene quickly evaporates from surface water, so it is commonly found as a vapor in the air.
- Trichloroethylene evaporates less easily from the soil than from surface water. It may stick to particles and remain for a long time.
- Trichloroethylene may stick to particles in water, which will cause it to eventually settle to the bottom sediment.
- Trichloroethylene does not build up significantly in plants and animals.

How might I be exposed to trichloroethylene?

- Breathing air in and around the home which has been contaminated with trichloroethylene vapors from shower water or household products such as spot removers and typewriter correction fluid.
- Drinking, swimming, or showering in water that has been contaminated with trichloroethylene.
- Contact with soil contaminated with trichloroethylene, such as near a hazardous waste site.
- Contact with the skin or breathing contaminated air while manufacturing trichloroethylene or using it at work to wash paint or grease from skin or equipment.

How can trichloroethylene affect my health?

Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating.

Breathing large amounts of trichloroethylene may cause impaired heart function, unconsciousness, and death. Breathing it for long periods may cause nerve, kidney, and liver damage.

Drinking large amounts of trichloroethylene may cause nausea, liver damage, unconsciousness, impaired heart function, or death.

Drinking small amounts of trichloroethylene for long periods may cause liver and kidney damage, impaired immune system function, and impaired fetal development in pregnant women, although the extent of some of these effects is not yet clear.

Skin contact with trichloroethylene for short periods may cause skin rashes.

How likely is trichloroethylene to cause cancer?

Some studies with mice and rats have suggested that high levels of trichloroethylene may cause liver, kidney, or lung cancer. Some studies of people exposed over long periods to high levels of trichloroethylene in drinking water or in workplace air have found evidence of increased cancer. Although, there are some concerns about the studies of people who were exposed to trichloroethylene, some of the effects found in people were similar to effects in animals.

In its 9th Report on Carcinogens, the National Toxicology Program (NTP) determined that trichloroethylene is "reasonably anticipated to be a human carcinogen." The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is "probably carcinogenic to humans."

Is there a medical test to show whether I've been exposed to trichloroethylene?

If you have recently been exposed to trichloroethylene, it can be detected in your breath, blood, or urine. The breath test, if it is performed soon after exposure, can tell if you have been exposed to even a small amount of trichloroethylene.

Exposure to larger amounts is assessed by blood and urine tests, which can detect trichloroethylene and many of its breakdown products for up to a week after exposure. However, exposure to other similar chemicals can produce the same breakdown products, so their detection is not absolute proof of exposure to trichloroethylene. This test isn't available at most doctors' offices, but can be done at special laboratories that have the right equipment.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level for trichloroethylene in drinking water at 0.005 milligrams per liter (0.005 mg/L) or 5 parts of TCE per billion parts water.

The EPA has also developed regulations for the handling and disposal of trichloroethylene.

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 100 parts of trichloroethylene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

Glossary

Carcinogenicity: The ability of a substance to cause cancer.
CAS: Chemical Abstracts Service.
Evaporate: To change into a vapor or gas.
Milligram (mg): One thousandth of a gram.
Nonflammable: Will not burn.
ppm: Parts per million.
Sediment: Mud and debris that have settled to the bottom of a body of water.
Solvent: A chemical that dissolves other substances.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Trichloroethylene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is http://www.atsdr.cdc.gov/toxfaq.html . ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

FINAL

No Further Action Record of Decision

Niagara Falls Armed Forces Reserve Center

9400 Porter Road

Niagara Falls, New York

February 2015

TABLE OF CONTENTS

FIGURES

ACRONYMS AND ABBREVIATIONS

AFRC	Armed Forces Reserve Center
AOC	Area of Concern
bgs	Below Ground Surface
BRAC	Base Realignment and Closure
CALEPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
Class GA	NYSDEC Class GA Groundwater Effluent Limitations
COC	Contaminant of Concern
CPC	Contaminant of Potential Concern
CSCO	Commercial Soil Cleanup Objective
CSF	Carcinogenic Slope Factor
DERP	Defense Environmental Restoration Program
DPW	Department of Public Works
EPA	Environmental Protection Agency
EPC	Exposure Point Concentration
HHRA	Human Health Risk Assessment
IRA	Interim Remedial Action
IRIS	USEPA Integrated Risk Information System IRIS
mg/kg	Milligrams per Kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
PARS	PARS Environmental, Inc.
PCB	Polychlorinated biphenyl
PID	Photoionization Detector

PP	Proposed Plan
PPRTVs	Provisional Peer Reviewed Toxicity Values
RfD	Reference Doses
RME	Reasonable Maximum Exposure
RI	Remedial Investigation
ROD	Record of Decision
RSC	Regional Support Command
RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOC	Semi-Volatile Organic Compound
TCL	Target Compound List
UCL	Upper Concentration Limit
μg/kg	Micrograms per Kilogram
μg/L	Micrograms per Liter
US	United States
USAR	United States Army Reserve
USCO	Unrestricted Soil Cleanup Objective
USEPA	United States Environmental Protection Agency
USEPA RAGS	USEPA Risk Assessment Guidance for Superfund
USGS	United States Geologic Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

SECTION 1 – DECLARATION

1.1 SITE NAME AND LOCATION

The Niagara Falls Armed Forces Reserve Center (AFRC) is located at 9400 Porter Road in Niagara Falls, New York, hereinafter the "Site." The property is owned by the United States (US) Army. A Site Location Map and Site Plan are included as Figures 1 and 2, respectively.

The Record of Decision (ROD) addresses environmental impacts in the vicinity of a cast iron fire protection main, 500,000-gallon reservoir, 24-inch corrugated metal storm sewer line located on the eastern boundary and the drainage swale located immediately south of the Site (Outfall No. 5). The areas of concern (AOCs) are depicted in Figure 3.

1.2 STATEMENT AND BASIS OF PURPOSE

This ROD selects No Further Action as the Selected Remedy for the AOCs on the southeastern portion of the Site. The AOCs include the former fire protection main, reservoir, corrugated metal storm sewer on the eastern boundary, and drainage swale south of the Site (Outfall No. 5).

The remedy was chosen in accordance with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This ROD is based on the conclusions presented in the *Final Remedial Investigation/Interim Remedial Action/Human Health Risk Assessment Report* prepared by PARS Environmental, Inc. (PARS) in December 2014.

New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. Executive Order 12580 delegates the President's decision-making authority to the Army with input and comments by the State, in accordance with CERCLA Sec. 121(f).

1.3 ASSESSMENT OF THE SITE

In 2008, product containing polychlorinated biphenyl (PCB) was observed discharging from a 6-inch diameter cast iron fire protection main into the 24-inch diameter corrugated storm sewer at Outfall No. 5 and then into the drainage swale at the southeast corner of the Site. PCB impacted soils were excavated from the drainage swale to below the NYSDEC maximum contaminant level of 1 milligram per kilogram (mg/kg). After further soil investigation in 2010 and 2011, an interim remedial action in the vicinity of the former excavation removed and disposed of soil from an approximately 10-foot (north-south) by 12-foot (east-west) area to a depth of approximately 5 feet. Approximately 2,000-gallons of perched groundwater was also removed from that excavation. No compounds were detected in the confirmatory samples at concentrations exceeding the applicable (Unrestricted Soil Cleanup Objectives (USCOs) and Commercial Soil Cleanup Objectives (CSCOs).

A total of seven permanent monitoring wells and six temporary well points were then installed as part of a supplemental (i.e., post-removal action) investigation. Benzene was detected in one groundwater sample from one temporary well and tetrachloroethene (TCE) was detected in one groundwater sample from a different temporary well, both at concentrations slightly above their respective Class GA criteria. No other chemicals were detected above Class GA criteria. Because these prior interim remedial actions removed contaminants that could have resulted in an unacceptable risk to foreseeable users of the Site, the selected remedy is protective of the public health, welfare, and the environment from actual or threatened releases of hazardous substances into the environment.

1.4 DESCRIPTION OF THE SELECTED REMEDY

The US Army, as the lead agency, has determined that No Further Action is the appropriate remedy for the AOCs. This determination is based on the findings of the corrected human health risk assessment (HHRA) that concluded that following the Interim Removal Action there were no remaining unacceptable risks from exposure to soil and groundwater for the commercial/industrial worker or construction worker, and Army's determination that residential use of the property is not reasonably anticipated.

The future reuse within the area of the Site where the AOCs are located includes a paved parking lot and commercial building. Residential use of the Site is not reasonably anticipated due to the close proximity to the airport runways, hangers, and taxiway as well as the adjacent light industrial zoning and the Town of Niagara Local Reuse Authority's future use for commercial/industrial purposes. A restriction prohibiting residential land use and groundwater use will be included in the deed transferring the Site.

1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that were applicable or relevant and appropriate to the remedial action, and is cost-effective.

The remedy in this OU does not satisfy the statutory preference for treatment as a principal element of the remedy because the interim remedial action was limited to only the removal of a few cubic yards of soil and several thousand gallons of collected water. On-site treatment could not have been economically conducted. To the extent necessary for disposal, treatment was conducted at the disposal facilities.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

1.6 ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for this site.

- Chemicals of concern and their respective concentrations.
- Baseline risk represented by the chemicals of concern.
- Cleanup levels established for chemicals of concern and the basis for these levels.
- How source materials constituting principal threats are addressed.

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and ROD.
- Potential land and ground-water use that will be available at the site as a result of the Selected Remedy
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.
- Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision).

1.7 AUTHORIZING SIGNATURE

The US Army, as the lead agency, has determined that No Further Action is appropriate for the AOCs. This remedy is protective of human health and the environment for the current and reasonably anticipated use of the Site.

Thomas E. Lederle   3 APRIL 2015

Thomas E. Lederle
Chief, Base Realignment and Closure Division

SECTION 2 – DECISION SUMMARY

2.1 SITE NAME, LOCATION AND DESCRIPTION

The Site is located at 9400 Porter Road in Niagara Falls, New York, hereinafter the "Site." The Site is an approximate 19.5 acre parcel located in the southern portion of Niagara Township, in Niagara Falls, Niagara County, New York. A Site Location Map is included as Figure 1.

The US Army is conducting response actions at the Site in accordance with the Defense Environmental Restoration Program (DERP), which requires that these activities be conducted in accordance with CERCLA and the NCP. Although the US Army is conducting activities at the Site in accordance with CERCLA, the Site is not included on the National Priorities List (NPL) nor has the U.S. Environmental Protection Agency (USEPA) included the Site in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS).

The Site is currently vacant and was formerly a national defense facility. Future land use for the Site is commercial/industrial. Residential use of the Site is not reasonably anticipated due to the close proximity to the airport.

Surface and storm water drainage is to Cayuga Creek located immediately west of the Site. Cayuga Creek is an intermittent tributary of the Niagara River. Storm sewer lines, drainage swales and outfalls are depicted in Figure 2.

The Site is bounded to the south by Porter Road and the property located immediately south of Porter Road is undeveloped forested land. Niagara Falls International Airport is adjacent to the north and east of the Site boundaries. Other properties in the vicinity of the Site are used primarily for commercial purposes.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The United States Government acquired the Site in 1955 and at that time the United States Navy used the Site to service helicopters and airplanes. Most of the buildings at the Site were constructed by 1956. The US Army obtained the Site from the Navy in 1962. From 1970 to 1975, the Site was used to service Nike Missiles from missile batteries around the State of New York.

The Site was most recently occupied by the 277th Quartermaster Company, the 865th Combat Support Hospital, the 1982nd Forward Surgical Unit and Area Maintenance Support Activity 76. A small presence was also maintained by personnel of the Department of Public Works (DPW), Fort Drum, New York (*Environmental Condition of Property Report*, CH2MHill, June 2007). No personnel or units have occupied the Site as of September 15, 2011 per Based Realignment and Closure (BRAC) law.

There has not been any CERCLA enforcement activity at this Site.

2.3 COMMUNITY PARTICIPATION

The US Army issued the Proposed Plan (PP) Report (PARS Environmental 2013c) to the community as part of its public participation responsibilities to inform the public of the US Army's preferred remedy and to solicit public comments pertaining to the remedial alternatives under Section 117(a) of CERCLA. The PP presented three alternatives, including the No Action Alternative.

Community members were invited to comment on the PP Report during the 30-day public comment period, which began on April 14, 2013 and concluded on May 14, 2013. No comments were received from the public.

There was no special effort to solicit the public's views about the future land use and the potential beneficial use of groundwater. It was clear from the alternatives presented in the PP that the HHRA did not consider residential use of the property and that the preferred remedy did not return groundwater to GA groundwater standards. The public commented on neither aspect. The public's view regarding land use can best be discerned from the Town of Niagara Local Redevelopment Authority selection of commercial/industrial use, approved by the Niagara Town Board, which was included in its Economic Development Conveyance Application submitted to the Office of Economic Adjustment and the Army Base Realignment and Closure Division. Selection of a non-residential use is particularly appropriate given the Site's airport location adjacent to taxiways, hangers, and runways.

This No Further Action ROD and the supporting Administrative Record files will be made available to the public when it is signed as final. The Administrative Record file will be available at the Niagara Falls Public Library, Earl W. Brydges Building, 1425 Main Street, Niagara Falls, NY, 14305.

2.4 SCOPE AND ROLE OF RESPONSE ACTION

Following the completion of several investigations and two remedial efforts to remove soil contaminated above the CSCOs, a Human Health Risk Assessment (HHRA) was performed to evaluate the remaining potential risks to human health from exposure to VOCs, SVOCs and PCBs in subsurface soils and groundwater under the reasonably anticipated land use. Prior to drafting the PP, the HHRA had calculated that a construction worker's total potential exposure to groundwater was slightly greater than the USEPA acceptable carcinogenic risk range of 1.0E-4 to 1.0E-6 provided that the worker engaged in an 8-hr per day excavation activity within the groundwater zone for a period of 180-days or longer. These exposure assumptions are highly conservative given the small size of the site. The HHRA revealed that there were no other unacceptable risks to commercial/industrial and construction workers. Risks to residents were not calculated because the property has no reasonably anticipated residential use.

Based on the above calculated risk to the construction worker, the preferred remedy in the PP was Implementation of a Site Management Plan (Alternative No. 2) requiring construction worker protection during excavation activities to achieve the remedial action objectives of reducing or eliminating inhalation of volatiles and dermal contact with groundwater.

Following receipt of public comments on the PP, a review of the HHRA revealed an error in the human health risk calculations. An incorrect Averaging Time of one year had been used. Correcting the Averaging Time to the EPA risk assessment guidance required 70 years resulted in no unacceptable risk to the construction worker. As a result, Army determined that the remedial action objectives for the Site are achieved without further remedial action and selects Alternative No. 1, No Action as the remedy for the AOCs. The residual contamination from the releases of hazardous substances at the Site does not present an imminent or substantial endangerment to public health, welfare or the environment.

2.5 SITE CHARACTERISTICS

This section briefly summarizes the topography, geology, hydrogeology and nature and extent of contamination at the Site.

2.5.1 Overview

The Site is located on the US Geologic Survey (USGS) 7.5-minute Tonawanda West topographic map. Topography at the Site is relatively flat with a slight gradient to the west/southwest and the elevation is approximately 575 feet above mean sea level. A Site Location Map is included as Figure 1.

