SECOND FIVE-YEAR REVIEW REPORT
FOR
NIAGARA FALLS ARMED FORCES RESERVE CENTER (AFRC)
BRAC PROPERTY
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM U.S. ARMY BASE REALIGNMENT AND CLOSURE PROGRAM

and

SITE MANAGEMENT PERIODIC REVIEW REPORT AND IC/EC CERTIFICATION SUBMITTAL
NIAGARA FALLS ARMED FORCES RESERVE CENTER
SITE NO.: 932152
SITE ADDRESS: 9400 PORTER ROAD
NIAGARA FALLS, NY 14304-5713

March 2026

Prepared for:
Headquarters Dept. of the Army
Deputy Chief of Staff, G-9
600 Army Pentagon
Washington DC 20310

Prepared by

U.S. Army Corps of Engineers (USACE)
Buffalo District and Louisville District

SECOND FIVE-YEAR REVIEW REPORT
FOR
NIAGARA FALLS ARMED FORCES RESERVE CENTER (AFRC)
BRAC PROPERTY
9400 PORTER ROAD
NIAGARA FALLS, NEW YORK
DEFENSE ENVIRONMENTAL RESTORATION PROGRAM U.S. ARMY BASE REALIGNMENT AND CLOSURE PROGRAM

Additionally submitted to satisfy substantial requirements for the following:

SITE MANAGEMENT PERIODIC REVIEW REPORT AND IC/EC CERTIFICATION SUBMITTAL
NIAGARA FALLS ARMED FORCES RESERVE CENTER
SITE NO.: 932152
SITE ADDRESS: 9400 PORTER ROAD
NIAGARA FALLS, NY 14304-5713

Approved By:

STEPHANIE SANTIAGO
BRAC PROGRAM MANAGER
HQDA/OASA-IEE

03/06/2026
Date

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS 3
I. INTRODUCTION 4
FIVE-YEAR REVIEW SUMMARY FORM 6
II. RESPONSE ACTION SUMMARY 6
Pre-ROD Remedial Actions 7
Basis for Taking Action 8
Response Actions 10
Status of Implementation 11
III. PROGRESS SINCE THE LAST REVIEW 11
IV. FIVE-YEAR REVIEW PROCESS 11
Community Notification, Involvement & Site Interviews 11
Data Review 12
Site Inspection 12
V. TECHNICAL ASSESSMENT 12
QUESTION A: Is the remedy functioning as intended by the decision documents? 12
QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid? 12
QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy? 13
VI. ISSUES/RECOMMENDATIONS 13
OTHER FINDINGS 14
VII. PROTECTIVENESS STATEMENT 14
VIII. NEXT REVIEW 15
IX. REFERENCES 15

TABLES

Table 1 – Risk Characterization Carcinogenic Summary
Table 2 – Risk Characterization Non-Carcinogenic Summary
Table 3 – Protectiveness Determinations/Statements from the 2020 FYR

FIGURES

Figure 1 – Site Location Map
Figure 2 – Site Features
Figure 3 – Areas of Concern Map
Figure 4 – Soil Delineation Map and Excavation Limit
Figure 5 – Sample Location/Groundwater Concentration Map
Figure 6 – Airport Land Use Plan

APPENDICES

Appendix A: NYSDEC IC-EC Certification
Appendix B: Figures
Appendix C: Deeds of Transfer

Appendix D: Site Inspection
Appendix E: Photographic Record
Appendix F: Interview Record
Appendix G: Public Notice
Appendix H: Risk Assessment and Toxicology Evaluation

LIST OF ABBREVIATIONS & ACRONYMS

AFRC	Armed Forces Reserve Center
AOC	Area of Concern
bgs	below ground surface
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
Class GA	New York Water Classification Class GA: fresh groundwater
CPC	contaminant of potential concern
CSCO	Commercial Soil Cleanup Objective
DPW	Department of Public Works
FYR	Five-Year Review
HHRA	Human Health Risk Assessment
IRA	Interim Remedial Action
LUC	Land Use Control
MCL	Maximum Contaminant Limit
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
PCB	polychlorinated biphenyl
PP	Proposed Plan
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
SVOC	Semi-Volatile Organic Compound
TCL	Target Compound List
USACE	United States Army Corps of Engineers
USCO	Unrestricted Soil Cleanup Objective
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tanks
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of these reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

This FYR was completed pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 U.S.C. §§9601 et. seq.) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300.430(f)(4)(ii)) and the Defense Environmental Restoration Program (DERP, 10 U.S.C. §§2701 et. seq.), as implemented in accordance with the Defense Environmental Restoration Program Manual (DoDM 2018).

This is the second FYR for the Niagara Falls Armed Forces Reserve Center (AFRC) located at 9400 Porter Road in Niagara Falls, New York. The triggering action for this statutory review is the due date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants, or contaminants remain at the site at concentrations that do not allow for unlimited use and unrestricted exposure (UU/UE). Only Industrial Land Use, the reasonably anticipated future land use, was fully evaluated and assessed during the remedial investigations. Additionally, this FYR fulfills substantial requirements for the New York State Department of Conservation, Division of Environmental Remediation (DER) requirement for a Site Management Periodic Review Report (PRR). Section 6.3(b) of DER-10 *Technical Guidance for Site Investigation and Remediation* (available online at http://www.dec.ny.gov/regulations/67386.html) While the FYR report varies slightly in terms of content when compared to the format of a PRR, this FYT report meets the substantial requirements for a PRR. This FYR also contains an Appendix with the DER Certification of Institutional Controls/Engineering Controls (IC/ECs). The IC/EC certification supports that the IC/EC requirements are in place as intended and are functioning.

The Niagara Falls AFRC Five-Year Review was led by U.S. Army Corps of Engineers USACE. Participants included a Project Engineer with the USACE Buffalo District, a PhD, toxicology and risk review with the USACE Buffalo District, and the Project Manager for the USACE Louisville District. The USACE Louisville District provided the internal technical review for this FYR. The review began on 9/19/2024.

Site Background

The Niagara Falls Armed Forces Reserve Center (AFRC) Site consists of approximately 19.5 acres. The Site is currently vacant. There is a collection of buildings on the property, including a former Army reserve center, various building and shops, and a large aircraft hangar that includes service areas. The property is almost completely paved (Figure 2). The Site is located in the town of Niagara, Niagara County, New York and is located within the southern portion of the Niagara Township. The property is bounded by airport hangars and taxiways to the North and East, Porter Road to the South, and woods and retail commercial property to the West. See Figure 1 for site location and boundaries. The immediate area surrounding the Site is zoned as Light Industrial and the Site is subject to local codes including the Town of Niagara Zoning Ordinance. The Niagara Falls International Airport Sustainability Master Plan (NFTA, 2021) concludes that residential structures that are non-compatible to the Runway Protection Zone, already exist in the vicinity of Runways 6 and 10R on the opposite side of Porter Road. Site Boundaries are shown in Figure 2.

Army investigation and remediation activities have addressed 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 addressed six former underground storage tanks (USTs) and a former fueling area adjacent to former Building 2 (Figure 3).

Topography

The Site is relatively flat with a slight gradient to the west/southwest and the elevation is approximately 575 feet above mean sea level. 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.

Geology

The Site 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 (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 110 feet of sandstone and shale (Medina Group).

Soils encountered during the site inspection (SI) and remedial investigation (RI) consisted of noncohesive 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 mix. Native surficial soils are comprised of silty clay with trace fine sand. Bedrock was not encountered during the investigation and proves were not advanced beyond 13 feet bgs.

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 how 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 (CH2MHill, 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.

The past investigations of groundwater at the Site were 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.

Land Use

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. All operations related to Army mission on the site ceased as of September 15, 2011, per Base Realignment and Closure (BRAC)law (Pub. Law 105-101). In September 2018, ownership of the Site was transferred from the Army to the town of Niagara. Subsequently in April 2019, the site was sold by the Town of Niagara to Reger Holdings LLC. The property was then sold again to Stavatti Aerospace in 2020. The town of Niagara retained 3.7 acres of land for proposed projects. Language restricting residential use is included in the current quitclaim deed (Appendix C) and as documented by the 2015 Record of Decision (ROD).

Surface and storm water drain to Cayuga Creek located immediately south of Porter Road where there 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. Figure 6 shows the Airport Land Use Plan from the Niagara Falls International Airport Sustainable Airport Master Plan (NFTA 2021). The Sustainable Master Plan was updated in 2021, but the figure is from 2014 and shows the property as still being owned by the US Army. Based on the Site location and Army BRAC policy when transferring commercial property under an Economic Development Conveyance, a restriction prohibiting residential use was included in the deed transferring the property.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Niagara Falls AFRC		
EPA ID: NY8210424273		
Region: 2	**State:** NY	**City/County:** Town of Niagara, Niagara County
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: Department of Defense		
Author name: Laura Rosten		
Author affiliation: USACE Buffalo District		
Review period: 9/19/2024 - 3/31/2025		
Date of site inspection: 3/14/2025		
Type of review: Statutory		
Review number: 2		
Triggering action date: 4/3/2020		
Due date *(five years after triggering action date)*: 4/3/2025		

II. RESPONSE ACTION SUMMARY

Pre-ROD Remedial Actions

The Niagara Falls AFRC is not on the National Priorities List and the Army investigated the Site as the lead agency in accordance with the delegated authorities under Executive Order 12580, as amended. The environmental investigations were completed under CERCLA, the NCP and the Defense Environmental Restoration Program. The investigations, reports, and recommendations were completed in accordance with these statutory authorities and followed DoD and EPA guidance documents.

An investigation of Outfall No. 5 and the drainage swale was performed between October 2008 and August 2009. Aroclor 1254 (a polychlorinated biphenyl - PCB) 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. In September 2009, approximately 134 tons of PCB contaminated soils were excavated from the drainage swale. Perchloroethene (PCE) was also detected in the post-excavation soil samples at Outfall No. 5 and from the drainage swale but all concentrations were less than the New York State Department of Conservation (NYSDEC) Maximum Contaminant Level (MCL) of 1 mg/kg. The 24-inch diameter storm sewer was also cleaned as part of this remedial action.

In November and December 2010, an SI including a geophysical survey, exploratory excavations and soil and water sampling was performed to evaluate potential impacts associated with the former underground storage tanks (USTs) at the former Building 2 and the fire protection main. Twelve exploratory excavations were completed based on the findings of the geophysical survey. A 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 free product and a heavy sheen were observed within the fill material and on the ground water surface in the exploratory excavation at TP-12. Several compounds, including PCBs, were detected in a water sample collected from TP-12 at concentrations exceeding the NYSDEC Water Quality Classification Class GA (fresh groundwater) Objectives. A drum vacuum was used to remove petroleum impacted water from the excavation area.

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. 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, PCBs, SVOCs were detected in soil samples, and several were greater than the NYUSCO or the CSCO.

As part of the RI, 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, trichloromethane, SVOCs and PCBs were detected in groundwater at concentrations greater than that of their respective Class GA Criteria.

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. Approximately 40 tons of soil was removed from the excavation and transported off-site for proper disposal. The soil was contaminated with VOCs, CVOCs, and PCBs

During the IRA 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 the IRA soil removal activities, an approximately 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 Polyvinyl chloride (PVC) cap prior to backfilling.

Five confirmatory soil samples were collected from this excavation during the IRA. The confirmatory soil samples were analyzed for Target Compound List (TCL) Volatile Organic Compound (VOCs), TCL Semi-Volatile Organic Compound (SVOCs) and PCBs. No compounds were detected in the confirmatory samples at concentrations exceeding the applicable USCOs and Commercial Use Soil Cleanup Objectives (CSCO) (NYSDEC Unrestricted Use Soil Cleanup Objectives (USCO) and CSCO.

Basis for Taking Action

In September 2011, a RI as required under 40 CFR 300.430(d)) of soil and groundwater was performed in the vicinity of 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 of the eastern boundary of the Site. Thirty 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. A supplemental investigation was performed in November 2012 to further evaluate the horizontal extent of groundwater impacts on the eastern portion of the Site. Based on the findings of the investigation and remediation activities, a Human Health Risk Assessment (HHRA), was performed for the Site.

During the HHRA, site-related chemicals selected for quantitative evaluation were identified as chemicals of potential concern (CPCs) based on analytical results collected as part of RI activities. The CPCs identified in subsurface soil using NYSDEC USCO included benzo(a)anthracene, dibenzo(a,h)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, Aroclor 1254, and Aroclor 1260. CPCs identified in groundwater using NYSDEC Class GA criteria included benzene, benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, trichloroethene, Aroclor 1254, and Aroclor 1260.

The exposure assessment was completed considering current and reasonably anticipated future use of the site, contaminated media, and the nature of contaminants. The following exposure pathways were identified for the construction worker and industrial/commercial worker (subsurface soil exposures only):

- dermal exposure to subsurface soil and groundwater;
- inhalation of subsurface soil particulates and groundwater; and
- ingestion of subsurface soil and groundwater.

The current and reasonably anticipated future land use is Industrial/Commercial Land Use. Residential (Unrestricted) Land Use was not evaluated in the HHRA. However, the residential drinking water standards were used for the groundwater ingestion exposure pathway since there are no industrial

groundwater values for ingestion. No change in land use is expected and was deemed unlikely. In addition, there are environmental restrictions and use limitations on what the Site can be used for since it is located adjacent to airport taxiways, hangers, and runways. Therefore, residential use was not considered as part of the risk assessment and a residential land use scenario was not included for potential exposure to soils and groundwater in the HHRA.

A review of the HHRA was conducted during the public comment period of the Proposed Plan. It was discovered that an incorrect Averaging Time (an exposure parameter used in the calculations of excess lifetime cancer risks) was used in the human health risk calculations. The Averaging time was corrected from one year to 70 years and the HHRA was revised accordingly. The updated exposure assessment and toxicity assessment were then integrated to developed both quantitative and qualitative risk evaluations. The calculated risks for carcinogenic and non-carcinogenic exposures are summarized on Tables 1 and 2. Based on the subsurface soil and groundwater data, no unacceptable non-carcinogenic or carcinogenic risks were identified under existing or future conditions. The total excess lifetime cancer risks for the construction worker and industrial/commercial worker were within the acceptable risk range set by the USEPA (1×10^{-4} to 1×10^{-6}) and total non-carcinogenic adverse health effects were significantly less than the hazard quotient of one. Therefore, no unacceptable cancer risks or non-carcinogenic adverse health effects were identified for either receptor evaluated in the HHRA: the commercial/industrial and construction worker. Residential use of the Site is not reasonably anticipated due to the close proximity to the airport taxiways, hangers, and runways and was not evaluated. Additionally, restrictions that prohibit residential use and any ingestion of groundwater were included in the deed when the Site was transferred.

Table 1: Summary of Excess Lifetime Cancer Risks.

Media	Population	Excess Lifetime 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-09	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 2: Summary of Non-Carcinogenic Hazard Quotients,

Media	Population	Non-Cancer Hazard Quotient	Principal Contributing Pathway
Subsurface Soil	Commercial/Industrial Worker	1.78E-01	Dermal contact
Total Subsurface Soil HQ – Commercial/Industrial Worker		**1.78E-01**	
Subsurface Soil	Construction Worker	1.28E-02	Dermal contact

Total Subsurface Soil HQ– Construction Worker		**1.28E-02**	
Groundwater	Construction Worker	5.45E-02	Dermal contact
Total Groundwater HQ – Construction Worker		**5.45E-02**	

Response Actions

The ROD (40 CFR 300.430(f)) for the Site was signed April 3, 2015, to address environmental impacts of the various releases related to and 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 (AOC) are shown on Figure 3. Remedial action objectives (RAOs, 40 CFR 300.430(d))) was established in the ROD as follows:

- 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.

The RAOs were established based on the results of the 2014 HHRA which had calculated that a construction worker's total potential risk from exposure to groundwater was greater than the acceptable risk range set by the USEPA in the NCP (1×10^{-4} to 1×10^{-6}). No non-carcinogenic adverse health effects were identified. The potential excess lifetime cancer risks were calculated considering that the worker engaged in an excavation activity within the groundwater zone but were based on an incorrect Averaging Time. When the averaging time was revised. no unacceptable risk to the construction worker (see the Basis of Taking Action section and Table 1) were identified. Although the revised HHRA resulted in no unacceptable risks to the commercial/industrial and construction worker, the RAOs were not updated at that time.

The No Further Action Alternative was not the Preferred Alternative but was selected in the ROD because: removal actions had already occurred on the Site and the No Action Alternative provided the same degree of protectiveness since there were now no unacceptable risks to receptors (based on the results of the revised HHRA). Additionally, the Preferred Alternative was also required the development of a Site Management Plan and Site Implementation Plan (NYSDEC requirement). However, on 5 August 2025, the NYSDEC sent a letter to the Army regarding a Site Management Periodic Review Report and Institutional Control/Engineering Control (IC/EC) Certification. The NYSDEC stated that Federal facilities such as this one which are subject to FYRs, the FYR Report will suffice for a Periodic Review Report (PRR) and that they expected the Army to include a completed NYSDEC IC/EC Certification as an appendix or exhibit to the FYR Report. Although this was not part of the No Further Action Alternative but is a requirement by the NYSDEC, it is included here in this FYR Report. The completed form can be found in Appendix B. Although residential use of the Site is not reasonably anticipated due to the close proximity to the airport runways, hangers, and taxiways and the adjacent property zoning/use, NYSDEC requested a restriction prohibiting residential land use and groundwater use to be included in the deed transferring the Site. The Army agreed as it was consistent with Army policy when property is conveyed for non-residential use under an Economic Development Conveyance. Additionally, the 2015 ROD states that the No Further Action decision is based solely on the Site remaining non-residential (Commercial/Industrial Land Use). Therefore, no RAOs or Remedial Goals (RGs) to achieve residential (UU/UE conditions) were established. The restriction (IC) prevents Residential Land Use on the Site.