The Site is located within the Niagara Watershed. Surface and storm water drainage is to Cayuga Creek located immediately west of the Site. Cayuga Creek is an intermittent tributary of the Niagara River. A Site Plan is included as Figure 2.

The investigation and remediation activities addresses environmental impacts in the vicinity of a cast iron fire protection main, 500,000-gallon reservoir, 24-inch corrugated metal storm sewer line located on the eastern boundary and drainage swale south of the Site (Outfall No. 5). Investigation and remediation activities also addresses six former underground storage tanks (USTs) and former fueling area adjacent to former Building 2. The AOC locations are depicted in Figure 3.

2.5.2 Geology

The Site is located in the Erie-Ontario Lowlands Physiographic Province. The region is characterized by relatively flat topography and dissected by east-west trending escarpments. The Site is located about 5 miles south of the Niagara Escarpment (*Environmental Condition of Property Report*, CH2MHill, June 2007).

The Niagara Falls area is underlain by glacial sediment consisting mainly of till and lacustrine silt and clay, which is approximately 5 to 80 feet thick. The glacial deposits overlay weathered dolomite and limestone of the Lockport Group (Niagaran Series of Middle Silurian age). The Lockport Group is underlain by approximately 100 feet of shale and limestone (Clinton Group), which is underlain by 110 feet of sandstone and shale (Medina Group).

Soils encountered during the site inspection and remedial investigation consisted of non-cohesive fill from 0 to 4 feet below ground surface (bgs). Fill material at some probe locations extended from 8 to 13 feet bgs. The fill material encountered was comprised of a coarse-grained mixture of sand and gravel with varying amounts of fine-grained silt and clay. Varying amounts of brick, slag, concrete, rebar, asphalt and wood were observed within this matrix. Native surficial soils are comprised of silty clay with trace fine sand. Bedrock was not encountered during the investigation and probes were not advanced beyond 13 feet bgs.

2.5.3 Hydrogeology

The Site is underlain by the Lakemont silty clay loam and the Fonda mucky silt loam. Both soil types are fine-to moderately fine-textured and have a low permeability. These soils are subject to ponding and the water table in the vicinity of the Site is at a depth of less than 4 feet bgs (*Environmental Condition of Property Report*, CH2MHill, June 2007).

The glacial deposits at the Site act as a confining unit for the weathered bedrock below. The hydraulic properties in the Lockport dolomite and limestone are related to secondary porosity and permeability owing to the presence of factures and solutioning. The main water-bearing zones in the Lockport Group are the weathered bedrock surface and horizontal fracture zones near stratigraphic contacts. The rock matrix transmits negligible amounts of groundwater because primary porosity is very low. The horizontal hydraulic conductivity of the weathered bedrock is estimated at 40 feet per day.

Investigation of groundwater at the Site was limited to a perched water zone underlying the Site. The perched water zone was encountered at depths ranging from 2 to 6 feet bgs. It is likely that the coarse-grained fill material overlying the less-permeable native fine-grained clay is creating the perched water conditions at the Site.

2.5.4 Remedial Activities

In 2008, a yellow substance was observed discharging from the 24-inch diameter corrugated storm sewer at outfall (Outfall No. 5) into the drainage swale at the southeast corner of the Site (*See,* Figure 3). An investigation was performed by United States Army Reserve (USAR). Product was also observed discharging from a 6-inch diameter cast iron fire protection main into the 24-inch diameter corrugated storm sewer. A sample of the product was collected and analyzed. Polychlorinated biphenyls (PCBs) were detected in the sample at a concentration of 2.1 mg/kg (Aroclor 1254). NYSDEC was notified and Spill # 0803478 was assigned for the discharge.

2.5.4.1 Investigation/Remediation of Drainage Swale and Storm Sewer

An investigation of the outfall and drainage swale was performed between October 2008 and August 2009. Maps related to the investigation and remediation of the drainage swale and Outfall No. 5 are included as Figures 4 through 6. Aroclor 1254 was detected in the soil samples collected from the drainage swale at concentrations ranging from non-detect to 1,060 mg/kg. Additionally, Aroclor 1260 was detected in one soil sample at a concentration of 2.98 mg/kg. The findings of the investigation are outlined in the *Final Remedial Action Report* (PARS, March 2010).

In September 2009, approximately 134 tons of PCB impacted soils were excavated from the drainage swale. PCB concentrations in the post-excavation soil samples at Outfall No. 5 and from the drainage swale were below the maximum contaminant level of 1 milligram per kilogram (mg/kg) that was established by NYSDEC (*See,* Figures 5 & 6). The 24-inch diameter storm sewer was also cleaned as part of the remedial action. Investigation and remediation activities are outlined in the *Final Remedial Action Report* (PARS, March 2010).

2.5.4.2 Site Inspection

In November and December 2010, a site inspection was performed to evaluate potential impacts associated with the former USTs at former Building 2 and the fire protection main. Inspection activities consisted of a geophysical survey, exploratory excavations and soil and water sampling. Soil probe and test pit locations are shown on Figure 7. The geophysical survey identified an approximate 150-foot long linear anomaly in the vicinity of the fire protection main that terminates at the 24-inch diameter corrugated storm sewer line.

Twelve exploratory excavations were completed based on the findings of the geophysical survey. The 6-inch diameter cast iron fire protection water main was encountered in five exploratory excavations (TP-2, TP-3, TP-4, TP-11 and TP-12). At TP-11, the 6-inch diameter pipe terminated at a concrete catch basin presumed to be the 500,000-gallon reservoir drain. A sample was collected from the water flowing from the 6-inch diameter line into the concrete catch basin. Elevated concentrations of toluene, naphthalene, PCBs and chromium were detected in the water sample.

Petroleum product and a heavy sheen were observed within the fill material and on the groundwater surface in one of the exploratory excavations (TP-12). Several compounds, including PCBs, were detected in a water sample collected from TP-12 at concentrations exceeding the NYSDEC Class GA Objectives. A drum vacuum was used to remove petroleum impacted water from the excavation.

A soil sample was collected from one of the exploratory excavations (TP-1) and several semi-volatile organic compounds (SVOCs) were detected at concentrations exceeding the NYSDEC Unrestricted Use Soil Cleanup Objectives (USCO) and Commercial Use Soil Cleanup Objectives (CSCO).

Twenty-one soil probes were completed as part of the site inspection. One soil sample was collected from each probe for laboratory analysis. Acetone, metals and PCBs were detected in several samples at concentrations exceeding the USCO. Several metals were detected at concentrations exceeding the CSCO. NYSDEC concluded that fill material may be the cause of the elevated concentrations for certain metals in the soil, which should nullify any concerns for high metal content in the soils. The fill material contains some slag and iron blast slag and open hearth slag from the production of carbon steel is commonly found throughout western New York.

The findings of the Site Inspection are outlined in the *Final Site Inspection Report* (PARS, June 2011).

2.5.4.3 Remedial Investigation

In September 2011, a remedial investigation of soil and groundwater was performed in the vicinity of the six former USTs, the former vehicle fueling area and the cast iron fire protection main that discharges to a 24-inch corrugated metal storm sewer line on the eastern boundary of the Site. As part of this work, 30 soil probes (16 primary and 14 secondary) and nine boreholes were completed to collect soil samples and temporary open-hole 1-inch wells were installed in each borehole to collect groundwater samples. Sample locations are depicted in Figure 8.

Two soil samples were collected for laboratory analysis from each of the probes. Soil samples collected from the primary locations were submitted for target compound list (TCL) volatile organic compounds (VOCs), SVOCs and PCBs analysis. Secondary soil samples were analyzed at select locations based on the results of the primary samples.

Acetone was detected in soil sample SP-23-2-4 at a concentration of 60 micrograms per kilogram (μg/kg), slightly exceeding the USCO for the compound of 50 μg/kg. Acetone is a common laboratory contaminant and is not considered a contaminant of concern at the Site. All other detected VOCs were at concentrations below their respective USCO and CSCO.

Six SVOCs were detected at concentrations exceeding their respective USCO in soil sample SP-29-1-3. Benzo(a)pyrene was also detected at a concentration exceeding the CSCO in this sample. Benzo(b)fluoranthene was detected at a concentration exceeding the USCO in soil sample SP-37-1-3. SVOCs were not detected in any other samples at concentrations exceeding their respective USCO or CSCO.

Total PCB concentrations exceeding the USCO were identified in five samples (SP-28-1-3, SP-29-1-3, SP-30-1-3, SP-32-2-4 and SP-33-0-2). The concentration of PCBs detected at SP-28-1-3 also exceeded the CSCO of 1,000 μg/kg. PCBs were not detected in the remaining samples at concentrations exceeding the USCO or CSCO.

At the request of NYSDEC, a surface soil sample was collected at Outfall 4, immediately below the vegetative cover within the drainage swale along Porter Road. The sample was analyzed for TCL VOCs, TCL SVOCs and PCBs. Nine SVOCs were detected at concentrations exceeding the respective USCO and five SVOCs were detected at concentrations exceeding the respective CSCO. The SVOCs detected in the sample from the drainage swale are commonly found in ditches that receive storm water runoff from asphalt paved surfaces. Based on maps of the storm water drainage system, discharge to Outfall No. 4 is only from runoff from parking areas.

Total PCBs were detected in the outfall sample at a concentration of 210 μg/kg. This concentration exceeded the USCO for the compound of 100 μg/kg, but not the CSCO of 1,000 μg/kg, which was the cleanup objective established by NYSDEC for the previous remediation of the drainage swale.

On September 26 and 27, 2011, nine temporary well points were installed in the open probe-holes at SP-22, 25, 30, 32, 34, 36, 42, 46 and 49. Eight groundwater samples were collected and analyzed for TCL VOCs, SVOCs, and PCBs. Samples collected at SP-42 and SP-49 were not analyzed for SVOCs and PCBs due to insufficient groundwater recharge.

Benzene was detected in the groundwater sample at SP-49 and trichlorofluoromethane was detected in the groundwater sample at SP-22 at concentrations slightly exceeding the respective Class GA criteria. No other VOCs were detected in the groundwater samples at concentrations exceeding the respective Class GA criteria.

Four SVOCs were detected in the groundwater samples at concentrations exceeding the respective Class GA criteria at three locations (SP-22, SP-25 and SP-34). These compounds are benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

Total PCBs were detected in groundwater samples from locations SP-30, SP-32 and SP-36 at concentrations exceeding the Class GA Criteria for the compound of 0.09 µg/L. PCB concentrations in these three samples were 0.77 µg/L (SP-30), 3 µg/L (SP-32), and 13 µg/L (SP-36). These exceedances are most likely the result of turbid water samples from the temporary well points. PCBs were not detected in the other groundwater samples at concentrations above the laboratory method detection limits.

The findings of the remedial investigation are outlined in the *Final Remedial Investigation/Interim Remedial Action/Human Health Risk Assessment Report* (PARS, December 2014).

2.5.4.4 Interim Remedial Action

An interim remedial action (IRA) was performed on September 29, 2011. The IRA included excavation of an approximately 10-foot (north-south) by 12-foot (east-west) area to a depth of approximately 5 feet bgs in the vicinity of the former exploratory excavation, TP-12. Excavation boundaries and confirmatory soil sample locations are depicted on Figure 9. Approximately 40 tons of soil was removed from the excavation and transported off-site for proper disposal.

During soil excavation activities, perched groundwater was observed at approximately two feet bgs. Perched groundwater exhibiting sheen was pumped from the excavation using a vacuum truck. Approximately 2,000-gallons of groundwater was removed from the excavation and transported off-site for proper disposal.

At the completion of soil removal activities, an approximate 8-foot long section of the 6-inch diameter cast iron fire protection main was removed from within the limits of the excavation. The open ends of the pipe were fitted with a Fernco and PVC cap prior to backfilling.

Five confirmatory soil samples were collected from the excavation. The confirmatory soil samples were analyzed for TCL VOCs, TCL SVOCs and PCBs. No compounds were detected in the confirmatory samples at concentrations exceeding the applicable USCOs and CSCOs.

The findings of the remedial investigation are outlined in the *Final Remedial Investigation/ Interim Remedial Action/Human Health Risk Assessment Report* (PARS, December 2014).

2.5.4.5 Supplemental Investigation

A supplemental investigation was performed in November 2012 to further evaluate the horizontal extent of groundwater impacts on the eastern portion of the Site. A total seven permanent monitoring wells and six temporary well points were installed as part of the investigation. Permanent and temporary wells locations and sample results are depicted in Figure 10. During drilling activities, soils were continuously logged and screened with a photoionization detector (PID). Based on PID readings, two soil samples were collected from the location of MW-5 and submitted the laboratory for TCL VOC, TCL SVOC and PCB analysis. No compounds were detected in the two soil samples at concentrations above the applicable USCO or CSCO.

Groundwater samples were collected from the six temporary well points on November 7 and 8, 2012 and from the seven permanent monitoring wells on November 19 and 20, 2012. Two of the permanent wells and one temporary well were dry. Groundwater samples were submitted to the laboratory for TCL VOC, TCL SVOC and PCB analysis. Benzene was detected in the perched groundwater sample from TW-1 and tetrachloroethene (TCE) was detected in the sample from TW-5 at concentrations slightly above their respective Class GA criteria. TW-1 did not have a sand filter pack or bentonite seal. No other compounds were detected above the Class GA criteria.

The findings are outlined in the *Final Supplemental Investigation Report* (PARS, March 2013).

2.5.4.6 Human Health Risk Assessment

Based on the findings of the investigation and remediation activities, a HHRA was performed by for the Site. The objective of the HHRA was to evaluate potential risks to human health under current and reasonably anticipated land use. The risk assessment was completed in accordance with the regulations and guidelines set forth by the USEPA and the United States Army Corps of Engineers (USACE). Based on the HHRA it was determined that under current or future conditions, the commercial/industrial and construction worker exposures to the individual soil and groundwater pathways do not pose an unacceptable risk.

Residential use of the Site is not reasonably anticipated due to the close proximity to the airport taxiways, hangers, and runways. Therefore, residential was not considered as part of the risk assessment for potential exposure to soil and groundwater.

The findings of the risk assessment are outlined in the *Final Remedial Investigation/Interim Remedial Action/Human Health Risk Assessment Report* (PARS, December 2014).

2.6 CURRENT AND POTENTIAL FUTURE LAND USE

2.6.1 Land Use

The Site is currently vacant. There is a collection of buildings on the property, including a former Army reserve center, various buildings and shops, and a large aircraft hanger that includes service areas. The property is almost completely paved. The Site will be transferred to the Town of Niagara for commercial/industrial use through an Economic Development Conveyance. The intended future land uses within the site addressed by this ROD include a paved parking lot and commercial building.

There is no reasonably anticipated residential use of the Site due to its locations between the ends of Runway 6 and Runway 10R. The property itself is bounded by airport hangers and taxiways to the north and east, Porter Road to the south, and woods and retail commercial property to the west. The area of the property addressed by this ROD is nearly or partly within the Runway Safety Area of Runway 6.