Status of Implementation

In January 2018, a Finding of Suitability to Transfer (FOST) was prepared to document the environmental suitability of the Site for transfer to the Town of Niagara Local Redevelopment Authority (LRA). The FOST included Deed Provisions and the Environmental Protection Provisions.

The property was first transferred outside the Army in September 2018. The Environmental Protection Provisions are documented in Exhibit D of the 2018 deed. The provisions included a residential use restriction that stated the property shall not be used for residential purposes including single family or multi-family residences, pre-school and childcare facilities, playgrounds, nursing home or assisted living facilities, and any type of educational facility for children/young adults in grades kindergarten through 12. These land use controls are an added measure intended for the Site to continue to meet the RAOs. The Environmental Protection Provisions memorialized in the deed will continue to be transferred to any new ownerships. The property was transferred again in April 2019 and 2020. The recorded deeds are included in Appendix C.

III. PROGRESS SINCE THE LAST REVIEW

Table 3 identifies the protectiveness determination and statement recorded for the Niagara Falls AFRC during the last FYR (USACE 2020).

Table 3: Protectiveness Determinations/Statements from the 2020 FYR

Protectiveness Determination	Protectiveness Statement
Protective	The remedy at Niagara AFRC is protective of human health and the environment. The risk assessment conducted at the site shows that there is no risk to human health and the environment and that no action is required based on the reasonably anticipated future land use of commercial and industrial. Review of the current Deed shows LUCs are in place (Deed restrictions on residential use), and the Town of Niagara zoning review confirms that there is no plan for residential use.

No issues affecting protectiveness were identified for the Niagara Falls AFRC during the 2020 FYR (USACE 2020).

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by newspaper posting in The Buffalo News on 6/19/2025, stating that there was a five-year review and inviting the public to submit any comments to USACE. The results of the review and the report will be made available at the Site information repository located at name of repository, physical or electronic address of repository.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. Individuals interviewed included: the Zoning Officer/Building Inspector for the Town of Niagara and the Chief Strategic Development and Asset Officer with Stavatti Aerospace Niagara. The results of these interviews are summarized below.

- Deed restrictions are in-place to prohibit residential use of the Site. The current property owner plans to use the property in accordance with current zoning.
- The Site (9400 Porter Road, Niagara Falls) is zoned in a heavy industrial zoned district. The Site is currently categorized as vacant industrial with no business licenses registered to the property and no certificates of occupancy issued.
- Adjacent properties are zoned light industrial and general business with legal non-conforming single-family homes to the west of the Site. There is interest in rezoning this area to a zone that would allow both the existing and future commercial and residential mix used. This rezoning would not affect the zoning status of the Site or the protectiveness of the remedy.

Data Review

No environmental sampling data was collected during the review period.

Site Inspection

The inspection of the Site was conducted on 3/14/2025. In attendance were a project engineer with USACE Buffalo District and a representative from Stavatti Aerospace Niagara. The purpose of the inspection was to assess the protectiveness of the remedy. The no observations or issues were noted during the site inspection that would call into question the protectiveness of the remedy.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Yes, the remedy is functioning as intended by the ROD. The ROD selected an NFA remedy and a restriction on residential use to be incorporated into the property transfer deed. The Site was first transferred outside the Army in 2018 with these restrictions included in the deed. A review of the transfer deeds and the Town of Niagara zoning of the Site has indicated the property will not be used for residential uses.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

The exposure assumptions and toxicity data used at the time of the remedy selection remain valid and no cleanup levels were established. The RAOs were determined to no longer be applicable, based on a weight-of-evidence evaluation of the groundwater inhalation pathway, as outlined below and detailed in Appendix H.

Changes in Toxicity and Other Contaminant Characteristics

Toxicity criteria used in the HHRA remain current, with the exception of carcinogenic slope factors for benzo(a)pyrene and other PAHs. PAH carcinogenicity has decreased in toxicity by a factor of ~7, resulting in the associated cancer estimates reported in the HHRA being overestimated relative to current estimates. There are also newly published non-cancer criteria for benzo(a)pyrene, which would produce new chemical hazard not previously quantified by the HHRA, which was determined to be negligible (Appendix H).

Changes in Exposure Pathways

The HHRA primarily used USEPA default values for exposure parameters, which remain current (Appendix H). The current and reasonably anticipated future land use at the site remains commercial/industrial and consistent with the no further action ROD, with restrictions to Land Use.

Changes in Risk Assessment Methods
The HHRA generally used the USEPA standardized risk assessment methodologies and guidance, which remain current. However, there were multiple departures from these standardized methods that required review in Appendix H.

The broadest deficiency was that non-cancer hazard was not comprehensively evaluated, instead being quantified only for dermal absorption and only for PCBs. This quantification itself was incorrect, as the dermally-absorbed dose calculated for evaluating carcinogenic endpoints, averaged over a 70-yr lifetime, was incorrectly applied for evaluating the non-carcinogenic endpoint. This resulted in the non-cancer hazard reported for construction worker dermal exposure to PCBs in groundwater being 70 times lower than it should have been (Appendix H). Correcting this calculation error would produce an unacceptable risk; however, the dermal absorption of PCBs from water contains considerable uncertainty overall, with USEPA guidance dictating that the dermal absorption coefficient used for quantification falls outside the effective prediction domain. As such, this quantification error may not substantially affect a determination regarding the health hazard associated with construction worker exposure to groundwater.

The most critical evaluation gap identified was non-cancer hazard associated with the inhalation of groundwater contaminants from a construction trench. The same trench inhalation model employed by the HHRA for evaluating carcinogenic effects was used here to evaluate non-carcinogenic effects. This resulted in an unacceptable hazard quotient (4.32) for construction workers associated with trichloroethene inhalation, which required a weight-of-evidence evaluation to make a further determination regarding the likelihood of site-specific exposure potentials to produce an adverse health effect. The weight-of-evidence evaluation found that the combination of the spatial extent of trichloroethene in groundwater, and its concentration (statistical estimates), and realistic exposure durations for construction workers exposed in a trench was unlikely to produce unacceptable non-cancer hazard (Appendix H). Therefore, while the HHRA did not evaluate non-cancer health endpoints for this key exposure pathway, the remedy remains protective of construction workers exposed to volatile groundwater contaminants in a confined trench atmosphere.

Expected Progress Towards Meeting RAOs
The existing RAOs associated with limiting exposure to groundwater during construction activities are not required to ensure protectiveness, and the previous five-year review recommendation that the RAOs should be withdrawn via an Explanation of Significant Differences document remains appropriate.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No, no other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations

Sites without Issues/Recommendations Identified in the Five-Year Review:
Niagara Falls AFRC

OTHER FINDINGS

The following are recommendations generated during the FYR and may improve management of the site but do not affect current and/or future protectiveness:

It is recommended that the RAOs are withdrawn and the FYR process and reporting requirements be modified to only require completing the NYSDEC IC/EC recertification every five years in lieu of doing a CERCLA Five Year Review if additional analysis indicates this as an option. The NYSDEC requires recertification for this Site (Niagara Falls Armed Forces Reserve Center (NYSDEC Site # 932152) and the IC/EC recertification would meet the CERCLA requirement of a FYR for the NFA Site with ICs (essentially no active remedy or remedial action underway, no inspections, only a requirement to verify Land Use has not changed). The HHRA completed for the RI showed potential unacceptable risk to construction workers due to an error in exposure assumptions, which resulted in the development of RAOs associated with limiting exposure to groundwater during construction activities. The RAOs were not updated or removed when the risk assessment was corrected. This FYR verified that the existing RAOs are not required to ensure protectiveness for the reasonably anticipated future use of the Site, which is industrial and commercial. The erroneous RAOs that were inadvertently included in the NFA ROD should be withdrawn. The NFA ROD should be modified via an Explanation of Significant Differences (ESD) to formally remove the RAOs.

Additionally, it is recommended that the ESD also include the results of an updated human health risk assessment. The risk assessment should include a residential land use exposure scenario. While Residential (Unrestricted) Land Use is not a reasonably anticipated future use of the site, the site was never evaluated using residential criteria. Depending upon the results of the risk assessment, the Site may meet the residential (unrestricted) land use and considered UU/UE. If no unacceptable risks to the residential receptor are identified and UU/UE is demonstrated, then the ESD would state these findings, and the Site could be closed by the DoD. Although, there is a Land Use Control memorialized in the deed, no additional CERCLA Five Year Reviews would be needed by the DOD and the requirement for NYSDEC IC/EC certification be completed every five years instead would have to be completed by the current landowner.

If the risk assessment does show the potential for unacceptable risks to residential receptors and UU/UE is not met, the ESD could be modified to document that a LUC is needed and the DoD would continue to be required to submit the IC/EC recertification form NYSDEC every five years rather than being attached as an Appendix to the FYR Report. The ESD can document that the IC/EC serves the same purpose as a CERCLA FYR and that the LUC is already in place. This would eliminate duplicative efforts by the DoD by having to complete both an IC/EC certification and a FYR Report every five years.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
Site: Niagara Falls AFRC	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy at the Niagara Falls AFRC is protective of human health and the environment. Restrictions to prohibit Residential (Unrestricted) Land Use have been implemented through use restrictions included in the deeds of transfer. Current land use and planned future land use is within the use restrictions. Town of Niagara zoning review also confirms there is no plan for residential use. Therefore, determination made in the ROD that residential use of the property is not reasonably anticipated remains valid and the remedy remains protective.	

VIII. NEXT REVIEW

The next five-year review report for the Niagara Falls AFRC is to be completed by April 2030.

IX. REFERENCES

CH2M Hill. 2007. Environmental Condition of Property Report, Niagara Falls USAR Center, Niagara Falls, New York. July 2007.

Niagara Falls International Airport (NFTA). 2021. Niagara Falls International Airport Sustainability Master Plan. February 2021.

PARS Environmental, Inc. 2009. PCB Spill Delineation Report, Outfall 5 Storm Water Culvert, Cleanup and Ditch Remediation. May 2009.

PARS Environmental, Inc. 2010. 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. 2011. 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. 2014. Final-Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment. December 2014.

PARS Environmental, Inc. 2013a. Final Supplemental Investigation Report. March 2013.

PARS Environmental, Inc. 2013b.Final Revised Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment. March 2013.

US. Army. 2015. February Niagara Falls Armed Forces Reserve Center, No Further Action Record of Decision. February 2015.

USACE. 2020. Second Five-Year Review, Niagara Falls Armed Forces Reserve Center. October 2020

Appendix A
NYSDEC IC-EC
CERTIFICATE

Enclosure 1

Certification Instructions

I. Verification of Site Details (Box 1 and Box 2):

Answer the three questions in the Verification of Site Details Section. The Owner and/or Qualified Environmental Professional (QEP) may include handwritten changes and/or other supporting documentation, as necessary.

II. Certification of Institutional Controls/ Engineering Controls (IC/ECs)(Boxes 3, 4, and 5)

1.1.1. Review the listed IC/ECs, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party should petition the Department separately to request approval to remove the control.

2. In Box 5, complete certifications for all Plan components, as applicable, by checking the corresponding checkbox.

3. If you cannot certify "YES" for each Control listed in Box 3 & Box 4, sign and date the form in Box 5. Attach supporting documentation that explains why the **Certification** cannot be rendered, as well as a plan of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is completed.

If the Department concurs with the explanation, the proposed corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Department's Project Manager. Once the corrective measures are complete, a new Periodic Review Report (with IC/EC Certification) must be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 6 and Box 7**):**

If you certified "YES" for each Control, please complete and sign the IC/EC Certifications page as follows:

- For the Institutional Controls on the use of the property, the certification statement in Box 6 shall be completed and may be made by the property owner or designated representative.

- For the Engineering Controls, the certification statement in Box 7 must be completed by a Professional Engineer or Qualified Environmental Professional, as noted on the form.

Enclosure 2
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form
Site Details **Box 1**

Site No. **932152**

Site Name **Niagara Falls Armed Forces Reserve Center**

Site Address: 9400 Porter Road Zip Code: 14304-5713
City/Town: Niagara Falls
County: Niagara
Site Acreage: 19.520

Reporting Period: September 20, 2020, to September 20, 2025

	YES	NO
1. Is the information above, correct?	YES	❑ ❑
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?		NO
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	❑	NO ❑
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	❑	NO ❑
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	❑	NO ❑

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? ❑ ❑ Commercial and Industrial	YES	
7. Are all ICs in place and functioning as designed?	YES	❑ ❑

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

_____ _____
Signature of Owner, Remedial Party or Designated Representative **Date**

SITE NO. 932152

Box 3

Description of Institutional Controls

Parcel	Owner	Institutional Control
	Niagara Falls Airport Center of Commerce	**Land use Restriction** **Prohibition on residential use**

Box 4

Description of Engineering Controls

None Required

Not Applicable/No EC's

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the Engineering Control certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

	YES	NO
	YES	❑❑

2. For each Engineering control listed in Box 4, I certify by checking "YES" below that all of the following statements are true:

   (a) The Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place or was last approved by the Department.

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment.

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

	YES	NO
	YES	❑❑

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and

DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

_____ _____

Signature of Owner, Remedial Party or Designated Representative Date

IC CERTIFICATIONS
SITE NO. 932152

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I __Stephanie Santiago _____ at
Print name

BRAC Program Manager
Office of the Assistant Secretary of the Army (IE&E),
DASA-ESOH, Base Realignment and Closure (BRAC),
ATTN: SAIE-ESOZ-BRAC (Office: 5B115A-2)
110 Army Pentagon,
Washington, DC 20310-0110

Print business address

am certifying as _____REMEDIAL PARTY_____ (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

03/06/2026

_____ _____

Signature of Owner, Remedial Party, or Designated Representative Rendering Certification Date

Enclosure 3 ***(See Second Five-Year Review Report for the PRR Components and Content)***
Periodic Review Report (PRR) General Guidance

I. Executive Summary: (1/2-page or less)
   A. Provide a brief summary of site, nature and extent of contamination, and remedial history.
   B. Effectiveness of the Remedial Program - Provide overall conclusions regarding;
      1. progress made during the reporting period toward meeting the remedial objectives for the site
      2. the ultimate ability of the remedial program to achieve the remedial objectives for the site.
   C. Compliance
      1. Identify any areas of non-compliance regarding the major elements of the Site Management Plan (SMP, i.e., the Institutional/Engineering Control (IC/EC) Plan, the Monitoring Plan, and the Operation & Maintenance (O&M) Plan).
      2. Propose steps to be taken and a schedule to correct any areas of non-compliance.
   D. Recommendations
      1. recommend whether any changes to the SMP are needed
      2. recommend any changes to the frequency for submittal of PRRs (increase, decrease)
      3. recommend whether the requirements for discontinuing site management have been met.

II. Site Overview (one page or less)
   A. Describe the site location, boundaries (figure), significant features, surrounding area, and the nature and extent of contamination prior to site remediation.
   B. Describe the chronology of the main features of the remedial program for the site, the components of the selected remedy, cleanup goals, site closure criteria, and any significant changes to the selected remedy that have been made since remedy selection.

III. Evaluate Remedy Performance, Effectiveness, and Protectiveness
   Using tables, graphs, charts and bulleted text to the extent practicable, describe the effectiveness of the remedy in achieving the remedial goals for the site. Base findings, recommendations, and conclusions on objective data. Evaluations and should be presented simply and concisely.

IV. IC/EC Plan Compliance Report (if applicable)
   A. IC/EC Requirements and Compliance
      1. Describe each control, its objective, and how performance of the control is evaluated.
      2. Summarize the status of each goal (whether it is fully in place and its effectiveness).
      3. Corrective Measures: describe steps proposed to address any deficiencies in ICECs.
      4. Conclusions and recommendations for changes.
   B. IC/EC Certification
      1. The certification must be complete (even if there are IC/EC deficiencies), and certified by the appropriate party as set forth in a Department-approved certification form(s).

V. Monitoring Plan Compliance Report (if applicable)
   A. Components of the Monitoring Plan (tabular presentations preferred) - Describe the requirements of the monitoring plan by media (i.e., soil, groundwater, sediment, etc.) and by any remedial technologies being used at the site.
   B. Summary of Monitoring Completed During Reporting Period - Describe the monitoring tasks actually completed during this PRR reporting period. Tables and/or figures should be used to show all data.
   C. Comparisons with Remedial Objectives - Compare the results of all monitoring with the remedial objectives for the site. Include trend analyses where possible.
   D. Monitoring Deficiencies - Describe any ways in which monitoring did not fully comply with the monitoring plan.
   E. Conclusions and Recommendations for Changes - Provide overall conclusions regarding the monitoring completed and the resulting evaluations regarding remedial effectiveness.

VI. Operation & Maintenance (O&M) Plan Compliance Report (if applicable)
   A. Components of O&M Plan - Describe the requirements of the O&M plan including required activities, frequencies, recordkeeping, etc.

B. Summary of O&M Completed During Reporting Period - Describe the O&M tasks actually completed during this PRR reporting period.

C. Evaluation of Remedial Systems - Based upon the results of the O&M activities completed, evaluated

the ability of each component of the remedy subject to O&M requirements to perform as designed/expected.

D. O&M Deficiencies - Identify any deficiencies in complying with the O&M plan during this PRR reporting period.

E. Conclusions and Recommendations for Improvements - Provide an overall conclusion regarding O&M for the site and identify any suggested improvements requiring changes in the O&M Plan.

VII. Overall PRR Conclusions and Recommendations

A. Compliance with SMP - For each component of the SMP (i.e., IC/EC, monitoring, O&M), summarize;

1. whether all requirements of each plan were met during the reporting period
2. any requirements not met
3. proposed plans and a schedule for coming into full compliance.

B. Performance and Effectiveness of the Remedy - Based upon your evaluation of the components of the SMP, form conclusions about the performance of each component and the ability of the remedy to achieve the remedial objectives for the site.