The immediate area surrounding the Site is zoned by the Town of Niagara as Light Industrial and following conveyance the Site will be subject to local codes including the *Town of Niagara Zoning Ordinance*.[1] The draft airport master plan concludes that non-compatible residential structures, a mobile home park, and a hotel already exist in the vicinity of Runways 6 and 10R on the opposite side of Porter Road.[2] There is no basis to conclude that the zoning authority would allow the residential use of property in the vicinity of Runways 6 and 10R that is located

[1] MRB Group, *U.S. Army Reserve Center Redevelopment Plan*, 11 (February 2008).
[2] McFarland Johnson, *Draft Sustainable Airport Master Plan*, 3-16 (2014).

on the same side of Porter Road as the runways that conflicts with the existing zoning. Based on the Site location and Army BRAC policy when transferring commercial property under an Economic Development Conveyance, a restriction prohibiting residential use will be included in the deed transferring the property.

2.6.2 Groundwater Use

The shallow perched groundwater is not used for drinking water. Because the property is within the service area of the Niagara Falls Water Board, there is no future potable groundwater use. Additionally, the shallow nature, low production, and the groundwater's location adjacent to an airport make its use more than inadvisable. It is unlikely that an attempt to use the shallow groundwater could meet the location and construction standards for a groundwater well permit set forth in Subpart 5-2 and Appendix 5B of Title 10 of the Rules and Regulations of the State of New York. These regulations would also require that Niagara County Health Department grant a shallow well variance because the well would be shallower than 19 feet. A restriction prohibiting groundwater use will be included in the deed transferring the property.

2.7 SUMMARY OF SITE RISKS

The risk assessment estimates what potential risks that the AOCs pose if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed. This section summarizes the results of the HHRA for the AOCs.

2.7.1 Human Health Risk Assessment

An HHRA was performed to evaluate potential current and future risks associated with detected constituents in subsurface soil and groundwater at the AOC. The HHRA was performed for VOCs, SVOCs and PCBs in subsurface soils and groundwater in accordance with CERCLA, NCP and applicable USEPA guidance. A detailed discussion of the HHRA is presented in the *Final Remedial Investigation/Interim Remedial Action/Human Health Risk Assessment Report* (PARS, December 2014).

2.7.1.1 Identification of Chemicals of Potential Concern

Site-related chemicals selected for quantitative evaluation were defined as Chemicals of Potential Concern (CPCs). CPCs were identified based on analytical results collected as part of remedial investigation and remedial action activities.

Compounds in soil detected at concentrations above the NYSDEC USCO and compounds in groundwater detected above the NYSDEC Class GA criteria were selected as part of the initial screening process. SVOCs detected in the surface soil sample at Outfall No. 4 were not evaluated as part of the risk assessment because these compounds are not suspected to be from a point source release from the Site. The SVOCs detected in the sample at Outfall No. 4 are commonly found in ditches/drainage swales that receive storm water runoff from asphalt paved surfaces. The NYSDEC agreed that SVOCs were not associated with a discharge from the Site and were likely related to runoff. PCBs were detected in this sample at a concentration that exceeds the USCO for the compound of 100 μg/kg. Therefore, the surface soil sample at Outfall No 4. was evaluated for PCBs as part of the risk assessment.

All compounds selected as part of the initial screening process were carried into the secondary screening process. Evaluation of compounds for the secondary screening process is based on the guidelines set forth in the USEPA *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (RAGS)*.

The 95% upper concentration limit (UCL) was calculated using updated PRO UCL 5.0.00 Software developed by Lockheed Martin and the USEPA (*Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites)*. If the UCL could not be calculated because of an insufficient number of detections, the maximum detected concentration for the compound was used in the risk assessment. Based on the distribution of statistical data for some of the groundwater and subsurface soil samples, the Pro UCL Software recommended using the 97.5% UCL, which yields a more conservative assessment.

The 95% or 97.5% UCL was used as the exposure point concentration (EPC) for each compound. The EPC is an estimate of the mean concentration of a compound found in a specific medium at an exposure point. The maximum detected concentration for each compound identified as part of the initial screening process was compared to the respective Regional Screening Level (RSL) presented in the USEPA RSL Tables. Groundwater samples were compared to the RSL Tapwater Supporting Table and the surface soil sample was compared to the RSL Residential Table. Subsurface soil samples were compared to the RSL Industrial Soil Table based on the anticipated future use of the Site for commercial/industrial purposes.

Based on the secondary screening, PCBs (Aroclor 1260) in surface soil at Outfall No. 4 was not considered a CPC at the Site. Subsurface soil and groundwater CPCs identified as part of the secondary screening process are shown in the following exhibits.

Exhibit 1 - Subsurface Soil CPC Selection

Analyte	CAS Number	Frequency of Detection	Mean of Detected (mg/kg)	Range of Detected (mg/kg)	95% UCL (mg/kg)	Max. Detect (mg/kg)	EPC (mg/kg)	RSL (mg/kg)
Benzo(a)anthracene	56-55-3	44/66	0.629	0.0089-10	1.55[b]	10.0	1.55	2.9
Dibenzo(a,h)anthracene	53-70-3	15/66	0.296	0.01-2.3	0.247[c]	2.3	0.247	0.29
Benzo(b)fluoranthene	205-99-2	49/66	0.719	0.0048-14.0	2.024[b]	14.0	2.024	2.9
Benzo(a)pyrene	50-32-8	44/66	0.738	0.007-14.0	1.963[b]	14.0	1.963	0.29
Indeno(1,2,3-cd)pyrene	193-39-5	38/66	0.423	0.0062-8.8	1.113[b]	8.80	1.113	2.9
Aroclor 1254	11097-69-1	27/83	2.313	0.007-18.0	2.793[b]	18.0	2.793	1.0
Aroclor 1260	11096-82-5	15/83	0.473	0.025-1.6	0.14[a]	1.60	0.14	1.0

Notes:

mg/kg - Milligrams per Kilogram

UCL- Upper Concentration Limit

EPC - Exposure Point Concentration

RSL - Risk Based Concentration (USEPA Regional Screening Level (RSL) Tables for Industrial Soil, May 2014) a- Calculated using the 95% KM (Percentile Bootstrap) Method

b- Calculated using the 97.5% KM (Chebyshev) Method

c- Calculated using the 95% KM (Chebyshev) Method

Exhibit 2 - Groundwater CPC Selection

Analyte	CAS Number	Frequency of Detection	Mean of Detected (µg/L)	Range of Detected (µg/L)	95% UCL (µg/L)	Max. Detect (µg/L)	EPC (µg/L)	RSL (µg/L)
Benzene	71-43-2	3/19	1.237	0.51-1.6	NC	1.6	1.6	0.45
Benzo(a)anthracene	56-55-3	3/17	0.593	0.44-0.85	NC	0.85	0.85	0.034
Benzo(b)fluoranthene	205-99-2	1/17	NA	NA	NC	1.1	1.1	0.034
Indeno(1,2,3-cd)pyrene	193-39-5	1/17	NA	NA	NC	0.91	0.91	0.034
Trichloroethene	79-01-6	2/19	4.19	0.58-7.8	NC	7.8	7.8	0.49
Aroclor 1254	11097-69-1	1/17	NA	NA	NC	2.0	2.0	0.039
Aroclor 1260	11096-82-5	3/17	4.923	0.77-13.0	NC	13.0	13.0	0.039

Notes:

µg/L - Micrograms per liter

UCL- Upper Concentration Limit

EPC - Exposure Point Concentration

RSL - Regional Screening Level (USEPA Regional Screening Level (RSL) Tables for Tap Water, May 2014)

CPC - Contaminant of Potential Concern

NA- Not enough detected data available

NC- Not calculated because there are not enough detected values to compute meaningful or reliable statistics and estimates.

2.7.1.2 Exposure Assessment

An exposure assessment was conducted to identify the potential for human contact to compounds detected in soil and groundwater at the Site. Current land use and future planned land use conditions were examined to evaluate potential exposures.

The proposed future reuse within the AOCs includes a paved parking lot and commercial building. There is no reasonably anticipated use of the Site for residential purposes due to restrictions and use limitations imposed by its location adjacent to airport taxiways, hangers, and runways. Therefore, residential use was not considered as part of the risk assessment for potential exposure to soils and groundwater.

After examining current and reasonably anticipated uses of the Site, contaminated media, and the nature of the contaminants, six exposure pathways for the construction worker and industrial/commercial worker were evaluated. These exposures are:

- dermal exposure to subsurface soil and groundwater;
- inhalation of subsurface soil particulates and groundwater; and
- ingestion of subsurface soil and groundwater.

Exhibit 3 summarizes these exposure pathways.

Exhibit 3 – Summary of Potential Exposure Pathways

Potentially Exposed Population	Exposure Route, Medium, Exposure Point	Pathway Selected for Evaluation	Reason for Selection
Child Trespasser	Dermal exposure to surface soil; ingestion of surface soil	No	There were no compounds of potential concern identified above the screening levels, therefore the pathway could not be completed.
Construction Worker	Dermal exposure to subsurface soil	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future construction workers to come in contact with soil during excavation or construction activities.
Construction Worker	Inhalation of subsurface soil particulates	Yes	Future use of the Site is industrial/commercial, therefore the potential for land disturbance could cause future construction workers to come in contact with soil particulates.
Construction Worker	Incidental ingestion of subsurface soil	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future construction workers to come in contact with soil during excavation or construction activities.
Construction Worker	Incidental Ingestion of groundwater	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future construction workers to come in contact with groundwater during excavation or construction activities.
Construction Worker	Inhalation of exposed groundwater	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future construction workers to be exposed to volatiles from groundwater during construction activities.
Construction Worker	Dermal exposure to groundwater	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future construction workers to come in contact with the groundwater during construction activities at the Site.
Commercial/Industrial Worker	Dermal exposure to subsurface soil	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future commercial/industrial workers to come in contact with soil during landscaping activities.

Potentially Exposed Population	Exposure Route, Medium, Exposure Point	Pathway Selected for Evaluation	Reason for Selection
Commercial/Industrial Worker	Inhalation of subsurface soil particulates	Yes	Future use of the Site is industrial/commercial, therefore the potential for land disturbance could cause future commercial/industrial workers to come in contact with soil particulates.
Commercial/Industrial Worker	Incidental ingestion of subsurface soil	Yes	Future use of the Site is industrial/commercial, therefore the potential exists for future commercial/industrial workers to come in contact with soil during landscaping activities.
Commercial/Industrial Worker	Accidental Ingestion of groundwater	No	The future commercial/industrial worker would not come in contact with groundwater at the Site during trenching activities. Therefore this pathway is incomplete.
Commercial/Industrial Worker	Inhalation of exposed groundwater	No	The future commercial/industrial worker would not come in contact with groundwater at the Site during trenching activities. Therefore this pathway is incomplete.
Commercial/Industrial Worker	Dermal exposure to groundwater	No	The future commercial/industrial worker would not come in contact with groundwater at the Site during trenching activities. Therefore this pathway is incomplete.

The construction worker exposure scenario was examined for all pathways. Because exposure to groundwater results in a risk an order of magnitude greater than exposure to soil, the relevant exposure scenario is the construction worker excavating deeper than one foot below ground surface into the saturated soil zone. The industrial/commercial worker exposure scenario was examined for exposure to subsurface soil via dermal exposure, inhalation of particulates and incidental ingestion. The industrial/commercial worker would not be exposed to groundwater. The highest probable exposure to subsurface soil would be to a landscaper/groundskeeper who is planting or tilling.

The degree of exposure was evaluated by determining the contaminant concentrations that the population may be exposed, as well as the duration of the exposure and exposure pathways. Based on USEPA risk assessment guidance, exposures were quantified by estimating the Reasonable Maximum Exposure (RME) associated with each pathway of concern. The RME is the maximum chemical intake that is reasonably expected to occur at a site under both current and future land-use conditions. The RME for a given pathway is derived by combining the exposure point concentration for each chemical with standard intake factors and reasonable maximum values for assumed frequency and duration of the activity resulting in the exposure (USEPA, 1989b). The RME is intended to place a conservative upper-bound limit on the potential risk. Details regarding the intake calculations are included in the *Final Remedial Investigation/Interim Remedial Action/Human Health Risk Assessment Report* (PARS, December 2014).

It is noted here that the initial calculations for the exposure assessment to cancer-causing chemicals used an incorrect Averaging Time of one year instead of the 70 years required by EPA risk assessment guidance. A review of the HHRA following receipt of public comments on the

Proposed Plan revealed an error in the calculations. As discussed below, the use of the correct 70-year Averaging Time in the subsequent risk calculations resulted in no unacceptable risk to the construction worker.

2.7.1.3 Toxicity Assessment

The toxicity assessment defined the relationship between the dose of a compound and the probability that a carcinogenic or non-carcinogenic effect will occur. The toxicity assessment is divided into two parts: hazard identification and dose-response evaluation. As stated in RAGS, hazard identification is the process of determining whether exposure to a compound will cause an increase in the incidence of a particular adverse health effect and whether the health effect is likely to occur in humans. The dose-response evaluation quantifies the toxicological information and characterizes the relationship between the dose of a compound and the incidence of adverse health effects in a population. Toxicity values are expressed as reference doses (RfD) for oral non-carcinogenic effects and slope factors for carcinogenic effects.

Each compound was classified by its degree of carcinogenic properties. This information was obtained from the USEPA Integrated Risk Information System (IRIS). All subsurface soil compounds identified in this risk assessment were rated as B2 by the USEPA classification system. Therefore all toxicity values were evaluated as carcinogens. Although Aroclor 1254 is rated as a B2 carcinogen, risk characterization data exists for non-cancer risk to dermal exposure. Therefore, Aroclor 1254 was examined for carcinogenic and non-carcinogenic risk to dermal exposure.

The hierarchy of sources for identifying dose-response values was followed using the guidelines set forth in Memorandum: *Human Health Toxicity Values in Superfund Risk Assessments* which replaces the guidelines of RAGS Part A. The USEPA IRIS database was first consulted for all compounds. For compounds not available through IRIS, the USEPA Provisional Peer Reviewed Toxicity Values (PPRTVs) and California EPA values (CALEPA) were consulted.

Using the recommended equations for each pathway, the absorbed dose for each CPC was calculated for all carcinogens and non-carcinogens. The slope factor for each compound was obtained from the RSL Tables. The slope factor was adjusted for all dermal routes of exposure to represent the absorbed amount and not the administered. In accordance with RAGS Part E, Exhibit 4-1, toxicity factors for PCBs and SVOCs were not adjusted for exposure to groundwater. Therefore, only benzene and trichloroethene required adjustment. The slope factors for benzene and trichloroethene were divided by the oral absorbed efficiency value, which was obtained from the RSL tables.

2.7.1.4 Risk Characterization

The corrected exposure assessment and the toxicity assessment are integrated to develop both the quantitative and qualitative risk evaluations. The average daily intakes calculated as part of the exposure assessment were combined with the dose-response values from the toxicity assessment.

All compounds with potential carcinogenic effects were evaluated based on guidance from the USEPA RAGs. An individual upper-bound excess lifetime cancer risk was calculated by multiplying the calculated estimated daily intake by the appropriate carcinogenic slope factor (CSF) for each compound. The total lifetime cancer risk for simultaneous exposure to all chemicals within a pathway was calculated using the summation of each individual chemical.