C. Future PRR Submittals

1. Recommend, with supporting justification, whether the frequency of the submittal of PRRs should be changed (either increased or decreased).
2. If the requirements for site closure have been achieved, contact the Departments Project Manager for the site to determine what, if any, additional documentation is needed to support a decision to discontinue site management.

VIII. Additional Guidance

Additional guidance regarding the preparation and submittal of an acceptable PRR can be obtained from the Departments Project Manager for the site.

Appendix B
Figures

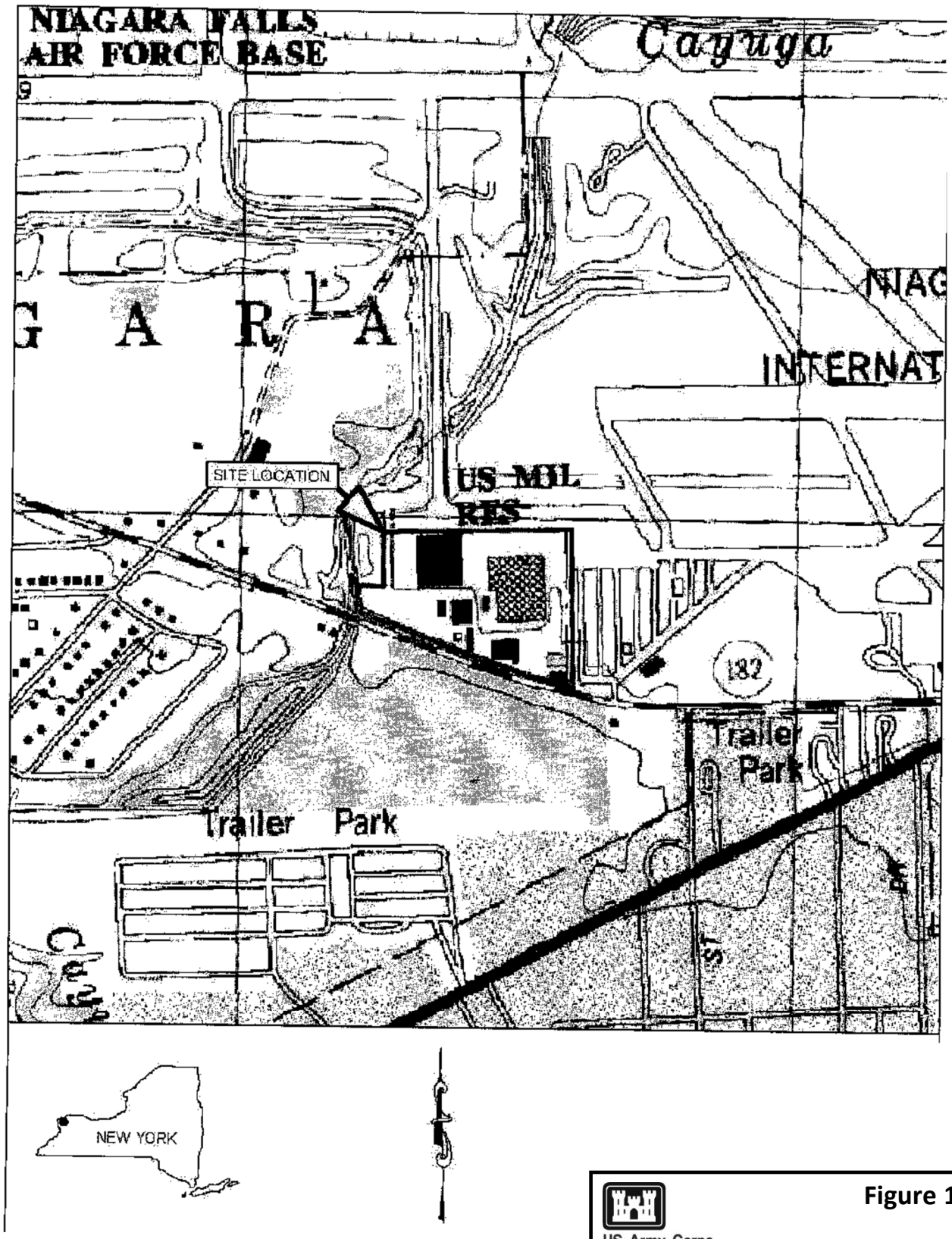


Figure 1

US Army Corps of Engineers
Louisville District

Site Location Map
Niagara AFRC
Niagara Falls, New York

*Figure taken from 2015 Niagara AFRC ROD

*Figure taken from Google Maps (July 2020)

US Army Corps of Engineers
Louisville District

Figure 2

Site Features
Niagara AFRC
Niagara Falls, New York

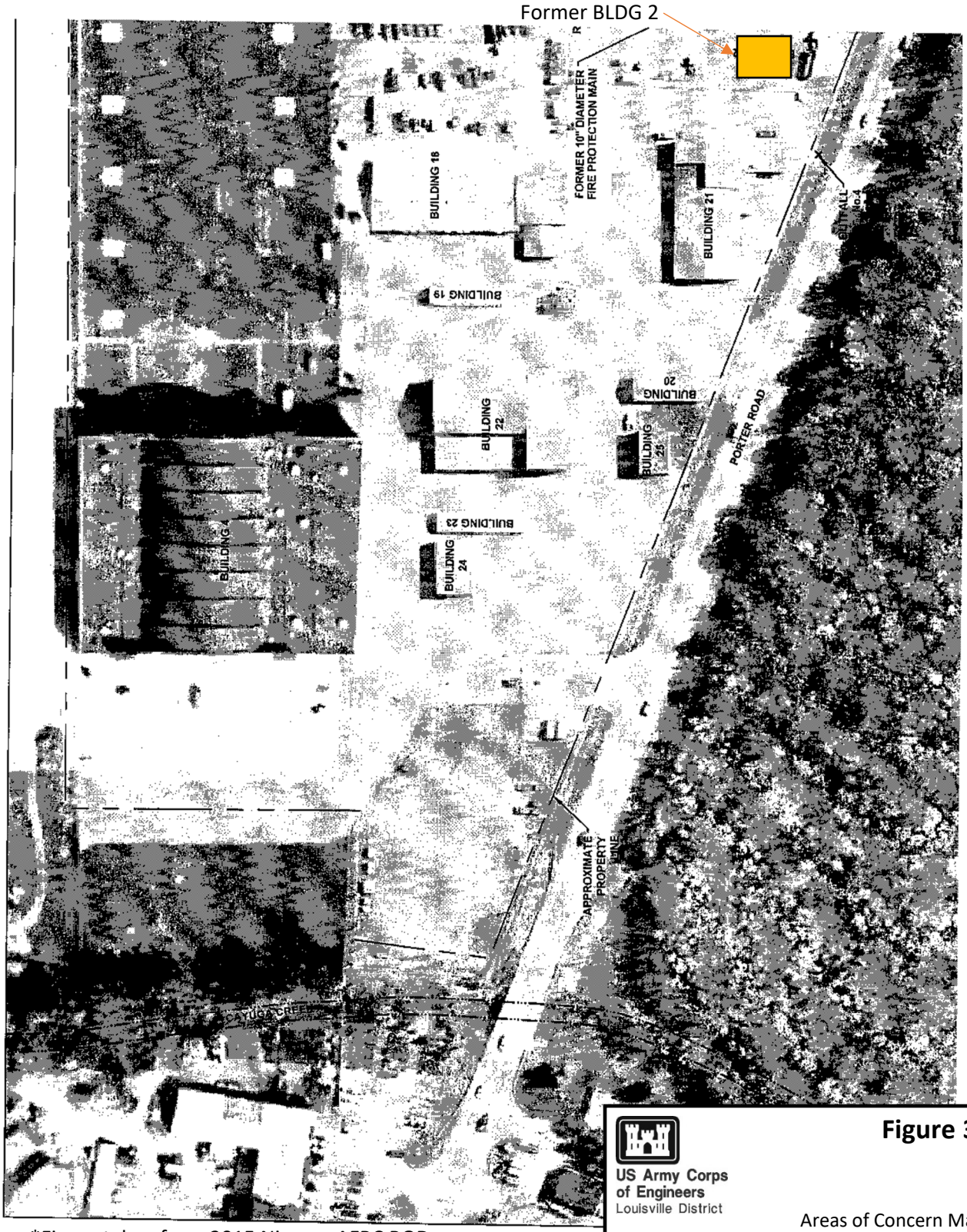
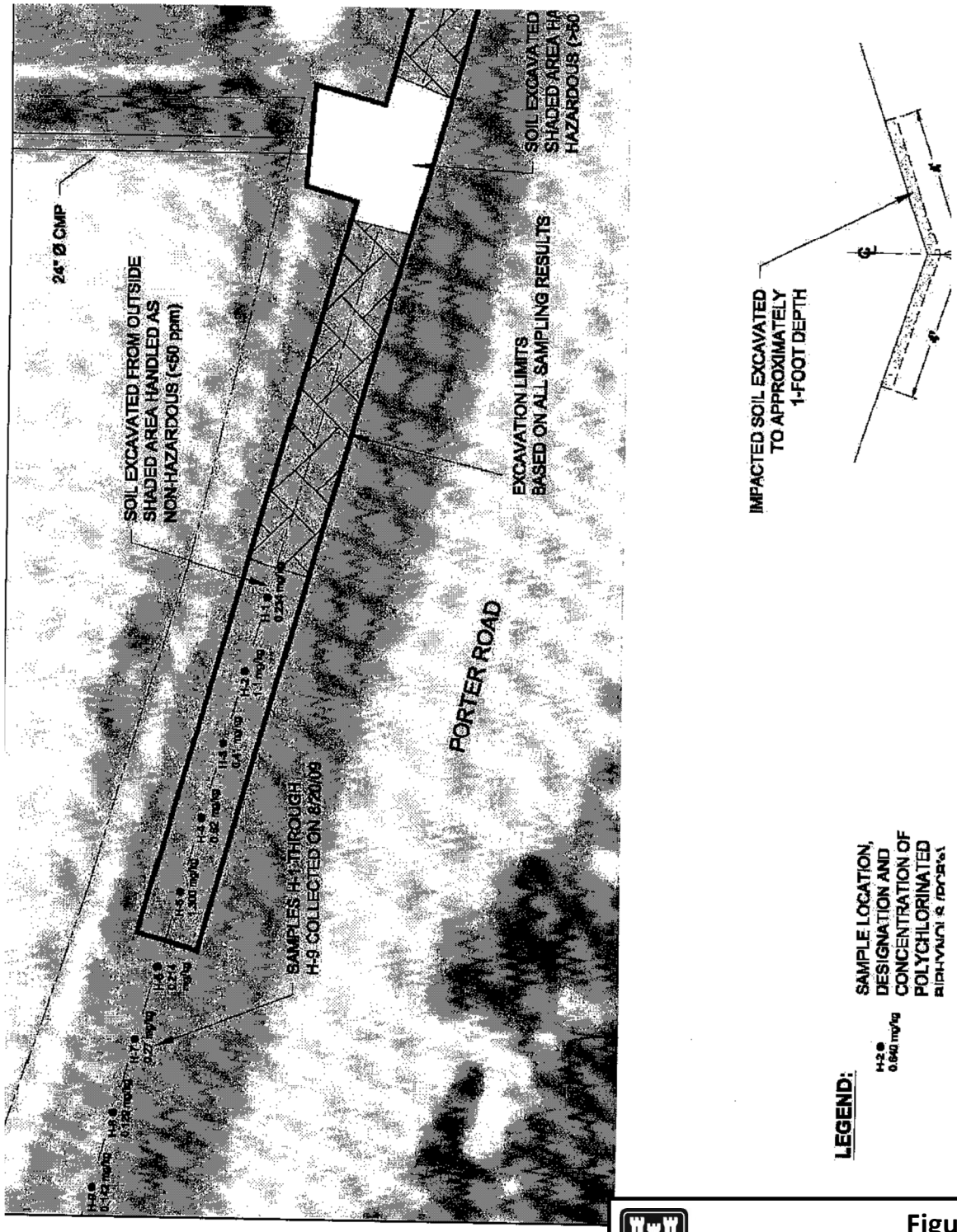


*Figure taken from 2015 Niagara AFRC ROD

US Army Corps of Engineers
Louisville District

Figure 3

Areas of Concern Map
Niagara AFRC
Niagara Falls, New York



US Army Corps of Engineers
Louisville District

Figure 4

Soil Delineation Map and
Excavation Limits
Niagara AFRC
Niagara Falls, New York

*Figure taken from 2015 Niagara AFRC ROD

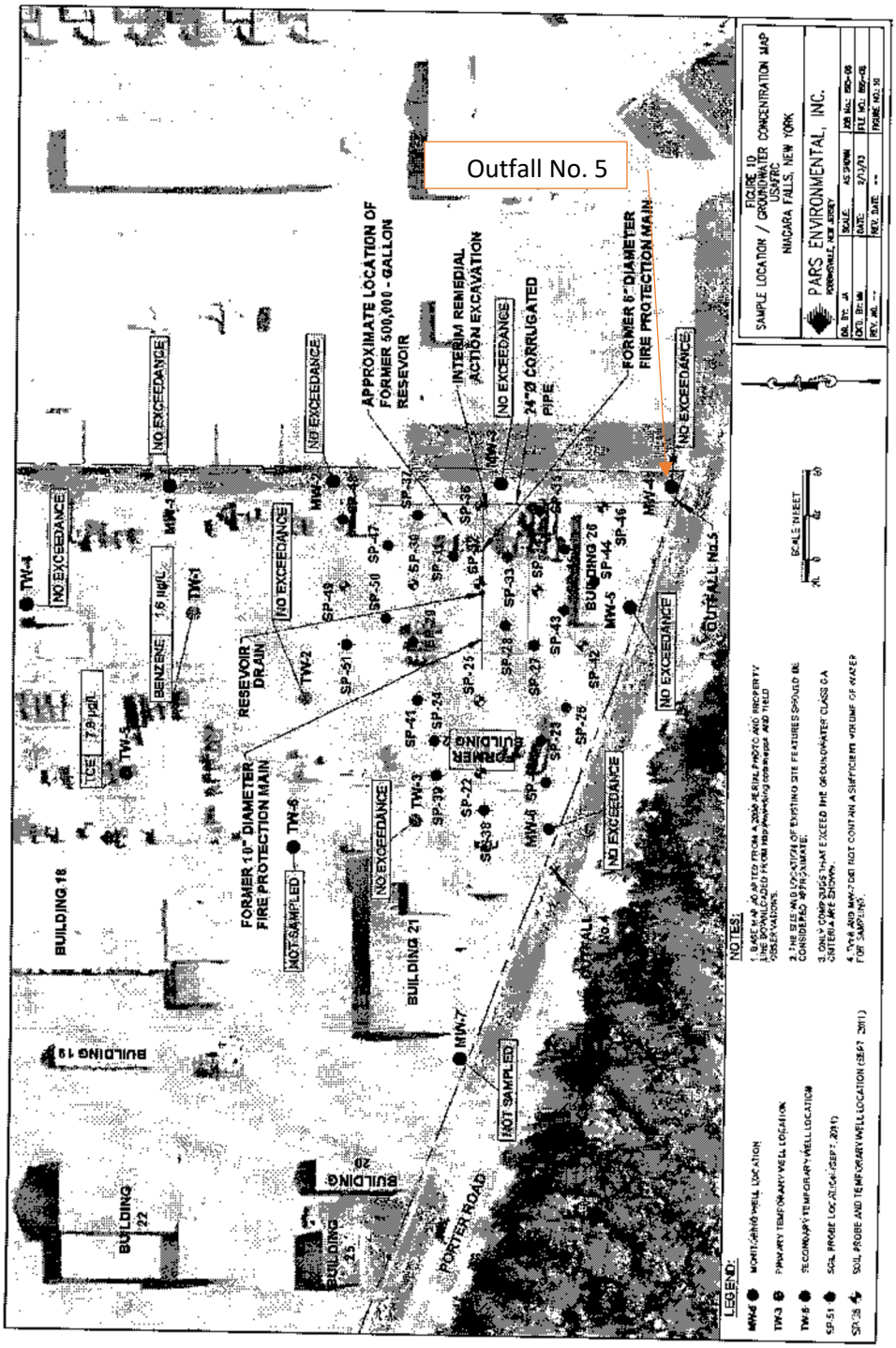
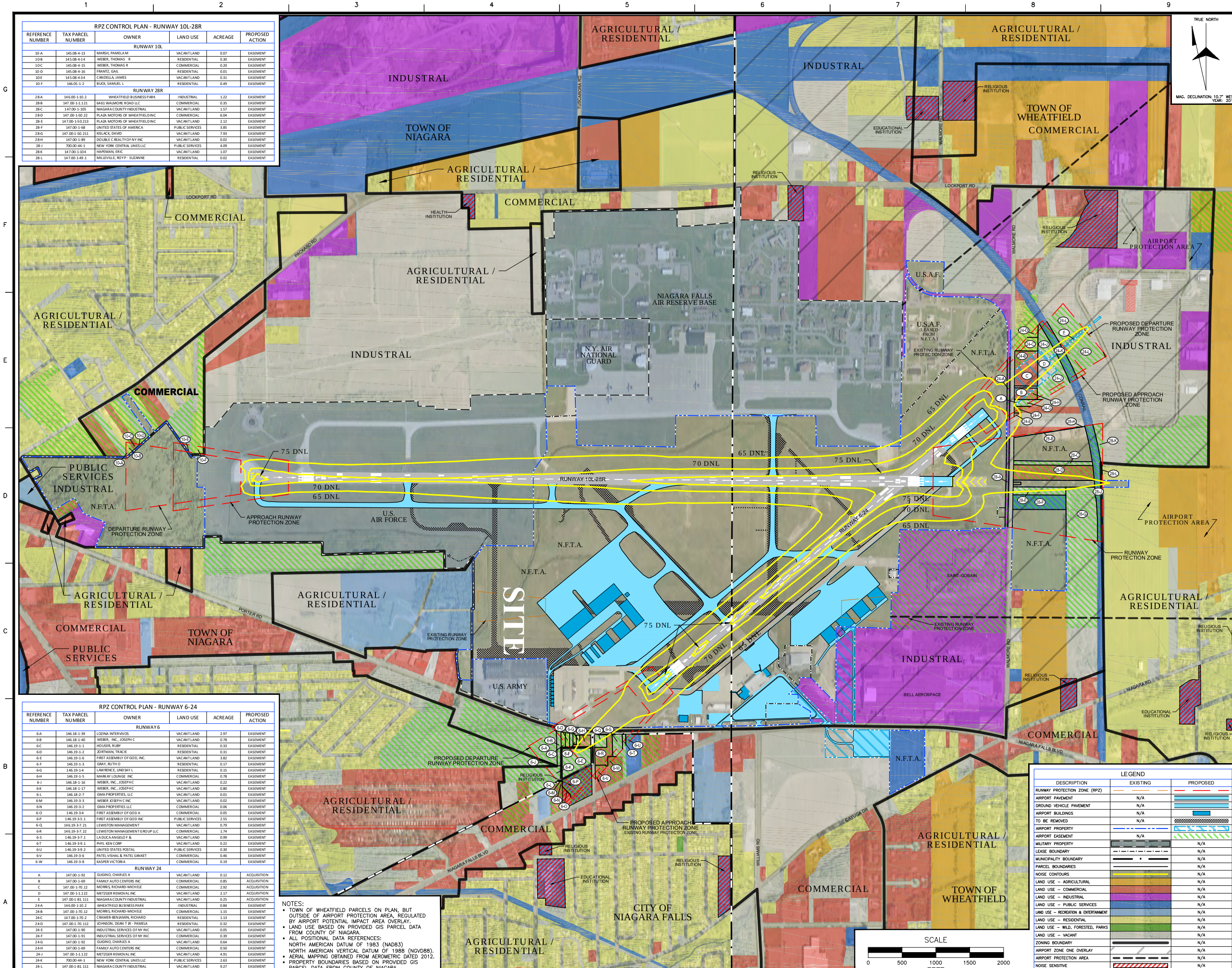