Non-carcinogens were evaluated based on guidance from the USEPA RAGS. A non-cancer hazard quotient was calculated by dividing the calculated exposure intake by the appropriate reference dose for each compound.

The calculated risks for carcinogenic and non-carcinogenic exposures are summarized in the Exhibits 4 and 5.

Based on the subsurface soil and groundwater data, no unacceptable non-carcinogenic or carcinogenic risks were identified under existing or future conditions. The total cancer risks were within the acceptable ranges set by the USEPA from 1 x 10^{-4} to 1 x 10^{-6}. Total non-carcinogenic risks were significantly lower than the acceptable hazard quotient of 1.

Exhibit 4 – Risk Characterization Carcinogenic Summary

Media	Population	Cancer Risk	Principal Contributing Pathway
Subsurface Soil	Commercial/Industrial Worker	3.24E-05	Dermal contact
Subsurface Soil	Commercial/Industrial Worker	3.11E-09	Inhalation
Subsurface Soil	Commercial/Industrial Worker	7.77E-06	Ingestion
Total Subsurface Soil Risk- Commercial/Industrial Worker		**4.02E-05**	
Subsurface Soil	Construction Worker	2.33E-06	Dermal contact
Subsurface Soil	Construction Worker	8.95E-11	Inhalation
Subsurface Soil	Construction Worker	7.38E-07	Ingestion
Total Subsurface Soil Risk- Construction Worker		**3.07E-06**	
Groundwater	Construction Worker	1.53E-05	Dermal contact
Groundwater	Construction Worker	8.19E-07	Inhalation
Groundwater	Construction Worker	5.73E-08	Ingestion
Total Groundwater Risk- Construction Worker		**1.62E-05**	

Exhibit 5 – Risk Characterization Non-Carcinogenic Summary

Media	Population	Non Cancer Risk	Principal Contributing Pathway
Subsurface Soil	Commercial/Industrial Worker	1.78E-01	Dermal contact
Total Subsurface Soil Risk- Commercial/Industrial Worker		**1.78E-01**	
Subsurface Soil	Construction Worker	1.28E-02	Dermal contact
Total Subsurface Soil Risk- Construction Worker		**1.28E-02**	
Groundwater	Construction Worker	5.45E-02	Dermal contact
Total Groundwater Risk- Construction Worker		**5.45E-02**	

2.7.1.5 Uncertainty

The interpretation of risk estimates is subject to a number of uncertainties as a result of conservative assumptions inherent in risk assessments. Quantitative human health risk estimates are based on numerous conservative assumptions. These conservative estimates lead to uncertainty in exposure and toxicity. Major sources of uncertainty and their potential effects are detailed in Exhibit 6.

Exhibit 6 - Sources of Uncertainty

Uncertainty	Effect	Justification
Exposure point concentration	Overestimate	The 95% UCL was calculated for each compound at the Site and used as the EPC in the risk assessment calculations. In addition, for sub surface soil, the 97.5% UCL yielded an even more conservative estimates than the 95% UCL
Exposure assumptions (frequency, duration, time)	Overestimate	Parameters selected are conservative estimates of exposure. This is true for the construction worker exposure. The impacted area is approximately one acre of the 19.5 acre Site, and the construction worker was calculated as spending 180 days working at the site. This yields a conservative estimate to the total amount of risk.
Exposure assumptions (frequency, duration, time)	Overestimate	Parameters selected are conservative estimates of exposure. This is true for the commercial/industrial worker exposure. The impacted area is approximately one acre of the 19.5 acre Site, and the commercial/industrial worker was calculated as spending 250days working at the site. This yields a conservative estimate to the total amount of risk.
Extrapolation of animal toxicity data to humans	Unknown	Animal studies typically involve high dose exposures, while humans are exposed to low doses in the environment

Uncertainty	Effect	Justification
Industrial RSL are not available for groundwater	Overestimate	Tap water groundwater screening levels are used in the risk assessment, since industrial groundwater levels are not available. This makes the exposure estimates much more conservative.
Dermal Doses	Unknown	Dermal cancer slope factors and reference doses were not listed in the USEPA RSL Tables or the IRIS database. To obtain the correct dermal doses, the ingestion values were converted following guidelines presented in RAGS Part A.
Fraction Ingested (FI)	Overestimate	The fraction of soil ingested from a contaminated source was assumed to be 100%. This is a conservative estimate of risk to the construction worker.

Exposure factors at the Site were selected in accordance with the RAGS guidelines, the USEPA Exposure Factors Handbook and the USEPA Supplemental Guidance: Update of Standard Default Exposure Factors (OSWER Directive 9200.1-120). This guidance recommends a default exposure frequency for a commercial/industrial worker of 250 days and for a construction worker of 180 days.

A groundskeeper is most likely to have the greatest degree of exposure of any commercial/ industrial worker at the Site, since subsurface soil is the only expected pathway for a commercial/industrial worker. It is unlikely that the groundskeeper would spend 250 days per year constantly exposed to subsurface soils. Most grounds keeping activities (mowing, planting, tilling etc.) do not require continuous digging or subsurface exposure. Additionally, during the late fall and winter, weather conditions are not conducive to planting and lawn care. The 250 days of exposure per year assumption is overly conservative and overestimates the risk to the commercial/industrial worker. Similarly, the exposure scenario resulting in the highest exposure was excavating an 8-foot deep utility trench. Because of the small size of the AOCs, the standard 180-day duration assumption is overly conservative and overestimates the risk to the commercial/industrial worker.

2.7.1.6 Conclusion

Under current or future conditions and based on the quantitative and qualitative analysis of the risk assessment, the commercial/industrial and construction worker exposure pathways at the Site do not pose an unacceptable risk. Residential use of the Site is not reasonably anticipated due to the close proximity to the airport taxiways, hangers, and runways. Restrictions prohibiting residential use and groundwater use will be included in the deed transferring the Site.

2.7.2 Ecological Risk Assessment

No ecological risk assessment was conducted at the Niagara Falls Armed Forces Reserve Center due to the lack of habitat.

2.8 REMEDIAL ACTION OBJECTIVES

Remedial measures for the Site must satisfy Remedial Action Objectives (RAOs) in accordance with the NYSDEC Technical Guidance for Site Investigation and Remediation and Section 40 CFR 300.430 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The RAOs are statements that convey the goals for minimizing or eliminating substantial risks to public health and the environment. RAOs were developed to protect human health and the environment based on the conclusions of the HHRA. The RAOs for the Site are as follows:

Groundwater

- Reduce or eliminate inhalation of volatiles from exposed contaminated groundwater during subsurface construction activities.
- Reduce or eliminate dermal contact with groundwater that may occur during construction activities

2.9 DESCRIPTION OF ALTERNATIVES

Prior to drafting the PP, the HHRA had calculated that a construction worker's total potential exposure to groundwater was slightly greater than the USEPA acceptable carcinogenic risk range of 1.0E-4 to 1.0E-6 provided that the worker engaged in an excavation activity within the groundwater zone, but that there were no other unacceptable risks to commercial/industrial and construction workers. Based on this single risk to the construction worker, the Preferred Remedy in the PP was Implementation of a Site Management Plan (Alternative No. 2) requiring construction worker protection during excavation activities to achieve the remedial action objectives of reducing or eliminating inhalation of volatiles and dermal contact with groundwater.

Following receipt of public comments on the Proposed Plan, a review of the HHRA revealed an error in the human health risk calculations. An incorrect Averaging Time of one year had been used. Correcting the Averaging Time to the EPA risk assessment guidance required 70 years resulted in no unacceptable risk to the construction worker. Army compared the No Action Alternative to the Preferred Alternative, and determined that these were the same in every way except for the Site Implementation Plan. Because the Site Management Plan is no longer needed for the protection of human health, Army determined that both the No Action Alternative and the Preferred Alternative offered equivalent levels of protection and were equally effective in achieving the RAOs and ARARs for the Site. Army chooses No Further Action as the Selected Remedy because it imposes a lower degree of burden on future development while achieving an equivalent level of protection of human health and the environment. (Because removal actions have occurred at the AOCs, the correct term for Alternative No. 1 is "No Further Action." This is the term used for the Selected Remedy in this ROD.)

2.9.1 Description of Remedy Components

Although the Site will not be used for residential purposes, evaluating a remedy that achieves an unrestricted use is required. DER-10 guidance also requires the evaluation of a "no-action" alterative to provide a baseline for comparison against other alternatives. Since an IRA has been completed for the Site, the following alternatives were evaluated.

- No Further Action (Alternative No. 1): Under this alternative, the Site would remain in its current state, with no additional controls in-place.
- Implementation of a Site Management Plan (Alternative No. 2): Under this alternative, a Site Management Plan would be developed to address contaminated groundwater remaining at the Site in the event subsurface activities were performed (i.e., site upgrades, utility repair, new construction, etc.).

- Unrestricted Use Cleanup (Alternative No. 3): Under this alternative, it would be necessary to remediate soil and fill material where concentrations exceed the USCOs. For unrestricted use scenarios, excavation and off-Site disposal of impacted soil and fill is generally regarded as the most applicable remedial measure. This alternative assumes that those non-building areas which exceed USCOs would be excavated and disposed at an approved off-Site landfill. During the excavations, groundwater encountered would also be captured, stored and disposed of off-Site (assumed disposal into the City of Niagara Falls sanitary sewer system). Based on the Site analytical data from this and previous investigations, it is estimated that an approximate 20,500 square foot area or 3,034 cubic yards of soil would be excavated and 92,000 gallons of perched groundwater would be pumped from the excavations. The soil and groundwater would be disposed of off-site.

2.9.2 Common Elements and Distinguishing Features of Each Alternative

The common elements among the Proposed Plan alternatives are: (1) no Alternative includes land use controls to prevent future residential use of the property or to prevent the use of groundwater; (2) no Alternative includes a component directly addressing the sporadic, small exceedance of the GA groundwater standards, although Alternative No. 3 will remove groundwater within the excavated soil and that flows into the excavation while open; and (3) because Alternatives Nos. 1 and 2, as well as perhaps Alternative No. 3, will leave residual groundwater and/or soil contamination above unlimited use and unrestricted exposure standards, five-year reviews will be required pursuant to CERCLA § 121(c).

The distinguishing feature of Alternative 3 is that it would remove all soil with chemical concentrations exceeding USCO standards. Alternatives Nos. 1 and 2 do not remove any soil. Alternative No. 2 leaves the soil exceeding the USCO, in place but includes a site management plan that would include the use of personal protection equipment or other engineering approaches to protect construction workers from chemicals in excavations that extend into the groundwater. Alternative No. 3 does not include a site management plan. Alternative No. 1 is the no further action alternative and so contains neither of these features. It leaves soil exceeding the USCO in place and, like Alternative No. 2, does not address the groundwater above GA standards.

2.9.3 Expected Outcomes of Each Alternative

Based on the corrected HHRA demonstrating that groundwater does not pose an unacceptable risk to Site workers, all of the Alternatives achieve all RAOs. Alternative 2 was designed to address exposure to construction workers conducting excavations within the AOCs. Correction of the exposure calculations, however, revealed that neither the site management plan nor the excavation of soil exceeding USCO standards was necessary to achieve an acceptable level of protection for Site workers. Therefore Alternative 2 is not distinguishable from Alternatives Nos. 1 and 3 with respect to achieving the remedial action objectives.

In addition, implementation of Alternative No. 3 would allow residential use of the property. However, residential use of the property is not possible due to its location adjacent to airport hangers and taxiways and between two airport runways, zoning, and the intended reuse that is consistent with these realities. Because the soil exceeding the CSCO standards was removed during prior remedial actions, Alternatives Nos. 1 and 2 allow the property to be used for all reasonably anticipated uses, which uses do not include residential.

None of the Alternatives directly address the slight and scattered exceedance of the GA groundwater standards. It is unlikely that the groundwater produces adequate flow for drinking water purposes. The bedrock that occurs at depths ranging between 13 and 16 feet is overlain by 11 to 16 feet of silty clay, which has a very low permeability expected to be in the range of 1x10-5 to 1 x 10-7 cm/s and is not expected to produce sufficient amounts of water. On top of the silty clay to the surface is 0 to 4 feet of sandy fill. Twenty percent of the wells failed to produce any groundwater, and another ten percent failed to produce enough for a complete sample.

The Site is served by the public water utility and the perched groundwater's shallow nature, low production, and location adjacent to an airport make its use more than inadvisable. It is unlikely that an attempt to use the shallow groundwater could meet the location and construction standards for a permit that are set forth Subpart 5-2 and Appendix 5B of Title 10 of the Rules and Regulations of the State of New York, which would also require that Niagara County Health Department grant a shallow well variance because the well would be shallower than 19 feet.

2.10 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Below is a summary of the evaluation of the three alternatives remedy using the nine criteria in accordance with section 40 CFR 300.430 (e) (9) of the National Contingency Plan (NCP). A comparative analysis of each alternative is not included in the revised *Remedial Investigation/ Interim Remedial Action Report and Human Health Risk Assessment* issued in December 2014 because there was no unacceptable risk following correction of the exposure assessment calculations. The evaluation below is modified from the Proposed Plan to be consistent with the revised HHRA.

2.10.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Because the revised HHRA determined that there are no unacceptable risks for current and reasonably anticipated uses of the Site, all Alternatives are protective of human health and the environment. Although the alternative will not meet the chemical SCGs, Alternatives Nos. 1 and 2 are considered adequate remedies for human health with respect to the risk of exposure. Alternative No. 3 involves the removal of the contaminated soil and groundwater within the excavation area, and would be the most protective of human health and the environment.

2.10.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Alternative No. 3 is expected to achieve compliance with the chemical-specific soil USCOs and GA groundwater standards within the excavation area. Alternatives Nos. 1 and 2 achieve the CSCO standard but are not expected to meet the USCOs and GA groundwater standards. There is no reasonably anticipated use of the property that requires attainment of the USCOs and the perched groundwater at the site is not useable for drinking water purposes.

2.10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

All Alternatives are considered to maintain reliable protection of human health over time because there are no current residual risks that are considered to be unacceptable for the reasonably anticipated uses of the Site.

2.10.4 Reduction of Toxicity, Mobility and Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative No. 3 provides for the greatest reduction of toxicity, mobility and volume of soil and groundwater contamination within the excavation, as the majority of the soil contamination would be removed and disposed off-site. To the extent that groundwater is contained in the soil matrix or flows into the excavation, groundwater will also be removed. Alternatives Nos. 1 and 2 will not reduce the toxicity, mobility and volume of the contamination.

2.10.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative No. 3 involves excavation work, which could possibly cause exposure to contaminated soil and groundwater during remediation. Workers, particularly those in personal protective equipment, will be subject to the risk of injury resulting from equipment operations. The excavated soil will be transported in 200 to 250 semi trucks that will travel public roads to the selected landfill and approximately 30 vacuum trucks will transport collected groundwater on public roads to the sewage treatment plant. The risk to the public posed by these transportation requirements would be real but minimal in comparison to the risks posed by existing traffic.

2.10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternatives No. 1 and 2 are technically and administratively implementable and require no field implementation initially. If a site management plan that includes placing workers in Level C personal protective equipment were to be implemented, the complexity and the resources required to conduct simple excavations and utility installation within those excavations would be greatly increased, as would the physical risk to workers working in conjunction with machinery in a confined space such as a trench. As previously discussed, however, there is no need for worker protection from the Site chemicals. Alternative No. 3 will require significant equipment, materials and services, though the work processes involved are standard and there should be no implementability issues.

2.10.7 Cost

Alternative No. 1, which involves taking no further action, has the lowest capital and O&M cost as there will be no additional remedial activities completed. Alternative No. 2, which is the implementation of a SMP, has the second highest capital cost of approximately $13,200. O&M costs would associated with Alternative No. 2 include annual inspection and report preparation which are approximately $3,360. Alternative No. 3, which removes soil exceeding the USCO has the highest capital cost which is estimated at approximately $335,800. There is no long term O&M cost associated with Alternative No. 3.

2.10.8 State Acceptance

Prior to the correction of the HHRA, NYSDEC concurred in the selection of Alternative No. 2 as the Preferred Remedy provided that the United States placed a restriction in the deed that prohibits residential use. The deed will prohibit both residential use and groundwater use.

The NYSDEC concurs with the selection of No Further Action, as the Selected Remedy. Following revision of the HHRA to correctly calculate the estimated exposure to the construction worker, there is no difference in the protectiveness of the Alternatives Nos. 1 and 2, or the need for a Site Management Plan.

2.10.9 Community Acceptance

The US Army issued the PP Report to the community as part of its public participation responsibilities to inform the public of the US Army's preferred remedy and to solicit public comments pertaining to the remedial alternatives under Section 117(a) of CERCLA. Community members were invited to comment during the 30-day public comment period, which began on April 14, 2013 and concluded on May 14, 2013. No comments were received. It is therefore not determinable what alternative may or may not have been supported by the community.

2.10.10 Summary

Alternative No. 1 (No Further Action) achieves the RAOs and soil ARARs and is protective of commercial/industrial workers, construction workers and other foreseeable users of the Site. This alternative is considered to be protective of human health and the environment. No technical or administrative implementability issues are associated with this alternative and there would be no capital or long-term O&M costs. This alternative is not expected to meet the chemical-specific ARARs for the identified groundwater contamination. This alternative achieves adequate protection of human health at the lowest cost and is most easily implementable. There are no short-term or long-term effectiveness issues. This is the lowest cost alternative.

Alternative No. 2 (Implementation of a Site Management Plan) was presented in the PP as the Preferred Alternative because it achieves the RAOs and soil ARARs and was indicated for controlling the risk to construction workers conducting excavations. This alternative is considered to be protective of human health and the environment. Implementation of this alternative would result in reducing the potential exposure to contaminants during construction or excavation activities. This alternative is not expected to meet the chemical-specific ARARs for the identified groundwater contamination. This alternative is implementable on a technical basis. There are no short-term or long-term effectiveness issues.

Alternative No. 3 (Unrestricted Use Cleanup) achieves the RAOs and soil ARARs, plus removes all soil with chemical concentrations greater than the USCOs. Additionally, there is significant capital cost associated with the alternative and approvals are required for off-site disposal of soil and groundwater. This alternative is considered to be protective of human health and the environment. The RAOs for groundwater can be met; however, additional protective measures will need to be taken to limit the worker's exposure to groundwater during excavation activities. Furthermore, this alternative was not selected because potential exposure is limited to only the construction worker and contaminant levels are only slightly above the chemical-specific ARARs. There are no significant short-term or long-term effectiveness issues. This is the highest cost alternative.

2.11 PRINCIPAL THREAT WASTES

There is no Principal Threat Waste remaining on the AOCs. The pipes and culverts containing the yellow liquid, and the soil, leachate, and sediment that may have been classified as a principal threat waste were removed during the 2010 and 2011 remedial activities.

2.12 SELECTED REMEDY

The Selected Remedy is Alternative No. 1, No Further Action.

2.12.1 Summary of the Rationale for the Selected Remedy

The No Further Action Alternative is selected because it meets all of the RAOs in a manner that will be the least burdensome to the future property owners. Following correction of the exposure calculations, the revised HHRA concluded that the chemicals found at the AOCs did not pose an unacceptable risk to Site workers. Based on that determination, the Site Management Plan proposed as the single component of Alternative No. 2 became unnecessary.

The State concurred in the selection of Alternative No. 2 prior to revision of the HHRA, provided that a restriction preventing residential use of the Site was placed into the deed transferring the Site out of Federal ownership, to which the Army agrees. While the Army does not believe that a deed restriction is necessary given the Site's unique location, it is consistent with Army policy when property is conveyed for non-residential use under an Economic Development Conveyance. The deed will also contain a prohibition against groundwater use. These restrictions will assure that the HHRA's no residential use and no groundwater use assumptions will remain valid in perpetuity unless the property is in the future cleaned up for unlimited use and unrestricted exposure. The continuing validity of the assumption will be verified every five years by the CERCLA § 121(c) reviews.

2.12.2 Description of the Selected Remedy

The Selected Remedy requires no further action. Because chemicals remain at the AOCs above concentrations that allow for unlimited use and unrestricted exposure, a CERCLA § 121(c) review will be conducted every five years until the Army and the State concur these reviews are no longer necessary.

2.12.3 Summary of Estimated Costs

There is no cost associated with implementing the No Further Action remedy. The estimated cost for conducting six Five-Year Reviews over the next 30-years is $60,000.

2.12.4 Expected Outcomes of the Selected Remedy

The Selected Remedy is expected to achieve the RAOs protecting Site workers from exposure to contaminated groundwater. The Selected Remedy also meets the CSCO, the soil ARAR, making the Site immediately available for commercial/industrial use.

The Selected Remedy does not address the slight and scattered exceedances of the GA groundwater standards in this groundwater. However, the shallow perched groundwater is not suitable for drinking water use due to its shallow nature and low flow. It is unlikely that the groundwater could produce adequate flow for drinking water purposes. The bedrock that occurs at depths ranging between 13 and 16 feet is overlain by 11 to 16 feet of silty clay, which has a very low permeability expected to be in the range of $1x10^{-5}$ to 1×10^{-7} cm/s. On top of the silty clay to the surface is 0 to 4 feet of sandy fill. This unconsolidated material is not expected to be sufficiently transmissive due to its very low permeability and 16-foot thickness. Twenty percent of the wells failed to produce any groundwater, and another ten percent failed to produce enough groundwater for a complete sample.

The Site is served by the public water utility and the perched groundwater's shallow nature, low production, and location adjacent to an airport make its use more than inadvisable. It is unlikely that an attempt to use the shallow groundwater could meet the location and construction standards for a permit that are set forth Subpart 5-2 and Appendix 5B of Title 10 of the Rules and Regulations of the State of New York, which would also require that Niagara County Health Department grant a shallow well variance because the well would be shallower than 19 feet.

2.13 STATUTORY DETERMINATIONS

2.13.1 Protection of Human Health and the Environment

There are no exposure pathways posing an unacceptable risk for the reasonably anticipated uses of the Site. The Selected Remedy therefore provides an adequate level of protection.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy achieves the Commercial Soil Cleanup Objectives which is the ARAR for the reasonably anticipated use of the Site. The Selected Remedy does not meet the GA groundwater standard. However, it is unlikely that the shallow perched groundwater is usable for drinking water and the Site is served by a public drinking water utility.

2.13.3 Cost Effectiveness

The Selected Remedy achieves the RAOs at the lowest possible cost.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The Selected Remedy does not require any technology or action in order to achieve a permanent solution.

2.13.5 Preference for Treatment as a Principal Element

The Selected Remedy does not require the use of any treatment or other action in order to achieve the RAOs.

2.13.6 Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

Alternative No. 2, Implementation of a Site Management Plan was the Preferred Alternative presented in the Feasibility Study and the PP. The PP concluded that implementation of a Site Management Plan would satisfy the RAOs. Based on the conclusions of the corrected HHRA, the Army as the lead agency has determined that No Further Action is appropriate because calculated risks resulting from chemicals at the Site do not pose an unacceptable risk to human health and the environment.

Prior to drafting the PP, the HHRA had calculated that a construction worker's total potential exposure to groundwater was slightly greater than the USEPA acceptable carcinogenic risk range of 1.0E-4 to 1.0E-6 provided that the worker engaged in an excavation activity within the groundwater zone, but that there were no other unacceptable risks to commercial/industrial and construction workers. Based on this single risk to the construction worker, the Preferred Remedy in the PP was Implementation of a Site Management Plan (Alternative No. 2) requiring construction worker protection during excavation activities to achieve the remedial action objectives of reducing or eliminating inhalation of volatiles and dermal contact with groundwater.

Following receipt of public comments on the Proposed Plan, a review of the HHRA revealed an error in the human health risk calculations. An incorrect Averaging Time of one year had been used. Correcting the Averaging Time to the EPA risk assessment guidance required 70 years resulted in no unacceptable risk to the construction worker. Army compared the No Action Alternative to the Preferred Alternative, and determined that these attained equivalent levels of protection and were equally effective in achieving the RAOs and ARARs for the Site.

- Alternatives Nos. 1 and 2 offer equivalent protection to Site workers because there is no need for a Site Management Plan.
- Alternatives Nos. 1 and 2 both achieve the CSCO. Neither achieves the USCO.
- Neither Alternative 1 nor Alternative 2 achieves the groundwater GA standards.
- Both will require CERCLA § 121(c) Five-Year Reviews.

Army therefore selects No Further Action as the Selected Remedy because it imposes a lower degree of burden on future development while being equally protective of human health and the environment.

SECTION 3 – RESPONSIVENESS SUMMARY

There were no public comments on the Proposed Plan.

Prior to the correction of the HHRA, NYSDEC concurred in the selection of Alternative No. 2 as the Preferred Remedy provided that the United States places a restriction in the deed that prohibits residential use. While the Army does not believe that a deed restriction is necessary given the Site's unique location, it is consistent with Army policy when property is conveyed for commercial use under an Economic Development Conveyance. The deed will also contain a prohibition against groundwater use. These restrictions will assure that the HHRA's no residential use and no groundwater use assumptions will remain valid in perpetuity unless the property is in the future cleaned up for unlimited use and unrestricted exposure. The continuing validity of the assumption will be verified every five years by the CERCLA § 121(c) reviews. By law, the deed must also reserve the United States' right to impose additional future CERCLA remedies. If violations of the deed restrictions occur, Army can choose either to enforce the deed restrictions or to implement/enforce additional remedies.

The Army has considered and responded to the following State comments received February 18, 2015 from the Chief, Section C, Remedial Bureau A, Division of Environmental Remediation, NYSDEC.

Page 1: "New York State Department of Environmental Conservation (NYSDEC) [*concurs or concurs in part*] with the selected remedy."

Comment: Agree that this can say 'concurs'

Response: "Concurs" is selected.

Page 3: "The New York State Department of Conservation, as the support agency, has determined that No Further Action is appropriate for the AOCs. This remedy is protective of human health and the environment for the current and reasonably anticipated use of the Site."

Comment: DEC prefers to issue a concurrence letter rather than signing the ROD.

Response: The signature block with the above text will be removed from the document.

Page 10: "These exceedances were most likely the result of turbid water samples from the temporary well points."

Comment: This is suggested language. "These exceedances are most likely the result of turbid water samples from the temporary well points."

Response: Concur with suggested language.

Page 21: No Action (Alternative No. 1): Under this alternative, the Site would remain in its current state, with no additional controls in-place.

Comment: Change name of alternative here. Elsewhere in the text, including the declaration section, it is already referred to as 'no further action.'

Response: The text will be revised to read "No Further Action."

Page 25: "New York State Department of Environmental Conservation (NYSDEC) [*concurs or concurs in part*] with the selected remedy."

Comment: Agree that this can say 'concurs'

Response: "Concurs" is selected.

SECTION 4 – REFERENCES

CH2M Hill. *Environmental Condition of Property Report, Niagara Falls USAR Center, Niagara Falls, New York.* July 2007.

PARS Environmental, Inc. *PCB Spill Delineation Report, Outfall 5 Storm Water Culvert, Cleanup and Ditch Remediation.* May 2009.

PARS Environmental, Inc. *Remedial Action Report, PCB Spill Delineation Report, Outfall 5 Storm Water Culvert Cleanup and Ditch Remediation, Niagara Falls US AFRC, 9400 Porter Road, Niagara Falls, NY, NYSDEC Spill #0803478.* March 2010.

PARS Environmental, Inc. *Inspection Report, Niagara Falls AFRC, Building 2 and Former Fire Protection Main, 9400 Porter Road, Niagara Falls, Niagara County, NY.* June 2011.

PARS Environmental, Inc. *Quality Assurance Project Plan/Sampling Plan.* September 2011.

PARS Environmental Inc. *Final – Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment.* December 2014.

PARS Environmental Inc. *Final Supplemental Investigation Report.* March 2013.

PARS Environmental Inc. *Final Revised Remedial Investigation/ Interim Remedial Action Report And Human Health Risk Assessment.* March 2013.