*Figure taken from 2015 Niagara AFRC ROD

US Army Corps of Engineers
Louisville District

Figure 5

Sample Location/Ground Water Concentration Map
Niagara AFRC
Niagara Falls, New York



RPZ CONTROL PLAN - RUNWAY 10L-28R

REFERENCE NUMBER	TAX PARCEL NUMBER	OWNER	LAND USE	ACREAGE	PROPOSED ACTION
RUNWAY 10L					
10-A	145.08-4-13	MARSH, PAMELA M	VACANT LAND	0.07	EASEMENT
10-B	145.08-4-14	WEBER, THOMAS R	RESIDENTIAL	0.30	EASEMENT
10-C	145.08-4-15	WEBER, THOMAS R	COMMERCIAL	0.20	EASEMENT
10-D	145.08-4-16	FRANTZ, GAIL	RESIDENTIAL	0.01	EASEMENT
10-E	145.08-4-34	CANDELA, JAMES	VACANT LAND	0.31	EASEMENT
10-F	146.05-1-2	BUCK, SAMUEL L	RESIDENTIAL	0.49	EASEMENT
RUNWAY 28R					
28-A	146.00-1-10.2	WHEATFIELD BUSINESS PARK	INDUSTRIAL	1.22	EASEMENT
28-B	147.00-1-1.121	6461 WALMORE ROAD LLC	COMMERCIAL	0.35	EASEMENT
28-C	147.00-1-105	NIAGARA COUNTY INDUSTRIAL	VACANT LAND	1.57	EASEMENT
28-D	147.00-1-50.22	PLAZA MOTORS OF WHEATFIELD INC	COMMERCIAL	6.04	EASEMENT
28-E	147.00-1-50.213	PLAZA MOTORS OF WHEATFIELD INC	VACANT LAND	2.12	EASEMENT
28-F	147.00-1-68	UNITED STATES OF AMERICA	PUBLIC SERVICES	3.85	EASEMENT
28-G	147.00-1-50.211	KISLACK, DAVID	VACANT LAND	7.93	EASEMENT
28-H	147.00-1-89	DOUBLE C REALTY OF N Y INC	VACANT LAND	0.02	EASEMENT
28-J	700.00-44-1	NEW YORK CENTRAL LINES LLC	PUBLIC SERVICES	4.09	EASEMENT
28-K	147.00-1-104	HAPEMAN, ERIC	VACANT LAND	1.07	EASEMENT
28-L	147.00-1-49.1	MILLEVILLE, ROY P - SUZANNE	RESIDENTIAL	0.02	EASEMENT

RPZ CONTROL PLAN - RUNWAY 6-24

REFERENCE NUMBER	TAX PARCEL NUMBER	OWNER	LAND USE	ACREAGE	PROPOSED ACTION
RUNWAY 6					
6-A	146.18-1-39	LOZINA INTERVIVOS	VACANT LAND	2.97	EASEMENT
6-B	146.18-1-40	WEBER, INC., JOSEPH C	VACANT LAND	0.78	EASEMENT
6-C	146.19-1-1	HOUSER, RUBY	RESIDENTIAL	0.33	EASEMENT
6-D	146.19-1-2	ZORTMAN, TRACIE	RESIDENTIAL	0.31	EASEMENT
6-E	146.19-1-6	FIRST ASSEMBLY OF GOD, INC.	VACANT LAND	3.82	EASEMENT
6-F	146.19-1-3	GRAY, RUTH D	RESIDENTIAL	0.17	EASEMENT
6-G	146.19-1-4	LAWRENCE, LINDSAY L	RESIDENTIAL	0.15	EASEMENT
6-H	146.19-1-5	MARKAY LOUNGE INC	COMMERCIAL	0.78	EASEMENT
6-I	146.18-1-16	WEBER, INC., JOSEPH C	VACANT LAND	0.22	EASEMENT
6-K	146.18-1-17	WEBER, INC., JOSEPH C	VACANT LAND	0.80	EASEMENT
6-L	146.18-2-7	GMA PROPERTIES, LLC	VACANT LAND	0.01	EASEMENT
6-M	146.19-3-3	WEBER JOSEPH C INC	VACANT LAND	0.02	EASEMENT
6-N	146.19-3-2	GMA PROPERTIES LLC	COMMERCIAL	0.06	EASEMENT
6-O	146.19-3-4	FIRST ASSEMBLY OF GOD A	COMMERCIAL	0.05	EASEMENT
6-P	146.19-3-5.1	FIRST ASSEMBLY OF GOD INC	PUBLIC SERVICES	2.55	EASEMENT
6-Q	146.19-3-7.21	LEWISTON MANAGEMENT	VACANT LAND	0.79	EASEMENT
6-R	146.19-3-7.22	LEWISTON MANAGEMENT GROUP LLC	COMMERCIAL	1.74	EASEMENT
6-S	146.19-3-7.1	LA DUCA ANGELO F &	VACANT LAND	0.99	EASEMENT
6-T	146.19-3-9.1	PHYL KEN CORP	VACANT LAND	0.22	EASEMENT
6-U	146.19-3-9.2	UNITED STATES POSTAL	PUBLIC SERVICES	0.30	EASEMENT
6-V	146.19-3-6	PATEL VISHAL & PATEL SANKET	COMMERCIAL	0.46	EASEMENT
6-W	146.19-3-8	KASPER VICTORIA	COMMERCIAL	0.19	EASEMENT
RUNWAY 24					
A	147.00-1-92	GUGINO, CHARLES A	VACANT LAND	0.12	ACQUISITION
B	147.00-1-69	FAMILY AUTO CENTERS INC	COMMERCIAL	0.85	ACQUISITION
C	147.00-1-70.12	MORRIS, RICHARD-MICHELE	COMMERCIAL	2.92	ACQUISITION
D	147.00-1-1.122	METZGER REMOVAL INC	VACANT LAND	2.17	ACQUISITION
E	147.00-1-81.111	NIAGARA COUNTY INDUSTRIAL	VACANT LAND	0.25	ACQUISITION
24-A	146.00-1-10.2	WHEATFIELD BUSINESS PARK	INDUSTRIAL	0.84	EASEMENT
24-B	147.00-1-70.12	MORRIS, RICHARD-MICHELE	COMMERCIAL	1.15	EASEMENT
24-C	147.00-1-70.3	CRAMER-BENJAMIN, RICHARD	RESIDENTIAL	1.13	EASEMENT
24-D	147.00-1-70.112	JOHNSON, DEAN T JR - PAMELA	RESIDENTIAL	0.32	EASEMENT
24-E	147.00-1-90	INDUSTRIAL SERVICES OF NY INC	VACANT LAND	0.05	EASEMENT
24-F	147.00-1-91	INDUSTRIAL SERVICES OF NY INC	COMMERCIAL	0.39	EASEMENT
24-G	147.00-1-92	GUGINO, CHARLES A	VACANT LAND	0.64	EASEMENT
24-H	147.00-1-69	FAMILY AUTO CENTERS INC	COMMERCIAL	0.50	EASEMENT
24-J	147.00-1-1.122	METZGER REMOVAL INC	VACANT LAND	4.91	EASEMENT
24-K	700.00-44-1	NEW YORK CENTRAL LINES LLC	PUBLIC SERVICES	2.63	EASEMENT
24-L	147.00-1-81.111	NIAGARA COUNTY INDUSTRIAL	VACANT LAND	0.27	EASEMENT

NOTES:

- TOWN OF WHEATFIELD PARCELS ON PLAN, BUT OUTSIDE OF AIRPORT PROTECTION AREA, REGULATED BY AIRPORT POTENTIAL IMPACT AREA OVERLAY.
- LAND USE BASED ON PROVIDED GIS PARCEL DATA FROM COUNTY OF NIAGARA.
- ALL POSITIONAL DATA REFERENCES: NORTH AMERICAN DATUM OF 1983 (NAD83) NORTH AMERICAN VERTICAL DATUM OF 1988 (NGVD88).
- AERIAL MAPPING OBTAINED FROM AEROMETRIC DATED 2012.
- PROPERTY BOUNDARIES BASED ON PROVIDED GIS PARCEL DATA FROM COUNTY OF NIAGARA.

SCALE

0 500 1000 1500 2000

FEET

LEGEND

DESCRIPTION	EXISTING	PROPOSED
RUNWAY PROTECTION ZONE (RPZ)		
AIRPORT PAVEMENT	N/A	
GROUND VEHICLE PAVEMENT	N/A	
AIRPORT BUILDINGS	N/A	
TO BE REMOVED	N/A	
AIRPORT PROPERTY		
AIRPORT EASEMENT	N/A	
MILITARY PROPERTY		N/A
LEASE BOUNDARY		N/A
MUNICIPALITY BOUNDARY		N/A
PARCEL BOUNDARIES		N/A
NOISE CONTOURS		N/A
LAND USE – AGRICULTURAL		N/A
LAND USE – COMMERCIAL		N/A
LAND USE – INDUSTRIAL		N/A
LAND USE – PUBLIC SERVICES		N/A
LAND USE – RECREATION & ENTERTAINMENT		N/A
LAND USE – RESIDENTIAL		N/A
LAND USE – WILD, FORESTED, PARKS		N/A
LAND USE – VAGANT		N/A
ZONING BOUNDARY		
AIRPORT ZONE ONE OVERLAY		N/A
AIRPORT PROTECTION AREA		N/A
NOISE SENSITIVE		N/A

NIAGARA FALLS INTERNATIONAL AIRPORT

McFarland Johnson
48 COURT STREET, METROCENTER, PO BOX 1690
BINGHAMTON, NEW YORK 13902 www.mjinc.com

NFTA
Niagara Frontier Transportation Authority
Serving Buffalo Niagara

NIAGARA FALLS INTERNATIONAL AIRPORT

–

SUSTAINABLE AIRPORT MASTER PLAN

MARK	DATE	DESCRIPTION
ISSUE:		

NFTA PROJECT NO:	31NG1203
DESIGNER PROJECT NO:	17828.00
CAD DWG FILE:	CT116.dwg
DRAWN BY:	RGT
CHECKED BY:	RLL
SCALE:	AS NOTED
COPYRIGHT:	

SHEET TITLE

AIRPORT LAND USE AND RPZ CONTROL PLAN

DRAWING# CT116

SHEET# 16 OF 18

K:\NFTA\1-17828.00 nfta rnpu\Drawings\AutoCAD\drawing set\CT116.dwg

Appendix C
Deeds of Transfer

NIAGARA COUNTY – STATE OF NEW YORK

JOSEPH A. JASTRZEMSKI – NIAGARA COUNTY CLERK
P.O. BOX 461, LOCKPORT, NEW YORK 14095-0461

COUNTY CLERK'S RECORDING PAGE

THIS PAGE IS PART OF THE DOCUMENT – DO NOT DETACH

INSTRUMENT #: 2019-05573

Receipt#: 2019413379
Clerk: TH
Rec Date: 04/15/2019 12:45:16 PM
Doc Grp: DEED
Descrip: DEED
Num Pgs: 17

Party1: UNITED STATE OF AMERICA
Party2: TOWN OF NIAGARA
Town: NIAGARA

Recording:

Cover Page	0.00
Recording Fee	0.00
Cultural Ed	0.00
Records Management - Coun	0.00
Records Management - Stat	0.00
RP5217 All others - State	0.00
Sub Total:	0.00
Transfer Tax	
Transfer Tax	0.00
Sub Total:	0.00
Total:	0.00

**** NOTICE: THIS IS NOT A BILL ****

***** Transfer Tax *****
Transfer Tax #: 4507
Exempt

Total: 0.00

Record and Return To:

PAUL/CHICAGO
FOR: DUKEHOLZMAN PHOTIADIS & GRESENS LLP

WARNING***
** Information may change during the verification process and may not be reflected on this page.

Joseph A. Jastrzemski
Niagara County Clerk

2019413379

2019-05573
04/15/2019 12:45:16 PM
17 Pages
DEED

Joseph A. Jastrzemski, Niagara County Clerk

Clerk: TH

QUITCLAIM DEED
FORMER NIAGARA FALLS ARMY RESERVE CENTER
9400 PORTER ROAD
TOWN OF NIAGARA, NEW YORK

THIS QUITCLAIM DEED, dated 27th September, 2018, is made and entered into by and between the UNITED STATES OF AMERICA, (hereinafter referred to as the "GRANTOR"), acting by and through the Director of Real Estate, Headquarters, U.S. Army Corps of Engineers, under the authority contained in section 2905(b) of the Defense Base Closure and Realignment Act of 1990, (Pub. L. No 101-510; 10 U.S.C. § 2687 note), as amended, whose mailing address is U.S. Army Corps of Engineers, New York District, ATTN: CENAN-RE-M, 26 Federal Plaza, Room 2007, New York, NY 10278, and the TOWN OF NIAGARA, a municipal corporation existing under the laws of the State of New York, whose mailing address is Town of Niagara, 7105 Lockport Road, Niagara Falls, NY 14305 (hereinafter referred to as the "GRANTEE").

WITNESSETH THAT:

THE GRANTOR, in consideration of $262,000.00, cash in hand paid, and the agreement of the GRANTEE to perform certain obligations set forth in Article 3 of the agreement between the GRANTOR and GRANTEE effective August 29, 2018, does hereby remise, release, and forever quitclaim unto the GRANTEE, its successors and assigns, all right, title and interest of the GRANTOR in and to all that certain parcel of land situated, lying and being in Niagara Township, Niagara County, New York, containing approximately 19.52 acres, as more particularly described in Exhibit "A," attached hereto and made a part hereof, together with all right, title and interest of the GRANTOR in and to the easement for purposes of ingress and egress across a 0.14 acre portion of a parcel of land situated, lying and being in Niagara Township, Niagara County, New York, and more particularly described in Exhibit "B," attached hereto and made a part hereof (hereinafter referred to as the "Property").

SUBJECT TO all valid and existing restrictions, reservations, covenants, conditions, and easements including, but not limited to, rights-of-way for railroads, highways, pipelines, and public utilities, if any, whether of public record or not.

TO HAVE AND TO HOLD the Property granted herein to the GRANTEE, its successors and assigns, together with all and singular the appurtenances, rights, powers, and privileges thereunto belonging or in anywise appertaining, and all the estate, right, title, interest, or claim whatsoever of the GRANTOR, either in law or in equity, and subject to the reservations, covenants, conditions, and restrictions hereinafter set forth in this deed.

AND IT IS FURTHER AGREED AND UNDERSTOOD by and between the parties hereto that the GRANTEE, by its acceptance of this deed, and as part of the consideration for the conveyance herein, covenants and agrees for itself, its successors, and assigns forever, that this deed is made and accepted upon each of the following covenants, conditions, and restrictions which shall be binding upon and enforceable against the GRANTEE, its successors and assigns in perpetuity by the GRANTOR and other interested parties as may be allowed by law; that the covenants, conditions, and restrictions set forth herein are a binding servitude on the Property and shall be deemed to run with the land in perpetuity; and that the failure to include the covenants, conditions, and restrictions in subsequent conveyances of the Property or portions thereof does not

abrogate the status of the covenants, conditions, and restrictions as binding upon the GRANTOR and the GRANTEE, its successors and assigns:

1. NON-DISCRIMINATION:

The GRANTEE covenants for itself, its successors and assigns and every successor in interest to the Property herein conveyed, or any part thereof, that the said GRANTEE and such successors and assigns shall not discriminate upon the basis of race, creed, color, religion, sex, disability, age, or national origin in the use, occupancy, sale, or lease of the Property, or in their employment practices conducted thereon. This covenant shall not apply, however, to the lease or rental of a room or rooms within a family dwelling unit nor shall it apply with respect to religion to premises used primarily for religious purposes. The GRANTOR shall be deemed a beneficiary of this covenant without regard to whether it remains the owner of any land or interest therein in the locality of the Property herein conveyed and shall have the sole right to enforce this covenant in any court of competent jurisdiction.

2. PROPERTY COVERED BY NOTICE, DESCRIPTION, ACCESS RIGHTS, AND COVENANT MADE PURSUANT TO SECTION 120(h)(3)(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (42 U.S.C. § 9620(h)(3)(A)):

For the Property, the GRANTOR provides the following notice, description, and covenant and retains the following access rights:

2a. Notice Pursuant to Sections 120(h)(3)(A)(i)(I) and (II)) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(i)(I) and (II):

Pursuant to sections 120(h)(3)(A)(i)(I) and (II) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(i)(I) and (II)), available information regarding the type, quantity, and location of hazardous substances and the time at which such substances were stored, released, or disposed of, as defined in section 120(h), is provided in Exhibit C, Notification of Hazardous Substance Storage, Release, and Disposal, attached hereto and made a part hereof.

2b. Description of Remedial Action Taken, if Any, Pursuant to Section 120(h)(3)(A)(i)(III) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(III)):

Pursuant to section 120(h)(3)(A)(i)(III) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(III)), a description of the remedial action taken, if any, on the Property is provided in Exhibit C, Notification of Hazardous Substance Storage, Release, and Disposal, attached hereto and made a part hereof.

2c. Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B)):

Pursuant to sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B)), the United States warrants that –

(a) All remedial action necessary to protect human health and the environment with respect to any hazardous substance identified pursuant to section 120(h)(3)(A)(i)(I) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 remaining on the Property has been taken before the date of this deed, and

(b) Any additional remedial action found to be necessary after the date of this deed shall be conducted by the United States.

2d. Access Rights Pursuant to Section 120(h)(3)(A)(iii) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(iii)):

The United States retains and reserves a perpetual and assignable easement and right of access on, over, and through the Property, to enter upon the Property in any case in which a remedial action or corrective action is found to be necessary on the part of the United States, without regard to whether such remedial action or corrective action is on the Property or on adjoining or nearby lands. Such easement and right of access includes, without limitation, the right to perform any environmental investigation, survey, monitoring, sampling, testing, drilling, boring, coring, testpitting, installing monitoring or pumping wells or other treatment facilities, response action, corrective action, or any other action necessary for the United States to meet its responsibilities under applicable laws and as provided for in this instrument. Such easement and right of access shall be binding on the GRANTEE and its successors and assigns and shall run with the land.

In exercising such easement and right of access, the United States shall provide the GRANTEE or its successors or assigns, as the case may be, with reasonable notice of its intent to enter upon the Property and exercise its rights under this clause, which notice may be severely curtailed or even eliminated in emergency situations. The United States shall use reasonable means to avoid and to minimize interference with the GRANTEE and the GRANTEE's successors' and assigns' quiet enjoyment of the Property. At the completion of work, the work site shall be reasonably restored. Such easement and right of access includes the right to obtain and use utility services, including water, gas, electricity, sewer, and communications services available on the Property at a reasonable charge to the United States. Excluding the reasonable charges for such utility services, no fee, charge, or compensation will be due the GRANTEE, nor its successors and assigns, for the exercise of the easement and right of access hereby retained and reserved by the United States.

In exercising such easement and right of access, neither the GRANTEE nor its successors and assigns, as the case may be, shall have any claim at law or equity against the United States or any officer or employee of the United States based on actions taken by the United States or its officers, employees, agents, contractors of any tier, or servants pursuant to and in accordance with this clause: Provided, however, that nothing in this paragraph shall be

considered as a waiver by the GRANTEE and its successors and assigns of any remedy available to them under the Federal Tort Claims Act.

3. "AS IS" Condition of Property:

A. The GRANTEE acknowledges that it has inspected, or has had the opportunity to inspect, the Property and accepts the condition and state of repair of the Property. The GRANTEE understands and agrees that the Property is conveyed "AS IS" without any representation, warranty, or guaranty by the GRANTOR as to quantity, quality, title, character, condition, size, or kind, or that the same is in a suitable condition or fit to be used for the purposes intended by the GRANTEE, and no claim for allowance or deduction upon such grounds shall be considered.

B. No warranties, either express or implied, are given with regard to the condition of the Property including, without limitation, whether the Property does or does not contain asbestos or lead-based paint. The GRANTEE shall be deemed to have relied solely on its own judgment in assessing the condition of the Property including, without limitation, any asbestos, lead-based paint, or other conditions on the Property. The failure of the GRANTEE to inspect or to exercise due diligence to be fully informed as to the condition of the Property shall not constitute grounds for any claim or demand against the GRANTOR.

C. Nothing in this "AS IS" provision shall be construed to modify or negate the GRANTOR's obligation under the "Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B))" or any other statutory obligations.

4. Hold Harmless:

A. To the extent authorized by law, the GRANTEE for itself, its successors and assigns, covenants and agree to indemnify and hold harmless the GRANTOR, its officers, agents, and employees from (1) any and all claims, damages, judgments, losses, and costs, including fines and penalties, arising out of the violation of the covenants, conditions, and restrictions in this deed by the GRANTEE, its successors and assigns, and (2) any and all claims, damages, losses, costs, and judgments arising out of, or in any manner predicated upon, exposure to asbestos, lead-based paint, or other condition on any portion of the Property after the date of the conveyance herein.

B. The GRANTEE, for itself, its successors and assigns, covenants and agrees that the GRANTOR shall not be responsible for any costs associated with modification or termination of the covenants, conditions, and restrictions in this deed including, without limitation, any costs associated with additional investigation or remediation of asbestos, lead-based paint, or other condition on any portion of the Property.

C. Nothing in this "Hold Harmless" provision shall be construed to modify or negate the GRANTOR's obligation under the "Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of

the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B))" or any other statutory obligations.

5. Post-Transfer Discovery of Contamination:

A. If a release or threatened release of a hazardous substance is discovered on the Property after the date of the conveyance herein, the GRANTEE, its successors or assigns shall be responsible for such newly discovered release or threatened release of a hazardous substance unless the GRANTEE, or its successors or assigns is able to demonstrate that such release or threatened release of a hazardous substance was due to the GRANTOR's activities, use, or ownership of the Property. If the GRANTEE, or its successors or assigns believe the newly discovered hazardous substance is due to the GRANTOR's activities, use, or ownership of the Property, the GRANTEE, or its successors or assigns shall immediately secure the site and notify the GRANTOR of the existence of the release or threatened release of the hazardous substance and the GRANTEE, or its successors or assigns shall not further disturb or allow the disturbance of such hazardous substance without the prior written permission of the GRANTOR.

B. The GRANTEE, for itself, its successors and assigns, as part of the consideration for the conveyance of the Property, hereby releases the GRANTOR from any liability or responsibility for any claims arising solely out of the release or threatened release of any hazardous substance on the Property occurring after the date of the conveyance herein where such hazardous substance was placed on the Property by the GRANTEE, or its successors, assigns, employees, invitees, agents, contractors, or any person other than the GRANTOR after the date of the conveyance herein. This "Post-Transfer Discovery of Contamination" provision shall not affect the GRANTOR's responsibilities to conduct response actions or corrective actions that are required by applicable laws, rules and regulations, including the GRANTOR's obligation under the "Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(ii) and (B))."

6. Environmental Protection Provisions:

The GRANTEE shall neither transfer the Property, lease the Property, nor grant any interest, privilege, or license whatsoever in connection with the Property without including the environmental protection provisions set forth in Exhibit "D," attached hereto and made a part hereof, and shall require the said provisions in all subsequent deeds, easements, transfers, leases, or grant of any interest, privilege, or license in, of, on, or to the Property or any portion thereof.

7. Anti-Deficiency Act:

The GRANTOR's obligation to pay or reimburse any money under this deed is subject to the availability of funds appropriated for this purpose to the Department of the Army and nothing in this deed shall be interpreted to require obligations or payments by the GRANTOR in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341.

8. No Waiver:

The failure of the GRANTOR to insist in any one or more instances upon timely or complete performance of any obligation of the GRANTEE, or its successors or assigns required by the covenants, conditions, or restrictions shall not be construed as a waiver or a relinquishment of the GRANTOR's right to future performance of any such obligation of the GRANTEE or its successors or assigns in strict accordance with the said covenants, conditions, and restrictions and all such obligations of the GRANTEE, its successors and assigns shall continue in full force and effect.

IN WITNESS WHEREOF, the GRANTOR has caused this deed to be duly executed in its name by the Director of Real Estate, Headquarters, U.S. Army Corps of Engineers this 27th day of September, 2018.

UNITED STATES OF AMERICA

By: _____
Brenda M. Johnson-Turner
Director of Real Estate
Headquarters, U.S. Army Corps of Engineers

NOTARIAL CERTIFICATE

DISTRICT OF COLUMBIA)

) ss

CITY OF WASHINGTON)

I, Marcia A. DeVille, a Notary Public in and for the District of Columbia, do hereby certify that on this the 27th day of September, 2018, Brenda M. Johnson-Turner, Director of Real Estate, Headquarters, U. S .Army Corps of Engineers, known to me or proven through satisfactory evidence of identity to be the person whose name is subscribed to the foregoing document, appeared in person and acknowledged before me that the signature on the document was voluntarily affixed by her for the purposes therein stated and that she had due authority to sign the document in the capacity therein stated.

MARCIA A. DEVILLE NOTARY PUBLIC EXP. 11-30-18 DISTRICT OF COLUMBIA

_____
Notary Public

ACCEPTANCE OF CONVEYANCE

The GRANTEE, acting by and through its Supervisor, hereby accepts the conveyance herein subject to all of the notices, covenants, conditions, restrictions, and reservations set forth in this deed, this 17 day of September, 2018.

TOWN OF NIAGARA

By: _____
Lee Wallace
Supervisor

ACKNOWLEDGEMENT

STATE OF NEW YORK)

) ss:

COUNTY OF NIAGARA)

I, Jacqueline Siegmann, a notary public, in and for the State of New York, County of Niagara, do hereby certify that Lee Wallace, Supervisor, Town of Niagara, New York, known to me or proven through satisfactory evidence of identity to be the person whose name is subscribed to the foregoing document, appeared in person and acknowledged before me that the signature on the document was voluntarily affixed by him for the purposes therein stated and that he had due authority to sign the document in the capacity therein stated.

Given under my hand and seal this 17 day of September, 2018.

_____
Notary Public

JACQUELINE SIEGMANN
NOTARY PUBLIC, STATE OF NEW YORK
QUALIFIED IN NIAGARA COUNTY
NO. 01SI6171343
MY COMMISSION EXPIRES JULY 23, 20 19

My commission expires: 7/23/19

EXHIBIT "A"

ALL THAT TRACT OR PARCEL OF LAND, situate in the Town of Niagara, County of Niagara and State of New York, being part of Lots 2 and 6, Township 13, Range 9 of the Holland Land Company's Survey, being more particularly bounded and described as follows:

BEGINNING AT A POINT in the northerly line of Porter Road, New York State Route 182 (being 100 feet wide), at the southwesterly corner of a parcel of land conveyed to The United States of America by a deed filed in the Niagara County Clerk's Office in Liber 1198 of Deeds at page 340, said point also being a distance of 176.25 feet northwesterly of the intersection of the west line of lot 2 and said northerly line of Porter Road, New York State Route 182;

Thence North 05°04'44" East along said lands conveyed to The United States of America, a distance of 155.91 feet to an angle point in the southerly line of lands conveyed to the Niagara Frontier Transportation Authority by a deed filed in the Niagara County Clerk's Office in Liber 1566 of Deeds at page 795;

Thence South 87°03'30" East along the southerly line of said lands conveyed to the Niagara Frontier Transportation Authority by Liber 1566 of Deeds at page 795, a distance of 149.79 feet to a point in the west line of lot 2 and the southeasterly corner of said parcel conveyed to the Niagara Frontier Transportation Authority;

Thence North 00°23'47" West along the west line of lot 2 and the easterly line of said lands conveyed to the Niagara Frontier Transportation Authority, a distance of 316.83 feet to the northwesterly corner of lands conveyed to The United States of America by a deed filed in the Niagara County Clerk's Office in Liber 674 of Deeds at page 492;

Thence North 89°36'10" East along a line parallel with the north line of lot 2 and along the northerly line of said lands conveyed to The United States of America by Liber 674 of Deeds at page 492, a distance of
1110.00 feet to the northeasterly corner of said lands conveyed to The United States of America by Liber 674 of Deeds at page 492;

Thence South 00°23'47" East along a line parallel with the west line of lot 2 and along the easterly line of said lands conveyed to The United States of America by Liber 674 of Deeds at page 492, a distance of 940.00 feet to a point in the northerly line of Porter Road, New York State Route 182 and the southeasterly corner of said lands conveyed to The United States of America by Liber 674 of Deeds at page 492;

Thence northwesterly along the northerly line of Porter Road, New York State Route 182, being a non-tangent curve, concave to the north, having a radius of 2815.00 feet, a central angle of 05°44'32" and a chord of 282.00 feet bearing North 72°15'01" West, a distance of 282.12 feet to the point of tangency;

Thence North 69°16'17" West continuing along the northerly line of Porter Road, New York State Route 182, a distance of 1078.94 feet to the POINT OF BEGINNING, containing **19.52** Acres of land, more or less.

STAMP
ADDED TO
CAPTURE
IMAGE

EXHIBIT "B"

PART OF THE 2.15 ACRE TRACT OR PARCEL OF LAND, situate in the Town of Niagara, County of Niagara and State of New York, conveyed by the United States of America by deed dated January 15, 1975, to the Niagara Frontier Transportation Authority, and recorded in the Niagara County Clerk's Office in Liber 1566 of Deeds at page 795, bounded and described as follows:

BEGINNING at a point in the east line of Lot No. 6, as described in the aforesaid 2.15 acre parcel of land, said point being distant northerly 275 feet from the southeast corner of said parcel; thence west forming an interior angle of 90° to the right, 20 feet to a point; thence north forming an interior angle of 90° to the right, 160 feet to a point; thence west forming an angle of 89° 04' to the left, 130 feet to a point; thence northerly forming an interior angle of 89° 04' to the right, 20 feet to a point in the northerly boundary of the aforesaid parcel; thence east along said northerly boundary forming an interior angle of 90° 56' to the right, 150 feet to the northeast boundary corner of said 2.15 acre parcel of land; thence south along the easterly boundary of said parcel forming an interior angle of 89° 03' 42", 180 feet to the point of beginning.

CONTAINING in all 0.14 acres of land, more or less.

EXHIBIT "C"
NOTIFICATION OF HAZARDOUS SUBSTANCE STORAGE, RELEASE, AND DISPOSAL*

Location	Name of Hazardous Substance	Date of Storage, Release, or Disposal	Remedial Actions
East of Building 22	PCBs	1991	Complete. In 1991, a PCB-contaminated transformer fell and broke over a storm sewer drain, east of Building 22. Oil containing 250 ppm PCB spilled on the pavement and into the drain. Surface paving materials, soils, and storm drain materials were remediated after the spill. The New York State Department of Environmental Conservation (NYSDEC) provided a letter, dated 19 February 1992, to confirm that no further action was necessary for the spill. The letter also confirmed that the NYSDEC incident file for this spill, Spill Number 9106446, was closed.
Eastern Portion of the Property** Former Building 2, Former Fire Protection Main and Reservoir Area, 24-Inch Storm Sewer Pipe, and Outfall 5	PCBs	2008	Complete. On June 24, 2008, a yellow substance was identified in the drainage swale along Porter Road, near the Property's southeast storm water discharge outlet, Outfall 5. The released material was found to contain PCBs and NYSDEC established the release as Spill Number 0803478. Delineation and investigative activities identified PCBs in soil samples at a maximum concentration of 1,060 parts per million (ppm). Approximately 134 tons of PCB-impact soils were excavated from the outfall and drainage swale to meet the clean-up level of 1 ppm. Subsequent investigations in the eastern portion of the Property led to the removal of an additional 40 tons of soil and 2,000 gallons of groundwater from the vicinity of the 24-inch discharge pipe that runs along the eastern Property boundary and empties at Outfall 5. All remedial actions have been completed and NYSDEC granted closure of the spill incident on 17 May 2012. A No Further Action Record of

Location	Name of Hazardous Substance	Date of Storage, Release, or Disposal	Remedial Actions
			Decision (ROD) for the area of concern was signed on 3 April 2015.

* 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 (whichever 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.

** A layout of the location of Former Building 2, the Former Fire Protection Main and Reservoir Area, the 24-Inch Storm Sewer Pipe, and Outfall 5 is shown below.