FIGURES

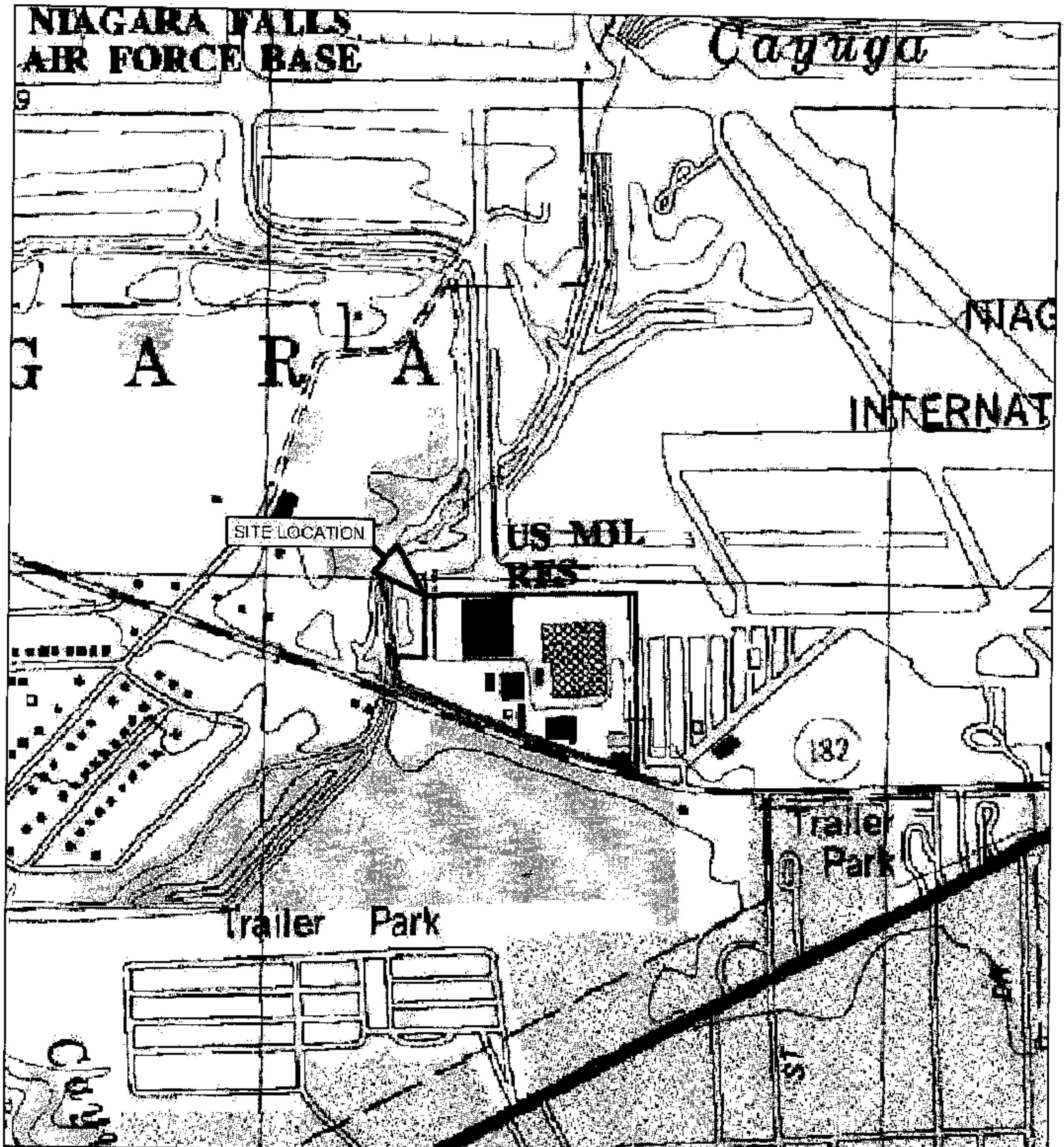
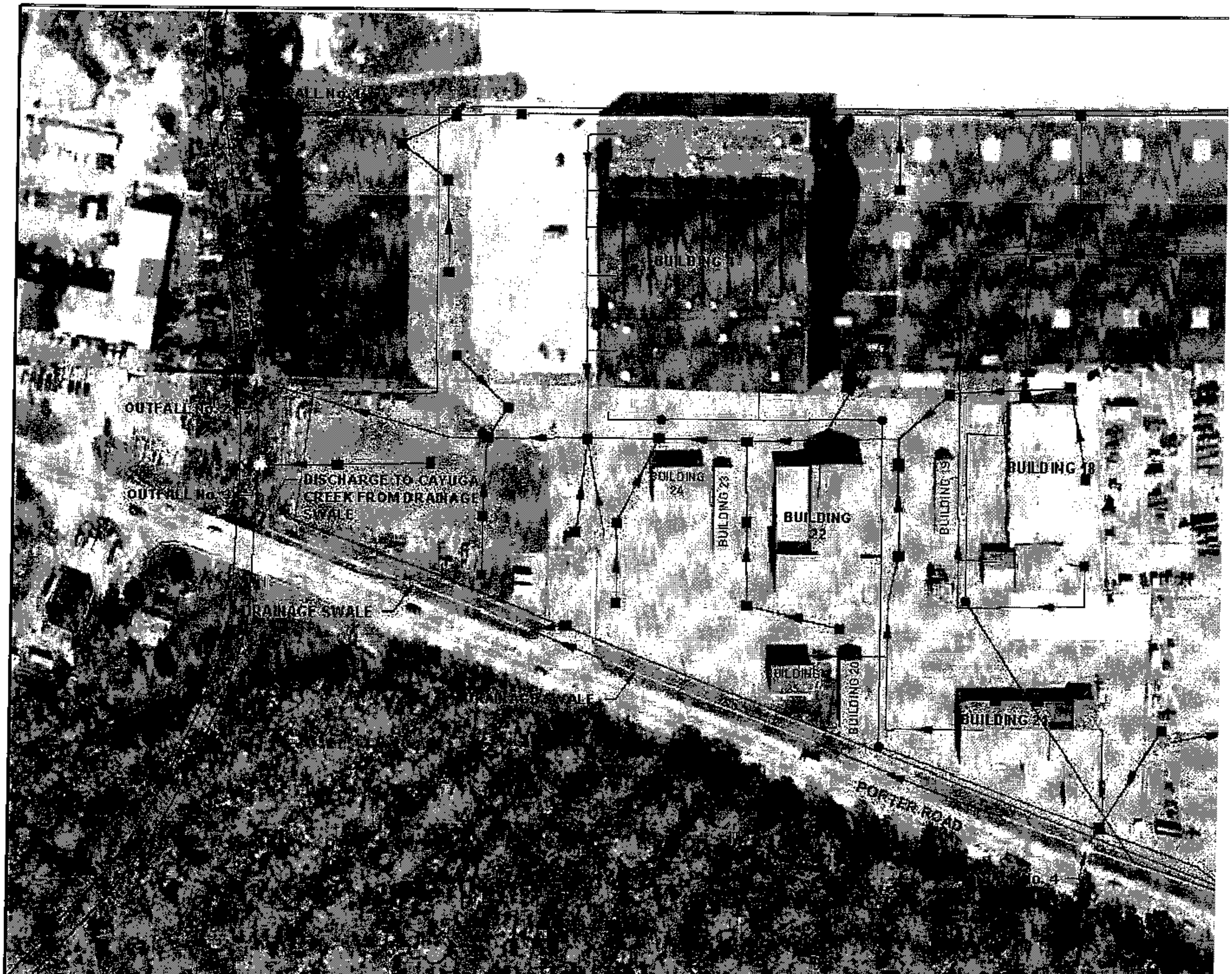


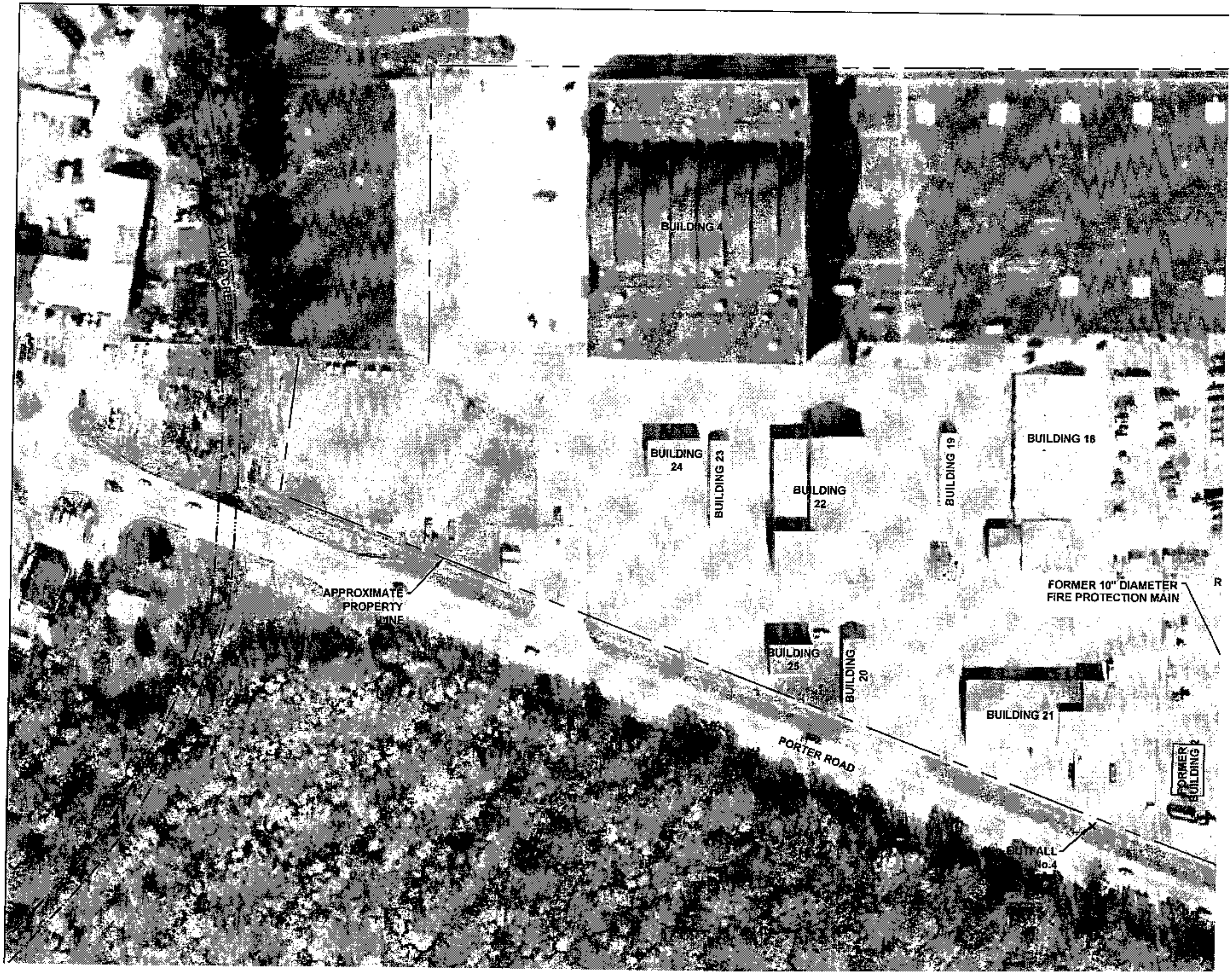
FIGURE 1
SITE LOCATION MAP
NIAGARA FALLS AFRC COMPLEX
NIAGARA FALLS, NEW YORK

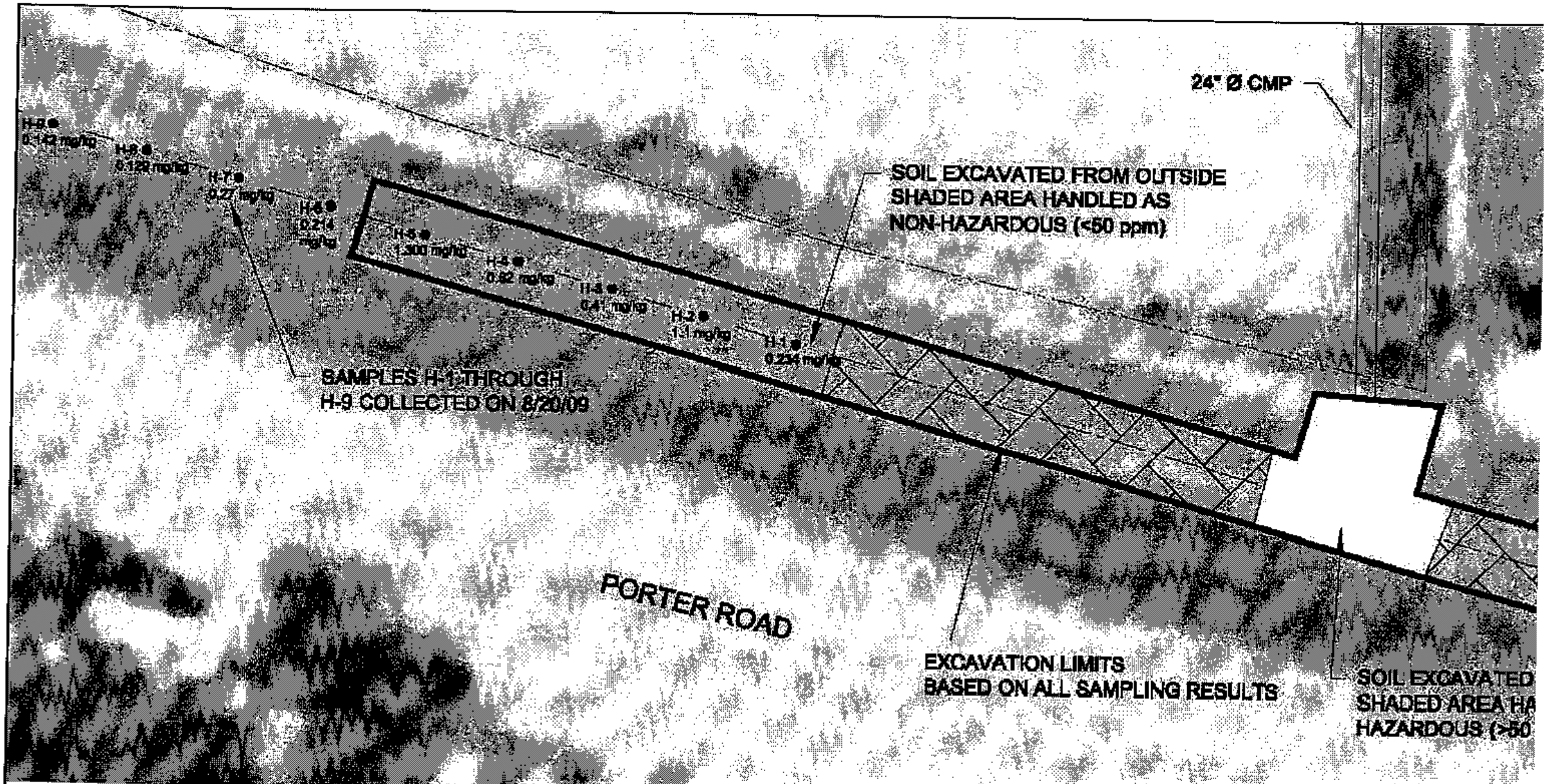
PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE:	1"=750'	JOB No.: 895-08
CK'D. BY: TD	DATE:	11/29/11	FILE NO.: 895-08
REV. NO. --	REV. DATE:	--	FIGURE NO.: 1



BUILDING 18
BUILDING 19
BUILDING 20
BUILDING 21
BUILDING 22
BUILDING 23
BUILDING 24
OUTFALL No. 2
OUTFALL No. 3
DISCHARGE TO CAYUGA CREEK FROM DRAINAGE SWALE
DRAINAGE SWALE
PORTER ROAD

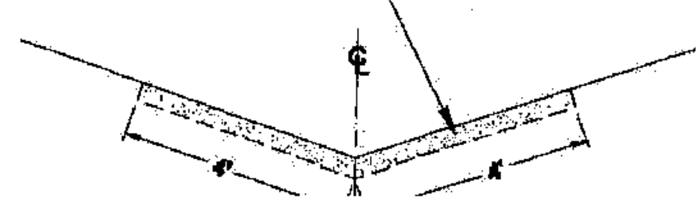

BUILDING 4
BUILDING 18
BUILDING 19
BUILDING 22
BUILDING 23
BUILDING 24
BUILDING 25
BUILDING 20
BUILDING 21
FORMER BUILDING 2
FORMER 10" DIAMETER FIRE PROTECTION MAIN
APPROXIMATE PROPERTY LINE
PORTER ROAD
OUTFALL No.4