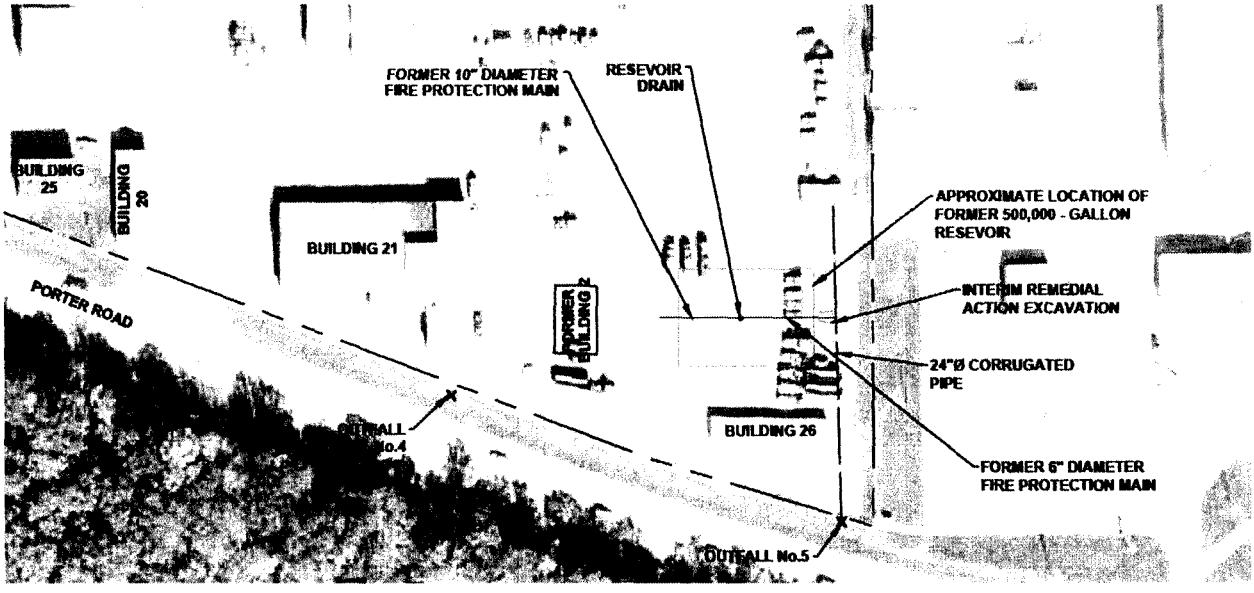


EXHIBIT "D"

ENVIRONMENTAL PROTECTION PROVISIONS

1. LAND USE RESTRICTION

A. The United States Department of the Army has undertaken careful environmental study of the Property and concluded that the land use restriction set forth below is required to ensure protection of human health and the environment. The GRANTEE, its successors or assigns, shall not undertake nor allow any activity on or use of the Property that would violate the land use restriction contained herein:

Residential Use Restriction. The GRANTEE, its successors and assigns, shall not use the property for residential purposes. For purposes of this provision, residential use includes, but is not limited to, single family or multi-family residences; pre-school and child care facilities; playgrounds whether or not related to non-residential facilities; nursing home or assisted living facilities; and any type of educational facility for children/young adults in grades kindergarten through 12.

B. Modifying Restrictions. Nothing contained herein shall preclude the GRANTEE, its successors or assigns, from undertaking, in accordance with applicable laws and regulations and without any cost to the GRANTOR, such additional action necessary to allow for other less restrictive uses of the Property. Prior to such use of the Property, GRANTEE shall consult with and obtain the approval of the GRANTOR, and, the New York State Department of Environmental Conservation (NYSDEC). Upon the GRANTEE's obtaining the approval of the GRANTOR and NYSDEC, the GRANTOR agrees to record an amendment hereto. This recordation shall be the responsibility of the GRANTEE and at no additional cost to the GRANTOR.

C. Submissions. The GRANTEE, its successors and assigns, shall submit any requests for modifications to the above restrictions to GRANTOR and NYSDEC, by first class mail, postage prepaid, addressed as follows:

GRANTOR – U.S. Army Engineer District, New York
Attention: CENAN-RE-M
26 Federal Plaza, Room 2007
New York, NY 10278.

NYSDEC – New York State Department of Environmental Conservation
Division of Environmental Remediation, Remedial Bureau E,
625 Broadway, 12th Floor
Albany, NY 12233-7015

2. NOTICE OF THE PRESENCE OF ASBESTOS AND COVENANT

A. The GRANTEE is hereby informed and does acknowledge that friable and non-friable asbestos or asbestos containing material "ACM" has been found on the Property. The Property may also contain improvements, such as buildings, facilities, equipment, and pipelines, above and below the ground, that contain friable and non-friable asbestos or ACM. The Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency have determined that unprotected or unregulated exposure to airborne asbestos fibers increases the risk of asbestos- related diseases, including certain cancers that can result in disability or death.

B. The following buildings on the Property have been determined to contain friable asbestos: 4, 19, and 22. The GRANTEE agrees to undertake any and all asbestos abatement or remediation in the aforementioned buildings that may be required under applicable law or regulation at no expense to the GRANTOR. The GRANTOR has agreed to transfer said buildings to the GRANTEE, prior to remediation or abatement of asbestos hazards, in reliance upon the GRANTEE's express representation and covenant to perform the required asbestos abatement or remediation of these buildings.

C. The GRANTEE covenants and agrees that its use and occupancy of the Property will be in compliance with all applicable laws relating to asbestos. The GRANTEE agrees to be responsible for any future remediation or abatement of asbestos found to be necessary on the Property to include ACM in or on buried pipelines that may be required under applicable law or regulation.

D. The GRANTEE acknowledges that it has inspected or has had the opportunity to inspect the Property as to its asbestos and ACM condition 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 asbestos or ACM hazards or concerns.

3. NOTICE OF THE PRESENCE OF LEAD-BASED PAINT (LBP) AND COVENANT AGAINST THE USE OF THE PROPERTY FOR RESIDENTIAL PURPOSE

A. The GRANTEE is hereby informed and does acknowledge that all buildings on the Property, which were constructed or rehabilitated prior to 1978, are presumed to contain lead-based paint. Lead from paint, paint chips, and dust can pose health hazards if not managed properly. Every purchaser of any interest in residential real property on which a residential dwelling was built prior to 1978 is notified that there is a risk of exposure to lead from lead-based paint that may place young children at risk of developing lead poisoning.

B. The GRANTEE covenants and agrees that it shall not permit the occupancy or use of any buildings or structures on the Property as residential property, as defined under 24 Code of Federal Regulations Part 35, without complying with this section and all applicable federal, state, and local laws and regulations pertaining to lead-based paint and/or lead-based paint hazards. Prior to permitting the occupancy of the Property where its use subsequent to sale is intended for residential habitation, the GRANTEE specifically agrees to perform, at its sole expense, the Army's abatement requirements under Title X of the Housing and Community Development Act of 1992 (Residential Lead-Based Paint Hazard Reduction Act of 1992).

C. The GRANTEE acknowledges that it has inspected or has had the opportunity to inspect the Property as to its lead-based paint content and condition 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 lead-based paint hazards or concerns.

4. PESTICIDE NOTICE AND COVENANT

A. The GRANTEE is hereby notified and acknowledges that registered pesticides have been applied to the Property conveyed herein and may continue to be present thereon. The GRANTOR and GRANTEE know of no use of any registered pesticide in a manner (1) inconsistent with its labeling or with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)(7 U.S.C. § 136, et seq.) and other applicable laws and regulations, or (2) not in accordance with its intended purpose.

B. The GRANTEE covenants and agrees that if the GRANTEE takes any action with regard to the Property, including demolition of structures or any disturbance or removal of soil that may expose, or cause a release of, a threatened release of, or an exposure to, any such pesticide, the GRANTEE assumes all responsibility and liability therefor.

NIAGARA COUNTY – STATE OF NEW YORK

JOSEPH A. JASTRZEMSKI – NIAGARA COUNTY CLERK
P.O. BOX 461, LOCKPORT, NEW YORK 14095-0461

COUNTY CLERK'S RECORDING PAGE

THIS PAGE IS PART OF THE DOCUMENT – DO NOT DETACH

INSTRUMENT #: 2019-05574

Receipt#: 2019413383
Clerk: TH
Rec Date: 04/15/2019 12:52:28 PM
Doc Grp: DEED
Descrip: DEED
Num Pgs: 12

Party1: TOWN OF NIAGARA
Party2: NIAGARA FALLS AIRPORT CENTER OF COMMERCE LLC
Town: NIAGARA

Recording:

Cover Page	8.00
Recording Fee	38.00
Cultural Ed	14.25
Records Management - Coun	1.00
Records Management - Stat	4.75
RP5217 - County	9.00
RP5217 All others - State	241.00
Sub Total:	316.00
Transfer Tax	
Transfer Tax	1048.00
Sub Total:	1048.00
Total:	1364.00

**** NOTICE: THIS IS NOT A BILL ****

***** Transfer Tax *****
Transfer Tax #: 4508
Transfer Tax

Transfer Tax	1048.00
Total:	1048.00

Record and Return To:

PAUL/CHICAGO
FOR: DUKEHOLZMAN PHOTIADIS & GRESENS LLP

WARNING***
** Information may change during the verification process and may not be reflected on this page.

Joseph A. Jastrzemski
Niagara County Clerk

QUITCLAIM DEED
A PORTION OF
9400 PORTER ROAD
(A PORTION OF THE FORMER NIAGARA FALLS ARMY RESERVE CENTER)
TOWN OF NIAGARA, NEW YORK

THIS QUITCLAIM DEED, dated April 11, 2019, is made and entered into by and between the Town of Niagara, a municipal corporation existing under the laws of the State of New York, whose mailing address is Town of Niagara, 7105 Lockport Road, Niagara Falls, NY 14305 (hereinafter referred to as the "GRANTOR") and **NIAGARA FALLS AIRPORT CENTER OF COMMERCE LLC**, a New York limited liability company (hereinafter referred to as the "GRANTEE").

WITNESSETH THAT:

THE GRANTOR, in consideration of the sum of Two Hundred and Sixty-Two Thousand Dollars ($262,000.00) and other good and valuable consideration, the sufficiency of which is hereby acknowledged, does hereby remise, release, and forever quitclaim unto the GRANTEE, its successors and assigns, all right, title and interest of the GRANTOR in and to all that certain parcel of land situated, lying and being in Niagara Township, Niagara County, New York, containing approximately **15.096** acres, as more particularly described in **Exhibit "A,"** attached hereto and made a part hereof, together with all right, title and interest of the GRANTOR in and to the easement for purposes of ingress and egress across a 0.14 acre portion of a parcel of land situated, lying and being in Niagara Township, Niagara County, New York, and more particularly described in **Exhibit "B,"** attached hereto and made a part hereof (hereinafter referred to as the "Property").

SUBJECT TO all valid and existing restrictions, reservations, covenants, conditions, and easements including, but not limited to, rights-of-way for railroads, highways, pipelines, and public utilities, if any, whether of public record or not.

TO HAVE AND TO HOLD the Property granted herein to the GRANTEE, its successors and assigns, together with all and singular the appurtenances, rights, powers, and privileges thereunto belonging or in anywise, appertaining, and all the estate, right, title, interest, or claim whatsoever of the GRANTOR, either in law or in equity, and subject to the reservations, covenants, conditions, and restrictions hereinafter set forth in this deed.

AND IT IS FURTHER AGREED AND UNDERSTOOD by and between the parties hereto that the GRANTEE, by its acceptance of this deed, and as part of the consideration for the conveyance herein, covenants and agrees for itself, its successors, and assigns forever, that this deed is made and accepted upon each of the following covenants, conditions, and restrictions which shall be binding upon and enforceable against the GRANTEE, its successors and assigns in perpetuity by the GRANTOR and other interested parties as may be allowed by law; that the covenants, conditions, and restrictions set forth herein are a binding servitude on the Property and shall be deemed to run with the land in perpetuity; and that the failure to include the covenants, conditions, and restrictions in subsequent conveyances of the Property or portions

2019413383

2019-05574
04/15/2019 12:52:28 PM
12 Pages
DEED

Joseph A. Jastrzemski, Niagara County Clerk Clerk: TH

thereof does not abrogate the status of the covenants, conditions, and restrictions as binding upon the GRANTOR and the GRANTEE, its successors and assigns.

That certain quitclaim deed ("**Government Deed**") from the United States of America ("**Government**") dated Sept 27, 2019 transferring the Property and more to the GRANTOR was recorded prior to recordation of this deed. In its transfer of the Property and more to the GRANTOR, the Government provided certain information regarding the environmental condition of the Property. The GRANTOR has no knowledge regarding the accuracy or adequacy of such information.

The italicized information below is copied verbatim (except as discussed below) from the Government Deed. The GRANTEE hereby acknowledges and assumes all responsibilities with regard to the Property placed upon the GRANTOR (the "Town") under the terms of the aforesaid Government Deed, and GRANTOR grants to GRANTEE all benefits with regard to the Property under the terms of the aforesaid Government Deed. Within the italicized information only, the term "GRANTOR" shall mean the Government, and the term "GRANTEE" shall mean the Town of Niagara. Within the italicized information below, the references to Exhibit "C" and Exhibit "D" means those exhibits attached to and made a part of the Government Deed.

1. NON-DISCRIMINATION:

The GRANTEE ("Town") covenants for itself, its successors and assigns and every successor in interest to the Property herein conveyed, or any part thereof, that the said GRANTEE ("Town") and such successors and assigns shall not discriminate upon the basis of race, creed, color, religion, sex, disability, age, or national origin in the use, occupancy, sale, or lease of the Property, or in their employment practices conducted thereon. This covenant shall not apply, however, to the lease or rental of a room or rooms within a family dwelling unit nor shall it apply with respect to religion to premises used primarily for religious purposes. The GRANTOR ("Government") shall be deemed a beneficiary of this covenant without regard to whether it remains the owner of any land or interest therein in the locality of the Property herein conveyed and shall have the sole right to enforce this covenant in any court of competent jurisdiction.

2. PROPERTY COVERED BY NOTICE, DESCRIPTION, ACCESS RIGHTS, AND COVENANT MADE PURSUANT TO SECTION 120(h)(3)(A) OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (42 U.S.C. § 9620(h)(3)(A)):

For the Property, the GRANTOR ("Government") provides the following notice, description, and covenant and retains the following access rights:

2a. Notice Pursuant to Sections 120(h)(3)(A)(i)(I) and (II) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(i)(I) and (II)):

Pursuant to sections 120(h)(3)(A)(i)(I) and (II) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(i)(I) and (II)), available information regarding the type, quantity, and location of hazardous substances and the time at which such substances were stored, released, or disposed of, as defined in section 120(h), is provided in ***Exhibit "C"****, Notification of Hazardous Substance Storage, Release, and Disposal, attached hereto and made a part hereof.*

2b. Description of Remedial Action Taken, if Any, Pursuant to Section 120(h)(3)(A)(i)(III) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(III)):

Pursuant to section 120(h)(3)(A)(i)(III) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(i)(III)), a description of the remedial action taken, if any, on the Property is provided in ***Exhibit "C"****, Notification of Hazardous Substance Storage, Release, and Disposal, attached hereto and made a part hereof.*

2c. Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B)):

Pursuant to sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B)), the United States warrants that —

(a) All remedial action necessary to protect human health and the environment with respect to any hazardous substance identified pursuant to section 120(h)(3)(A)(i)(I) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 remaining on the Property has been taken before the date of this deed, and

(b) Any additional remedial action found to be necessary after the date of this deed shall be conducted by the United States.

2d. Access Rights Pursuant to Section 120(h)(3)(A)(iii) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. § 9620(h)(3)(A)(iii)):

The United States retains and reserves a perpetual and assignable easement and right of access on, over, and through the Property, to enter upon the Property in any case in which a remedial action or corrective action is found to be necessary on the part of the United States, without regard to whether such remedial action or corrective action is on the Property or on adjoining or nearby lands. Such easement and right of access includes, without limitation, the right to perform any environmental investigation, survey, monitoring, sampling, testing, drilling, boring, coring, testpitting, installing monitoring or pumping wells or other treatment facilities, response action, corrective action, or any other action

necessary for the United States to meet its responsibilities under applicable laws and as provided for in this instrument. Such easement and right of access shall be binding on the GRANTEE ("Town") and its successors and assigns and shall run with the land.

In exercising such easement and right of access, the United States shall provide the GRANTEE ("Town") or its successors or assigns, as the case may be, with reasonable notice of its intent to enter upon the Property and exercise its rights under this clause, which notice may be severely curtailed or even eliminated in emergency situations. The United States shall use reasonable means to avoid and to minimize interference with the GRANTEE ("Town") and the GRANTEE's ("Town's") successors' and assigns' quiet enjoyment of the Property. At the completion of work, the work site shall be reasonably restored. Such easement and right of access includes the right to obtain and use utility services, including water, gas, electricity, sewer, and communications services available on the Property at a reasonable charge to the United States. Excluding the reasonable charges for such utility services, no fee, charge, or compensation will be due the GRANTEE ("Town"), nor its successors and assigns, for the exercise of the easement and right of access hereby retained and reserved by the United States.

In exercising such easement and right of access, neither the GRANTEE ("Town") nor its successors and assigns, as the case may be, shall have any claim at law or equity against the United States or any officer or employee of the United States based on actions taken by the United States or its officers, employees, agents, contractors of any tier, or servants pursuant to and in accordance with this clause: Provided, however, that nothing in this paragraph shall be considered as a waiver by the GRANTEE ("Town") and its successors and assigns of any remedy available to them under the Federal Tort Claims Act.

3. "AS IS" Condition of Property:

A. The GRANTEE ("Town") acknowledges that it has inspected, or has had the opportunity to inspect, the Property and accepts the condition and state of repair of the Property. The GRANTEE ("Town") understands and agrees that the Property is conveyed "AS IS" without any representation, warranty, or guaranty by the GRANTOR ("Government") as to quantity, quality, title, character, condition, size, or kind, or that the same is in a suitable condition or fit to be used for the purposes intended by the GRANTEE ("Town"), and no claim for allowance or deduction upon such grounds shall be considered.

B. No warranties, either express or implied, are given with regard to the condition of the Property including, without limitation, whether the Property does or does not contain asbestos or lead-based paint. The GRANTEE ("Town") shall be deemed to have relied solely on its own judgment in assessing the condition of the Property including, without limitation, any asbestos, lead-based paint, or other conditions on the Property. The failure of the GRANTEE ("Town") to

inspect or to exercise due diligence to be fully informed as to the condition of the Property shall not constitute grounds for any claim or demand against the GRANTOR ("Government").

C. Nothing in this "AS IS" provision shall be construed to modify or negate the GRANTOR's ("Government's") obligation under the "Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B))" or any other statutory obligations.