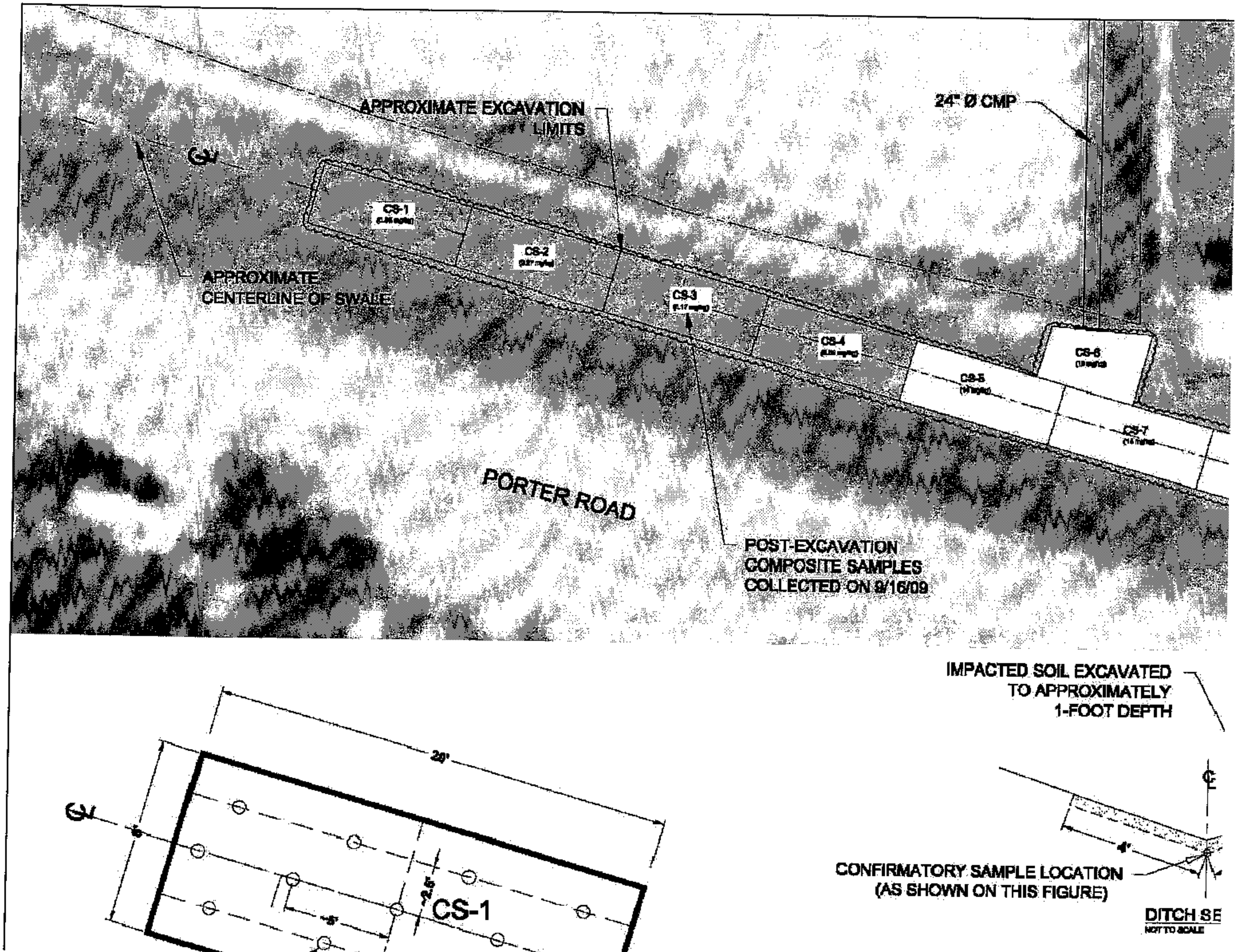


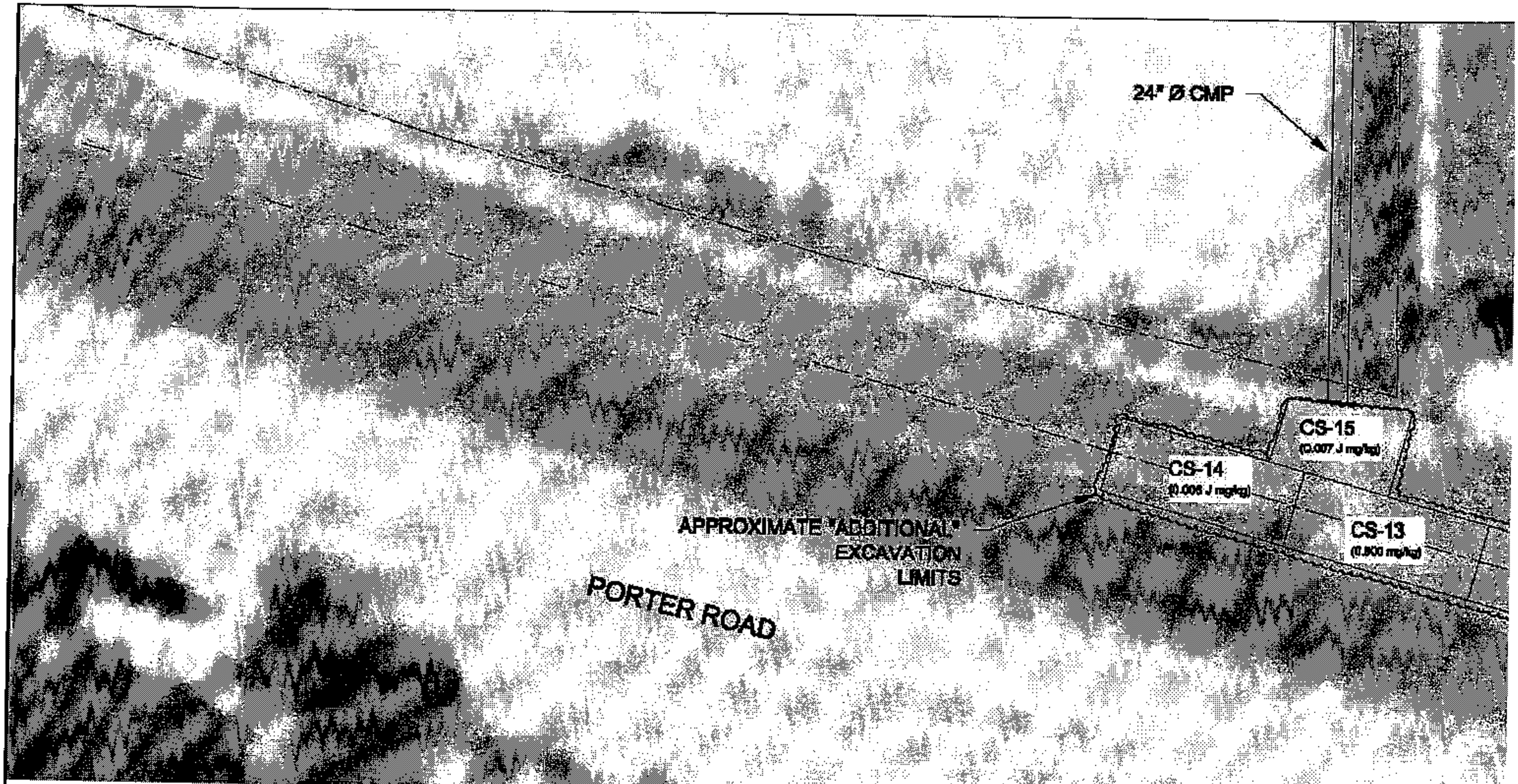
LEGEND:

H-2 ● 0.640 mg/kg SAMPLE LOCATION, DESIGNATION AND CONCENTRATION OF POLYCHLORINATED BIPHYNOLS (PCB's)

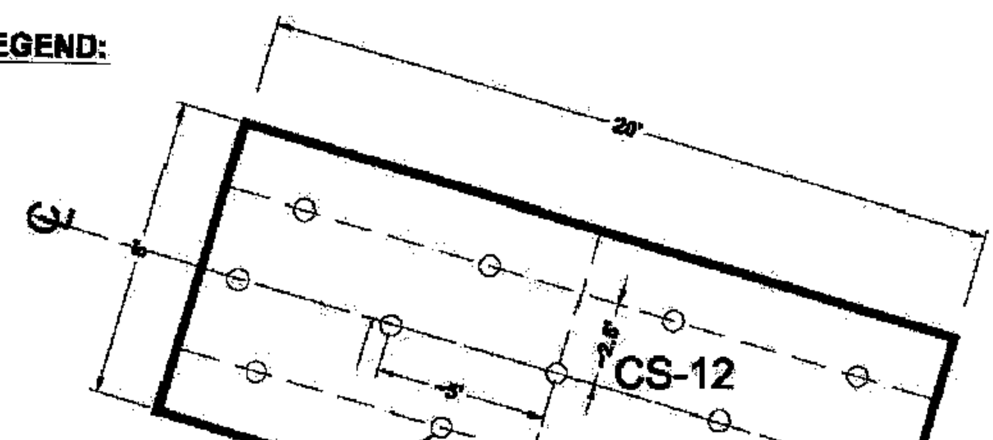
IMPACTED SOIL EXCAVATED TO APPROXIMATELY 1-FOOT DEPTH

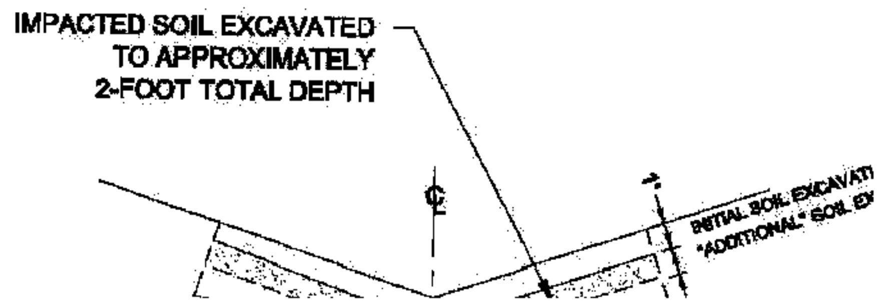


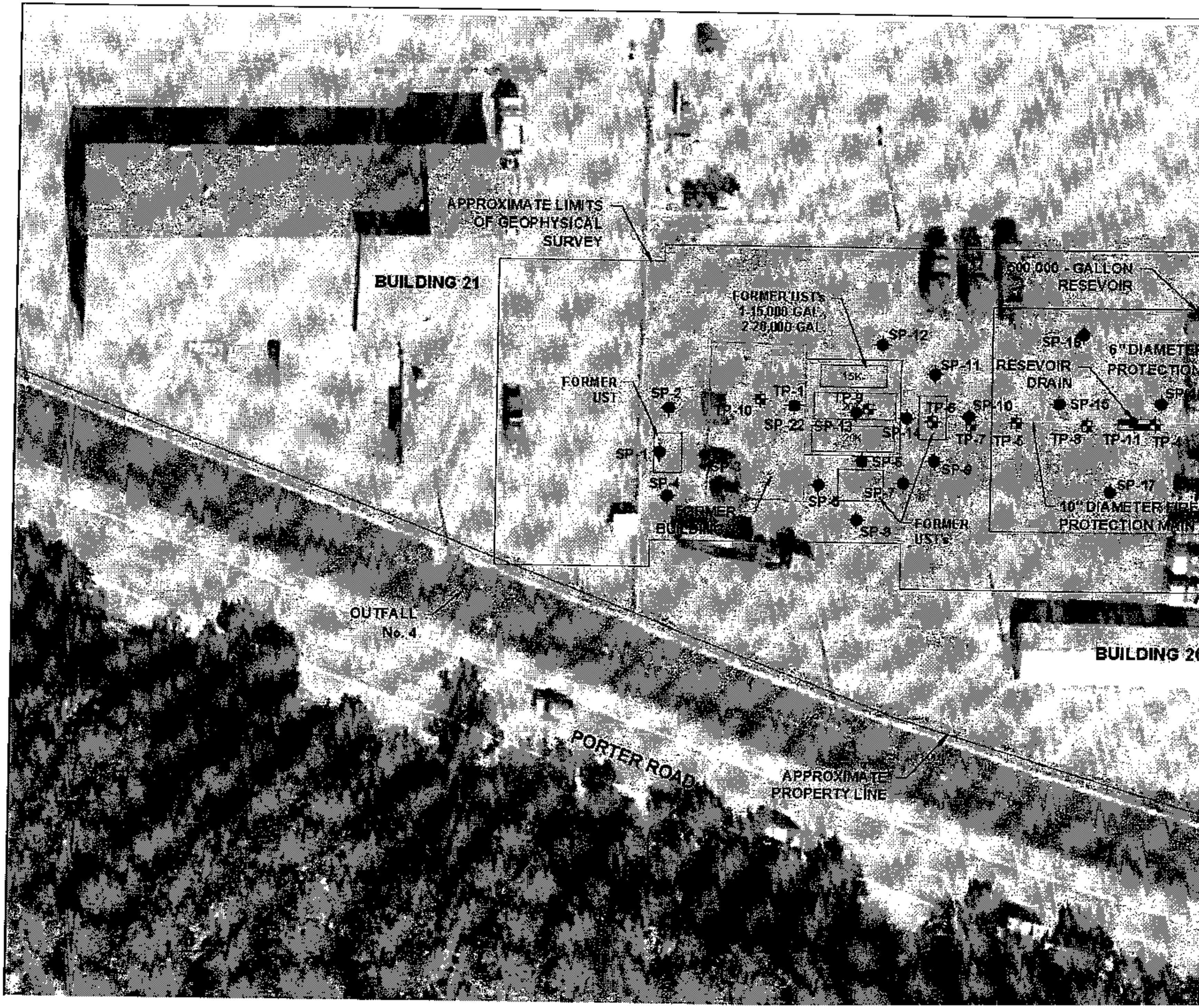

APPROXIMATE EXCAVATION LIMITS
24" Ø CMP
APPROXIMATE CENTERLINE OF SWALE
CS-1
CS-2
CS-3
CS-4
CS-5
CS-6
CS-7
PORTER ROAD
POST-EXCAVATION COMPOSITE SAMPLES COLLECTED ON 9/16/09
IMPACTED SOIL EXCAVATED TO APPROXIMATELY 1-FOOT DEPTH
20'
CS-1
CONFIRMATORY SAMPLE LOCATION (AS SHOWN ON THIS FIGURE)
DITCH SE
NOT TO SCALE