4. Hold Harmless:

A. To the extent authorized by law, the GRANTEE ("Town") for itself, its successors and assigns, covenants and agree to indemnify and hold harmless the GRANTOR ("Government"), its officers, agents, and employees from (1) any and all claims, damages, judgments, losses, and costs, including fines and penalties, arising out of the violation of the covenants, conditions, and restrictions in this deed by the GRANTEE ("Town"), its successors and assigns, and (2) any and all claims, damages, losses, costs, and judgments arising out of, or in any manner predicated upon, exposure to asbestos, lead-based paint, or other condition on any portion of the Property after the date of the conveyance herein.

B. The GRANTEE ("Town"), for itself, its successors and assigns, covenants and agrees that the GRANTOR ("Government") shall not be responsible for any costs associated with modification or termination of the covenants, conditions, and restrictions in this deed including, without limitation, any costs associated with additional investigation or remediation of asbestos, lead-based paint, or other condition on any portion of the Property.

C. Nothing in this "Hold Harmless" provision shall be construed to modify or negate the GRANTOR's ("Government's") obligation under the "Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B))" or any other statutory obligations.

5. Post-Transfer Discovery of Contamination:

A. If a release or threatened release of a hazardous substance is discovered on the Property after the date of the conveyance herein, the GRANTEE ("Town"), its successors or assigns shall be responsible for such newly discovered release or threatened release of a hazardous substance unless the GRANTEE ("Town"), or its successors or assigns is able to demonstrate that such release or threatened release of a hazardous substance was due to the GRANTOR's ("Government's") activities, use, or ownership of the Property. If the GRANTEE ("Town"), or its successors or assigns believe the newly discovered hazardous substance is due to the GRANTOR's ("Government's") activities, use, or ownership of the Property, the GRANTEE ("Town"), or its

successors or assigns shall immediately secure the site and notify the GRANTOR ("Government") of the existence of the release or threatened release of the hazardous substance and the GRANTEE ("Town"), or its successors or assigns shall not further disturb or allow the disturbance of such hazardous substance without the prior written permission of the GRANTOR ("Government").

B. The GRANTEE ("Town"), for itself, its successors and assigns, as part of the consideration for the conveyance of the Property, hereby releases the GRANTOR ("Government") from any liability or responsibility for any claims arising solely out of the release or threatened release of any hazardous substance on the Property occurring after the date of the conveyance herein where such hazardous substance was placed on the Property by the GRANTEE ("Town"), or its successors, assigns, employees, invitees, agents, contractors, or any person other than the GRANTOR ("Government") after the date of the conveyance herein. This "Post-Transfer Discovery of Contamination" provision shall not affect the GRANTOR's ("Government's") responsibilities to conduct response actions or corrective actions that are required by applicable laws, rules and regulations, including the GRANTOR's ("Government's") obligation under the "Covenant Pursuant to Sections 120(h)(3)(A)(ii) and (B) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. §§ 9620(h)(3)(A)(ii) and (B))."

6. Environmental Protection Provisions:

The GRANTEE ("Town") shall neither transfer the Property, lease the Property, nor grant any interest, privilege, or license whatsoever in connection with the Property without including the environmental protection provisions set forth in ***Exhibit "D,"*** *attached hereto and made a part hereof, and shall require the said provisions in all subsequent deeds, easements, transfers, leases, or grant of any interest, privilege, or license in, of, on, or to the Property or any portion thereof.*

7. Anti-Deficiency Act:

The GRANTOR's ("Government's") obligation to pay or reimburse any money under this deed is subject to the availability of funds appropriated for this purpose to the Department of the Army and nothing in this deed shall be interpreted to require obligations or payments by the GRANTOR ("Government") in violation of the Anti-Deficiency Act, 31 U.S.C. § 1341.

8. No Waiver:

The failure of the GRANTOR ("Government") to insist in any one or more instances upon timely or complete performance of any obligation of the GRANTEE ("Town"), or its successors or assigns required by the covenants, conditions, or restrictions shall not be construed as a waiver or a relinquishment of the GRANTOR's ("Government's") right to future performance of any such

obligation of the GRANTEE ("Town") or its successors or assigns in strict accordance with the said covenants, conditions, and restrictions and all such obligations of the GRANTEE ("Town"), its successors and assigns shall continue in full force and effect.

The GRANTEE, by acceptance of this deed, covenants and agrees for itself, its successors and assigns, that the Property is transferred on an "as is, where is" basis, without warranty of any kind, either expressed or implied, including as to the condition of the Property. The GRANTEE also covenants and agrees for itself, its successors and assigns, that GRANTOR has no obligation to provide any additions, improvements, or alterations to the Property.

The conditions, restrictions, and covenants set forth in this deed are a binding servitude on the Property and will be deemed to run with the land in perpetuity. Restrictions, stipulations and covenants contained herein will be inserted by the GRANTEE verbatim or by express reference in any deed or other legal instrument by which it divests itself of either the fee simple title or any other lesser estate in the Property or any portion thereof. All rights and powers reserved to the GRANTOR, and all references in this deed to GRANTOR shall include its successors in interest. The GRANTOR may agree to waive, eliminate, or reduce the obligations contained in the covenants; PROVIDED, HOWEVER, that the failure of the GRANTOR or its successors to insist in any one or more instances upon complete performance of any of the said conditions shall not be construed as a waiver or a relinquishment of the future performance of any such conditions, but the obligations of the GRANTEE, its successors and assigns, with respect to such future performance shall be continued in full force and effect.

IN WITNESS WHEREOF, the GRANTOR has caused this Quitclaim Deed to be duly executed in its name by the Supervisor this 11 day of April, 2019.

TOWN OF NIAGARA

By: _____
Name: Lee Wallace
Title: Supervisor

ACKNOWLEDGEMENT

STATE OF NEW YORK)
) ss:
COUNTY OF NIAGARA)

I, Steven M. Knapp, a notary public, in and for the State of New York, County of Niagara, do hereby certify that Lee Wallace of the Town of Niagara, known to me or proven through satisfactory evidence of identity to be the person whose name is subscribed to the foregoing document, appeared in person and acknowledged before me that the signature on the document was voluntarily affixed by him for the purposes therein stated and that he had due authority to sign the document in the capacity therein stated.

Given under my hand and seal this 10th day of April, 2019.

_____
Notary Public

My commission expires: August 7, 2021

STEVEN M. KNAPP
No. 01KN6362609
Notary Public, State of New York
Qualified in Erie County
My Commission Expires Aug. 7, 2021

4850-0692-3879.2

ACCEPTANCE OF CONVEYANCE

IN WITNESS WHEREOF, the GRANTEE, hereby accepts the conveyance herein subject to all of the notices, covenants, conditions, restrictions, and reservations set forth in this deed, this 11th day of April, 2019.

NIAGARA FALLS AIRPORT CENTER OF COMMERCE LLC
By Its Manager, Reman, LLC

By: _____
Name: Gordon Reger
Title: Member/Manager

ACKNOWLEDGEMENT

STATE OF NEW YORK)
) ss:
COUNTY OF NIAGARA)

I, Barbara B. Strzemski-Haase a notary public, in and for the State of New York, County of Niagara, do hereby certify that Gordon Reger of Niagara Falls Airport Center of Commerce LLC, known to me or proven through satisfactory evidence of identity to be the person whose name is subscribed to the foregoing document, appeared in person and acknowledged before me that the signature on the document was voluntarily affixed by him for the purposes therein stated and that he had due authority to sign the document in the capacity therein stated.

Given under my hand and seal this 12th day of April, 2019.

_____
Notary Public

My commission expires: Aug. 17, 2022

BARBARA B. STRZEMSKI-HAASE
Notary Public, State of New York
Registration No. 02ST6011758
Qualified in Erie County
My Commission Expires Aug. 17, 2022

4850-0692-3879.2

EXHIBIT A

LEGAL DESCRIPTION

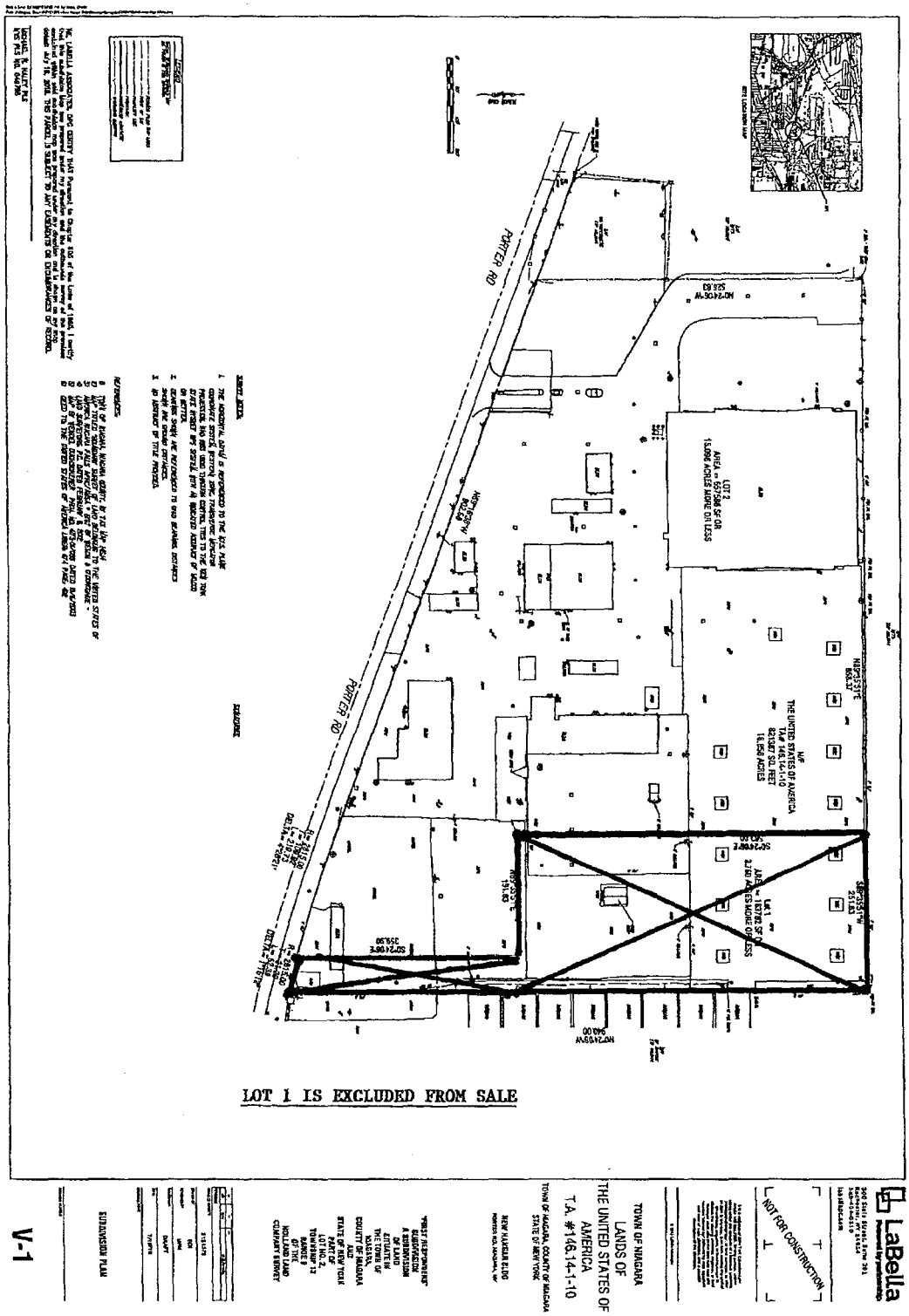
PARCEL A (Fee)
ALL THAT TRACT OR PARCEL OF LAND, situate in the Town of Niagara, County of Niagara and State of New York, being part of Lot 2, Township 13, Range 9 of the Holland Land Company's Survey, bounded and described as follows:

BEGINNING at the point of intersection of the northeast line of Porter Road with the west line of Lot 2; thence northerly along the west line of Lot 2, a distance of 526.83 feet to the northwest corner of lands acquired by the United States of America by Judgment recorded in Liber 674 of Deeds at page 492; thence easterly at an interior angle of 90° 00' 03: along the north line of said United States of America lands, a distance of 858.37 feet to a point; thence southerly at an interior angle of 89° 59' 57", a distance of 563.00 feet to an angle point; thence easterly at an exterior angle of 89° 59' 57", a distance of 191.63 feet to an angle point; thence southerly at an interior angle of 89° 59' 57", a distance of 359.90 feet to a point in the northeast line of Porter Road; thence northwesterly along the northeast line of Porter Road along an arc to the right having a radius of 2815 feet, a distance of 219.73 feet, the chord bearing of which is North 71° 37' 11" West, a chord distance of 219.68 feet to a point; thence northwesterly along the northeast line of Porter Road, a distance of 902.68 feet to the point or place of beginning.

PARCEL B (Easement)
ALL THAT TRACT OR PARCEL OF LAND, situate in the Town of Niagara, County of Niagara and State of New York, being part of Lot 6, Township 13, Range 9 of the Holland Land Company's Survey, bounded and described as follows:

BEGINNING at a point in the east line of Lot 6 distant 275 feet northerly from the intersection of the east line of Lot 6 with the northeast line of Porter Road; thence westerly at right angles, 20 feet to a point; thence northerly at right angles, 160 feet to a point; thence westerly at an exterior angle of 89° 04', 130 feet to a point; thence northerly at an interior angle of 89° 04', 20 feet to a point in the north line of lands conveyed to United States of America by deed recorded in Liber 1198 of Deeds at page 340; thence easterly at an interior angle of 90° 56' along the north line of said United States of America lands, 150 feet to the northeast corner thereof in the east line of Lot 6; thence southerly at an interior angle of 89° 03' 42" and along the east line of Lot 6, 180 feet to the point or place of beginning.

EXHIBIT B



4850-0692-3879.2
000161.01525 Administrative 9606730v1

Appendix D
Site Inspection

Five-Year Review Site Inspection Checklist
Niagara Falls Armed Forces Reserve Center (AFRC)

I. SITE INFORMATION

Site name: Niagara Falls Armed Forces Reserve Center	**Date of inspection:** March 14, 2025 9am - 10am
Location and Region: 9400 Porter Road, Niagara Falls, New York	**EPA ID:** NY8210424273
Agency, office, or company leading the five-year review: US Army Corps of Engineers, Buffalo District	**Weather/temperature:** 30° F, Clear

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☑ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other Land use controls - restrict residential use
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

V. ACCESS AND INSTITUTIONAL CONTROLS ☑ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☑ Gates secured ☐ N/A

Remarks: Property is fully fenced with secured gates

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A

Remarks: Security measures include building alarm systems and video surveillance

Five-Year Review Site Inspection Checklist
Niagara Falls Armed Forces Reserve Center (AFRC)

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☑ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☑ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) N/A
Frequency
Responsible party/agency
Contact

Name	Title	Date	Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☑ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☑ N/A

Specific requirements in deed or decision documents have been met ☑ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☑ No ☐ N/A
Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☑ ICs are adequate ☐ ICs are inadequate ☐ N/A

Deed requirements prevent residential use

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☑ No vandalism evident
Remarks: Property owner contact indicated no issues with vandalism/trespassing

2. **Land use changes on site** ☐ N/A
Remarks: 9400 Porter Rd is located in a Heavy Industrial zoned District. and Categorized vacant Industrial. Building 21 currently contains office space. Future plans include Industrial/Manufacturing. Buildings 19 and 23 have been demolished.

3. **Land use changes off site** ☑ N/A
Remarks: Adjacent properties are zoned light industrial and general business. Niagara Falls International Airport is located to the North and East, vacant property located directly South, and Commerical properties located to the West.

VI. GENERAL SITE CONDITIONS

A. Roads ☑ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☑ Roads adequate ☐ N/A
Remarks:

B. Other Site Conditions

Remarks: Site is mainly vacant. Some updates have been made to prepare for industrial/manufacturing use. No residential use is planned/expected.

Appendix E
Photographic Record

PHOTOGRAPHIC RECORD
Niagara Falls Armed Forces Reserve Center

9400 Porter Road, Niagara Falls, New York

Photo No. 1
(14-March-2025)

Description: View on-site facing west. Grassy area is within site fencing but is owned by County.

Photo No. 2
(14-March-2025)

Description: View from inside site of gated entrance and fencing along Porter Road.

PHOTOGRAPHIC RECORD
Niagara Falls Armed Forces Reserve Center

9400 Porter Road, Niagara Falls, New York

Photo No. 3
(14-March-2025)

Description: View of on-site buildings. Buildings were not occupied at the time of inspection.

Photo No. 4
(14-March-2025)

Description: View of on-site building 16. Building was not occupied at the time of inspection. Background shows off-site airport buildings.

PHOTOGRAPHIC RECORD
Niagara Falls Armed Forces Reserve Center

9400 Porter Road, Niagara Falls, New York

Photo No. 5
(14-March-2025)

Description: West side of hanger building.

Photo No. 6
(14-March-2025)

Description: View of on-site buildings. Buildings were not occupied at the time of inspection.

PHOTOGRAPHIC RECORD
Niagara Falls Armed Forces Reserve Center

9400 Porter Road, Niagara Falls, New York

Photo No. 7
(14-March-2025)

Description: View inside hanger which is currently vacant.