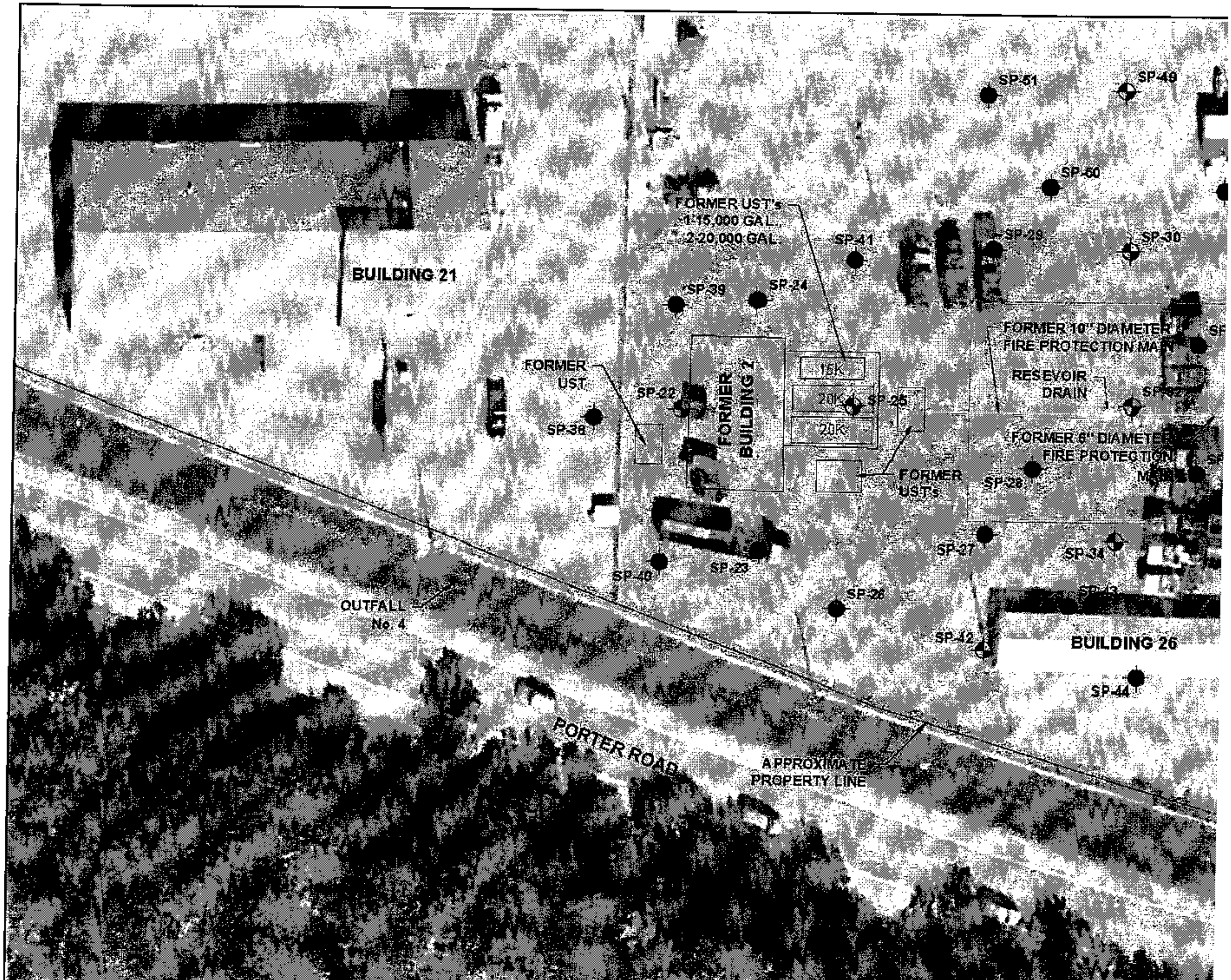

24" Ø CMP
CS-15
(0.007 J mg/kg)
CS-14
(0.006 J mg/kg)
CS-13
APPROXIMATE "ADDITIONAL" EXCAVATION LIMITS
PORTER ROAD

LEGEND:


20'
CS-12
2.5'
5'


IMPACTED SOIL EXCAVATED TO APPROXIMATELY 2-FOOT TOTAL DEPTH
1'


BUILDING 21
APPROXIMATE LIMITS OF GEOPHYSICAL SURVEY
FORMER UST
FORMER USTs 1-15,000 GAL, 2-20,000 GAL
15K
20K
SP-1
SP-2
SP-4
SP-5
SP-6
SP-7
SP-8
SP-9
SP-10
SP-11
SP-12
SP-13
SP-14
SP-15
SP-16
SP-17
SP-22
TP-1
TP-2
TP-4
TP-5
TP-6
TP-7
TP-8
TP-10
TP-11
FORMER USTs
500,000 - GALLON RESEVOIR
RESEVOIR DRAIN
10" DIAMETER FIRE PROTECTION MAIN
BUILDING 26
OUTFALL No. 4
PORTER ROAD
APPROXIMATE PROPERTY LINE



BUILDING 21
FORMER UST's
1-15,000 GAL.
2-20,000 GAL.
SP-51
SP-49
SP-50
SP-41
SP-29
SP-30
SP-39
SP-24
FORMER 10" DIAMETER
FIRE PROTECTION MAIN
RESEVOIR
DRAIN
FORMER
UST
SP-22
FORMER
BUILDING 2
15K
20K
20K
SP-25
SP-38
FORMER 6" DIAMETER
FIRE PROTECTION
MAIN
FORMER
UST's
SP-28
SP-27
SP-34
SP-40
SP-23
SP-26
SP-43
OUTFALL
No. 4
SP-42
BUILDING 26
SP-44
PORTER ROAD
APPROXIMATE
PROPERTY LINE

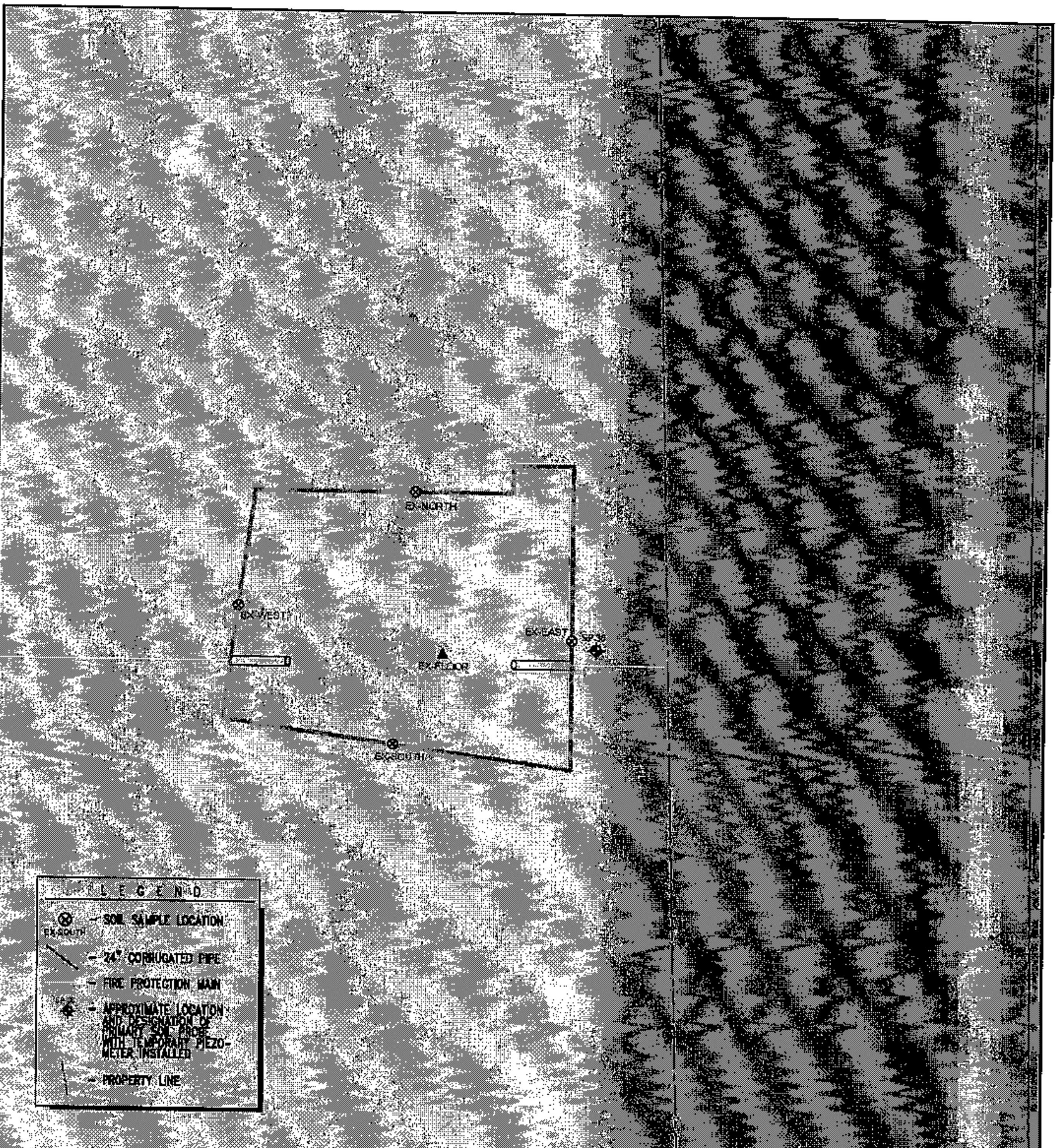
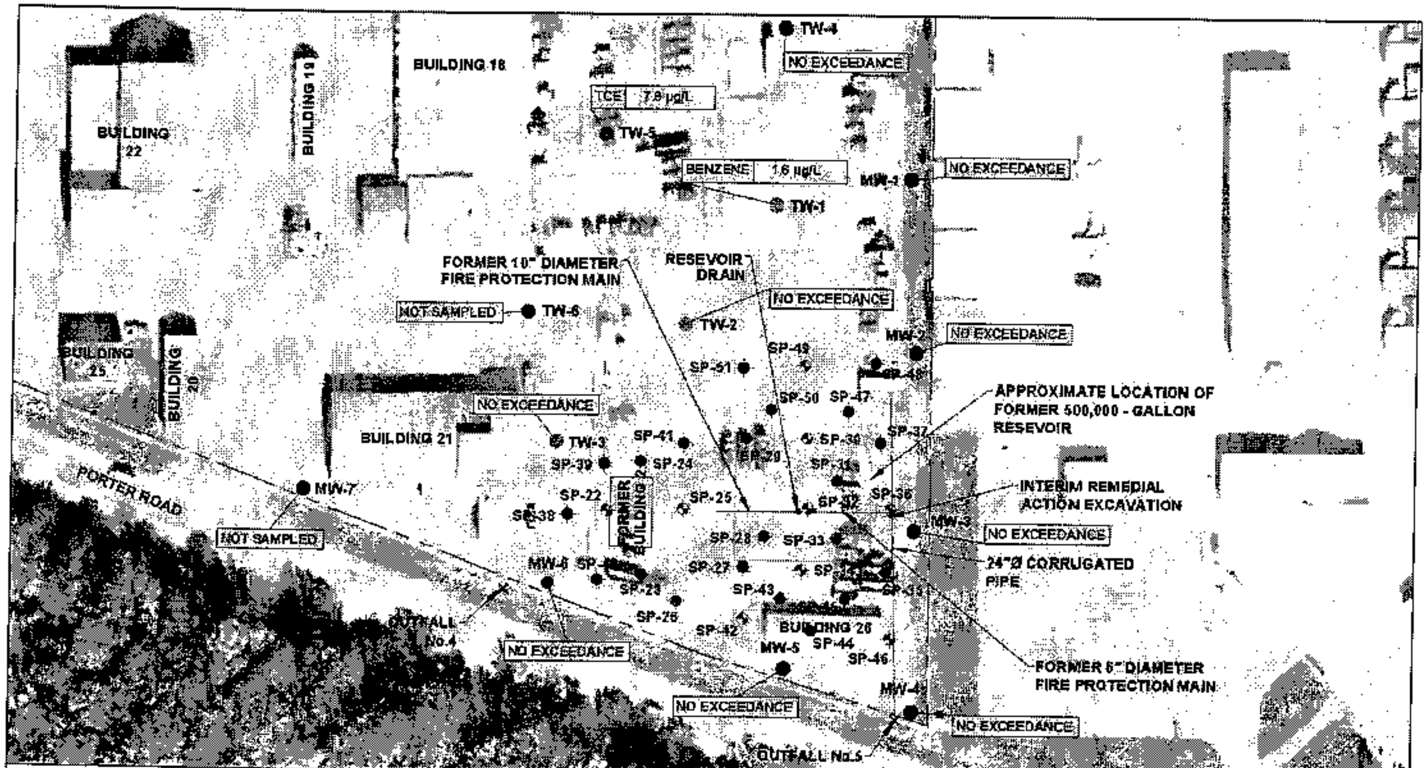


FIGURE 9
EXCAVATION LOCATION MAP
NIAGARA FALLS AFRC COMPLEX
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: 1"=5'	JOB No.: 895-08
CK'D. BY: TD	DATE: 11/29/11	FILE NO.: 895-08
REV. NO. --	REV. DATE: --	FIGURE NO.: 9



LEGEND:

- MW-6 ● MONITORING WELL LOCATION
- TW-3 ● PRIMARY TEMPORARY WELL LOCATION
- TW-6 ● SECONDARY TEMPORARY WELL LOCATION
- SP-51 ● SOIL PROBE LOCATION (SEPT. 2011)
- SP-38 SOIL PROBE AND TEMPORARY WELL LOCATION (SEPT. 2011)

NOTES:

1. BASE MAP ADAPTED FROM A 2009 AERIAL PHOTO AND PROPERTY LINE DOWNLOADED FROM http://www.bing.com/maps AND FIELD OBSERVATIONS.
2. THE SIZE AND LOCATION OF EXISTING SITE FEATURES SHOULD BE CONSIDERED APPROXIMATE.
3. ONLY COMPOUNDS THAT EXCEED THE GROUNDWATER CLASS GA CRITERIA ARE SHOWN.
4. TW-8 AND MW-7 DID NOT CONTAIN A SUFFICIENT VOLUME OF WATER FOR SAMPLING.

SCALE IN FEET
20 0 40 60

FIGURE 10
SAMPLE LOCATION / GROUNDWATER CONCENTRATION MAP
USAFRC
NIAGARA FALLS, NEW YORK

PARS ENVIRONMENTAL, INC.
ROBBINSVILLE, NEW JERSEY

DR. BY: JA	SCALE: AS SHOWN	JOB No.: 895-06
CKD. BY: MM	DATE: 2/13/13	FILE NO.: 895-06
REV. NO. --	REV. DATE: --	FIGURE NO.: 10

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau A
625 Broadway, 12th Floor, Albany, NY 12233-7015
P: (518) 402-9625 | F: (518) 402-9627
www.dec.ny.gov

March 27, 2015

Mr. Thomas Lineer
BRAC Division
Office of the Assistant Chief of Staff for Installation Management
Department of the Army
600 Army Pentagon
Washington, DC 20310-0600

Re: Niagara Falls US Armed Forces Reserve Center, Site # 932152

Dear Mr. Lineer:

The New York State Department of Environmental Conservation and the New York State Department of Health have reviewed the February 2015 No Further Action Record of Decision for the Niagara Falls US Armed Forces Reserve Center. The State concurs with the remedy selection documented in this Record of Decision.

The future reuse within the area of the Site where the Areas of Concern are located includes a paved parking lot and commercial building. Residential use of the Site is not reasonably anticipated due to the close proximity to the airport runways, hangers, and taxiway as well as the adjacent light industrial zoning and the Town of Niagara Local Reuse Authority's future use for commercial/industrial purposes. A restriction prohibiting residential land use and groundwater use will be included in the deed transferring the Site.

If you have any questions, please contact Mr. John Swartwout at (518)402-9620.

Sincerely,

James B. Harrington, P.E. Director
Remedial Bureau A
Division of Environmental Remediation

Ec: J. Swartwout, NYSDEC
C. Doroski, NYSDOH
R. Ramsdell, US Army