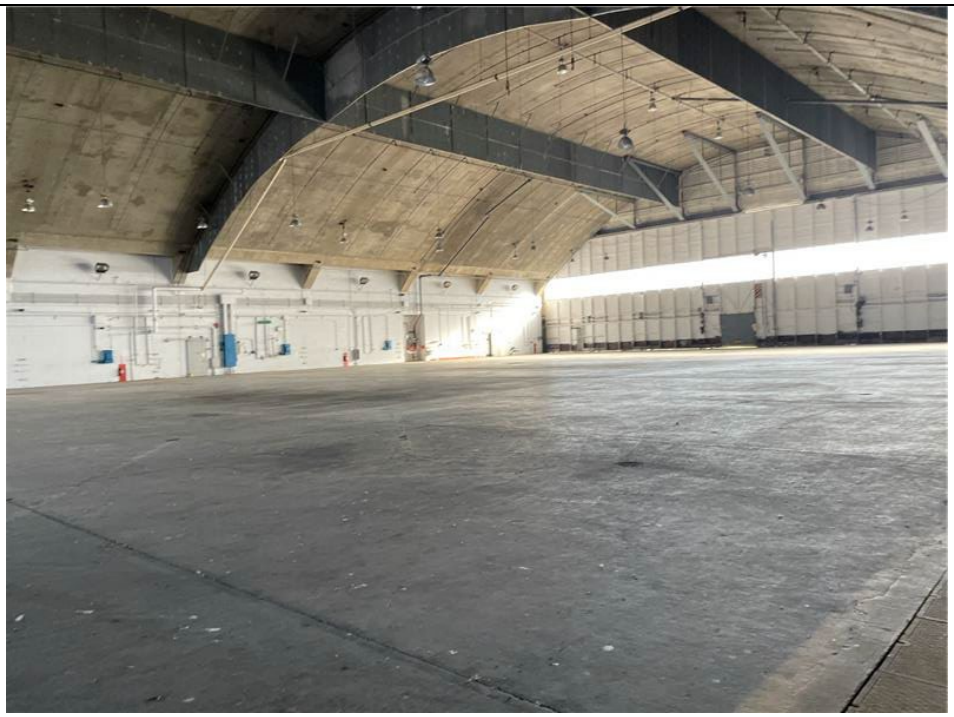


Photo No. 8
(14-March-2025)

Description: Gated entrance to 9400 Porter Road site.

Appendix F
Interview Record

INTERVIEW RECORD

Site Name: Niagara Falls AFRC, 9400 Porter Road	**EPA ID No.:**
Subject: Second Five-Year Review	**Date:** March 11, 2025
Type: ■ Telephone □ Visit □ Other **Location of Visit:**	□ Incoming ■ Outgoing

Contact Made By:

Name: Laura Rosten	**Title:** Project Engineer	**Organization:** USACE

Individuals Contacted:

Name: John Simon	**Title:** Chief Strategic Development and Asset Officer	**Organization:** Stavatti

Telephone No: 716-864-6984 **Email Address:**	**Street Address:** **City, State, Zip:**

Summary Of Conversation

1. To your knowledge, are deed restrictions for residential use and groundwater use still in place?

Yes, no infrastructure use has changed.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

An environmental Phase I was conducted at the time of property transfer and structural review was conducted of the hanger.

3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

No.

4. Do you feel well informed about the site's current condition?

As much as needed. Stavatti is currently waiting on significant funding. Stavatti has completed site work including new roofing, improvements to the hanger and hanger doors, electrical system, radiant heat, and existing boiler. Additional funding is needed to remove boiler and switch to natural gas.

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

On Stavatti property, restrictions include no residential land use and no school. This is not an issue as planned use includes building of aviation prototypes. A private placement memo is underway to secure additional funding for these projects.

INTERVIEW RECORD

Site Name: Niagara Falls AFRC, 9400 Porter Road	**EPA ID No.:**
Subject: Second Five-Year Review	**Date:** March 11, 2025
Type: □ Telephone □ Visit ■ Other **Location of Visit:**	■ Incoming □ Outgoing

Contact Made By:

Name: Laura Rosten	**Title:** Project Engineer	**Organization:** USACE

Individuals Contacted:

Name: Charles Haseley	**Title:**	**Organization:** Town of Niagara
Telephone No: **Email Address:** chaseley@townofniagara.com	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. What is the current status of the land use and zoning within and nearby the site (9400 Porter Road, Niagara Falls)?

9400 Porter Road is located in a (H-L) Heavy Industrial Zoned District. The site was zoned as such in conjunction with a site plan approval request to operate an airport manufacturing facility out of the existing hanger with the accessory exterior use of temporary plane storage and associated tarmac. However, although the site plan was ultimately approved by Town Board Resolution, no required work to the site nor buildings have been permitted nor conducted. In fact, none of the structures to include the aforementioned hanger has been issued, as required by State and local law, A certificates of occupancy. No businesses license/s is registered from 9400 Porter Road. 9400 Porter Road is categorized as vacant Industrial.

The adjacent parcels along Porter Rd. to the North side of Porter running East to the Town wheatfield Town line is zoned (l-I) Light industrial and is under the control of the NFTA. Heading West along Porter Road, lands located on both the North and South sides are predominantly located in a (B-1) General Business Zoned District, and are made up of a mix of commercial businesses (retail and service) and legal non -conforming single-family homes

2. Have there been any requests or interests to rezone or develop the area surrounding the site for residential purposes. If so, please explain.

Answer: Yes, the Town of Niagara has had an interest to rezone a portion of Porter Rd. to include the aforementioned stretch adjacent to 9400 Porter Rd. from its current (B-1) Zoning to a zone that would allow by right both the existing and future commercial and residential mix uses, but not to Include 9400 Porter Road nor the above described NFTA property.

A.) The Town of Niagara had included the above proposed changes for the proposed use/ zoning at time of adoption of the latest comprehensive/master plan, and was perspective in nature with no development proposed for the area and was based on the following:

- The Towns attempt to address the previous and newly raised concerns lodged by numerous single-family homeowners of which due to their properties being a legal non-conforming residential use in a business zoned district could not use the homes as equity for bank loans and or new mortgages, nor could prospective purchasers of these residential uses acquire the properties for the same reasons. This resulted in an opportunity to eliminate the past Town boards spot zoning approvals of numerous parcels and offer relief to those found in these circumstances.
- During the hearings held and discussions had leading up to the adoption of the Towns master plan, it was found that a need for available housing was needed in addition to satisfying business opportunity trends that illustrated the desire for smaller neighborhood retail and service locations versus larger box chain mall/plaza retail shopping centers. With that said, it was decided that because Porter Road was and is used for exactly that, the Town and its residents and businesses alike would benefit, hence the rezoning vision.
- Currently the Town is in the throes of adopting a new version of the Zoning code needed to advance the Towns comprehensive plan.

B.) Although not directly adjacent, discussions with the Town have been held with a developer of whom wishes to construct and operate a 30+ acre solar array farm, the application to the Town for required approvals pending. The lands are currently vacant farmland zoned (R-1) Residential and located on the North Side of Porter Rd., West of Tuscarora rd.

3. Is there any reason to believe that the site or surrounding areas will be used for residential purposes in the foreseeable future?

A.) The Towns comprehensive plan and soon to be associated new zoning code illustrates that the desired future use and any development of 9400 Porter Road is to remain strictly Industrial in Nature, with no vision to change its allowable use and or Zoning in the foreseeable future.

B.) The residential use envisioned for the newly created mix use of Porter Rd. was envisioned as somewhat as an accessory use to new businesses such as an accessory dwelling for a family run business/s, and or single apartment mix commercial building versus individuals building their dream homes in this area. In addition, due to the lack of available continues acreage, the chances of any multiply home subdivision development/s is slim to none. Finally, as this area is mostly developed, no major development of residential purposes is proposed nor foreseen for the future.

Appendix G
Public Notice

PUBLIC NOTICE

NIAGARA FALLS ARMED FORCES RESERVE CENTER
U.S. ARMY BEGINS SECOND FIVE-YEAR REVIEW

On behalf of the Base Realignment and Closure Office (BRAC), the United States Army Corps of Engineers (USACE) has begun the second five-year review of environmental remedies undertaken at the Niagara Falls Armed Forces Reserve Center (AFRC) located at 9400 Porter Road, Niagara Falls, New York. The Record of Decision document selecting the environmental remedy for this site was signed in April 2015.

The selected remedy for the Niagara Falls AFRC was No Further Action with Land Use Controls to prevent future residential use of the property. The Land Use Controls utilized to achieve protectiveness include deed restrictions preventing residential use of the site.

The five-year review will be conducted to determine whether the remedy remains protective of human health and the environment and functions as intended by the Record of Decision. The five-year review will also assess factors to determine if the remedy will continue to be protective in the future. The report is due for completion by April 2025.

If you have any questions, comments, or concerns about the five-year review, please contact:

Matthew Kluge, Project Manager, USACE
Phone: (502) 315-6478
Email: matthew.r.kluge@usace.army.mil

A copy of the final report will be available at the following document repository location:

Niagara Falls Public Library
Earl W. Brydges Building
1425 Main Street
Niagara Falls, NY 14305

DRAFT

Appendix H
Risk Assessment and Toxicology Evaluation

Risk Assessment and Toxicology Evaluation

This evaluation was prepared to address Question B in assessing the protectiveness of the remedy (OSWER No. 9355.7-03B-P), *"Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?"*

1. OVERVIEW

This attachment evaluates the exposure assumptions, toxicity data, and remedial action objectives employed at the Niagara Falls Armed Forces Reserve Center (AFRC) in Niagara Falls, New York. The 2015 record of decision (ROD) is under review, which established no further action required under CERCLA for multiple areas of concern (AOCs) at the eastern side of the site. The AOCs consist of a 6-inch cast iron fire protection main, a former 500,000-gallon reservoir, a 24-inch corrugated metal storm sewer line, and a drainage swale along the southern boundary of the site that receives discharge from the sewer line (Outfall No. 5) and drains to Cayuga Creek at the western boundary of the site.

A discharge of product was observed in 2008 and reported as a spill to the New York State Department of Environmental Conservation (NYSDEC), resulting in remediation activities in 2009 consisting of capping of the fire main, cleaning of the sewer line, and excavation from the drainage swale of 134 tons of soil contaminated with polychlorinated biphenyls (PCBs). The NYSDEC commercial soil cleanup objective (6 NYCRR 375-6) of 1 mg/kg total PCBs was used as the remedial goal for the swale. A subsequent CERCLA site inspection in 2010 resulted in an interim remedial action executed in 2011 that removed 40 tons of soil exhibiting residual product to a depth of 5 ft bgs adjacent to the sewer line, as well as 2,000 gal of perched groundwater that entered the excavation and exhibited a sheen.

The ROD (U.S. Army 2015) subsequently determined that the site posed no unacceptable risks associated with exposure of commercial, industrial, or construction workers to soil or groundwater. The ROD also determined that reasonably anticipated future land use at the site is limited to industrial, due to close proximity to the airport runways, hangars, and taxiway, as well as the adjacent light industrial zoning and the Town of Niagara Local Reuse Authority's designated future use of commercial/industrial. Nevertheless, consistent with BRAC policy, subsequent ownership transfer of the property included deed restrictions precluding residential land use and groundwater use.

Consistent with a no further action ROD, no constituents of concern were identified and no remedial goals were established. The human health risk assessment (HHRA), initially completed in 2012 following the remedial investigation (PARS 2012) had estimated that the risk to construction workers associated with potential exposure to groundwater exceeded the CERCLA criterion for incremental lifetime cancer risk (ILCR) (1E-04). Following release of the proposed plan, the HHRA was reviewed and corrections were made to the risk calculations, resulting in the ROD selecting the no further action alternative on the basis that the established remedial action objectives (RAOs) were achieved without further remedial action. However, the RAOs were erroneously retained in the ROD, which the first five-year review recommended should be withdrawn through an explanation of significant differences (ESD) document (USACE 2020). The RAOs at present are:

1. Reduce or eliminate inhalation of volatiles from exposed contaminated groundwater during subsurface construction activities.
2. Reduce or eliminate dermal contact with groundwater that may occur during construction activities.

This review reconsiders the applicability of the RAOs by evaluating current exposure assumptions and toxicity criteria. It also reviews the validity of the HHRA determination regarding risks associated with soil exposures, based on current exposure assumptions and toxicity criteria.

No ecological risk assessment was conducted due to the lack of habitat (U.S. Army 2015).

2. DOCUMENTATION OF THE PROGRESSION OF REPORTED RISKS

An HHRA was initially conducted in April 2012 following the 2011 interim remedial action and using groundwater and subsurface soil data collected during the site inspection and remedial investigation, as well as subsurface soil data collected in 2009 following the drainage swale excavation (PARS 2012). The HHRA concluded that there was no unacceptable risk to any receptor due to potential exposure to soil (surface or subsurface). The maximum estimated ILCR associated with soil exposure was 4E-05 for commercial/industrial workers, based on combined exposure to polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) in subsurface soil (Exhibit 4 in U.S. Army 2015). The maximum reported non-cancer hazard associated with soil exposure was 1.78E-01 for commercial/industrial workers (Exhibit 5 in U.S. Army 2015). However, non-cancer hazard was quantified only for dermal contact with PCBs, with hazard left unquantified for commensurate incidental ingestion of PCBs and for all applicable exposure routes associated with PAHs. These deficiencies are evaluated later in Section 4.1.

The HHRA concluded that there was an unacceptable ILCR (3.5E-04) associated with the potential exposure of construction workers to groundwater (U.S. Army 2013), primarily due to the inhalation of naphthalene volatilized in a construction trench (3.1E-04) (Tables 22 and 26 in PARS 2012).

The HHRA was updated in March 2013 following a November 2012 supplemental investigation, which further evaluated the horizontal extent of groundwater impacts on the eastern side of the site by installing seven permanent monitoring wells and six temporary well points. One outcome of this investigation was that trichloroethylene (TCE) was newly identified as a groundwater COPC due to one additional detection in 2012 (7.8 µg/L) in one of the temporary well points. The original HHRA had also reported a single detection of TCE (0.58 µg/L) among the eight temporary well points sampled in 2011.

The proposed plan released in April 2013 states that it summarizes the March 2013 updated HHRA, and while it does report the groundwater results from the 2012 supplemental investigation (including the TCE detection) (Table 3)[1], the text does not identify TCE as a COPC while appearing to retain the original determination of naphthalene driving unacceptable risk (3.5E-04). However, the basis for the naphthalene risk was two detections reported in the original April 2012 HHRA, whereas the maximum detection appears to have been reported in error, as it was no longer reported in the 2013 proposed plan or the 2015 ROD. The 2012 HHRA also contained internal inconsistencies with respect to naphthalene reporting—the two detections (3.8 and 13 µg/L) were reported in Table 5 (groundwater COPC selection)[2] and in Appendix F (ProUCL software input table), yet only a single detection (3.8 µg/L) is shown in Table 3 (groundwater analytical results) and Appendix E (analytical results summary tables, which are labeled draft). Note that elevated naphthalene was also detected (89 µg/L) in 2010 during the site inspection in a

[1] Note that there are multiple, non-contiguous tables titled Table 3 in the proposed plan: the first Table 3 provides surface water results, the second Table 3 provides the RI groundwater results, and the third Table 3 provides the supplemental investigation groundwater results.
[2] There is also an inconsistency internal to Table 5, with the range of detected values indicating 13 µg/L as the maximum concentration, yet the reported maximum detect listed as 8.4 µg/L, which is the average of the two reported detections.

water sample collected at TP-11 where the 6" fire protection main drained into a catch basin (presumed to be the former reservoir drain).[3,4] This water sample was not evaluated in the HHRA.

Following release of the proposed plan, an error in risk calculations was discovered, resulting in a final update to the HHRA in December 2014 (PARS 2014) that contains the risk assessment results summarized in the 2015 ROD (U.S. Army 2015). The identified error was that inhalation cancer risk was calculated using the exposure duration (1 yr) rather than the assumed lifetime (70 yrs) as the average time. Using the correct averaging time proportionally reduces the original naphthalene inhalation cancer risk estimate (from 3.1E-04 to 4.4E-06). The updated HHRA, however, also removed naphthalene as a COPC—presumably due to the reporting inconsistencies described above—while adding TCE as a COPC (Exhibit 2 in U.S. Army 2015). These updates resulted in a risk to construction workers from groundwater inhalation in a trench of 8.19E-07 and a total groundwater pathway risk of 1.62E-05, now driven primarily by dermal absorption (Exhibit 4 in U.S. Army 2015).[5,6,7]

The risks no longer exceeded the CERCLA criterion requiring remedial action (1E-04), thus resulting in the no action ROD.[8] However, both the HHRA and the ROD failed to evaluate non-cancer hazard associated with most exposure pathways and COPCs, including groundwater COPCs to which construction workers could be exposed via inhalation in a trench. This is further evaluated in Section 4.3.

The progression of reported groundwater inhalation risks is summarized as follows:

- 2012 April—original HHRA (PARS 2012) = 3.5E-04 (primarily due to naphthalene, but with an incorrect averaging time)
- 2012 Nov—Supplemental investigation (TCE identified as a COPC due to detection of 7.8 µg/L)
- 2013 Mar—updated HHRA (unavailable for review)
- 2013 Apr—Proposed Plan = 3.5E-04 (still primarily due to naphthalene despite erroneous reporting and new observation of TCE)
- 2014 Dec—updated, final HHRA (PARS 2014) = 8.19E-07 (naphthalene replaced with TCE and correct averaging time used)
- 2015 Feb—ROD = 8.19E-07

3. EXPOSURE EVALUATION

3.1. CURRENT EXPOSURE RESTRICTIONS

Exposure is currently restricted by deed restrictions on residential land use and groundwater use. However, this restriction is not component to a CERCLA remedy, which was no further action and which

[3] This is reported as the "west pipe end water" in the first Table 3 in the proposed plan and in the second Table 3 of Appendix E of the 2012 HHRA.
[4] The result of 89 µg/L is for VOC analysis (EPA Method 8260), with the corresponding SVOC analysis for naphthalene (EPA Method 8270) producing a result of 87 µg/L.
[5] The total dermal risk reported in the updated HHRA was 1.53E-05, driven by PCBs (Table 25 in PARS 2014). PCBs, however, have an estimated dermal absorption coefficient (K_p) that falls outside the effective prediction domain established by USEPA (2004) and, for example, do not have dermal absorption from water quantified by default in the USEPA's RSL calculator.
[6] The updated HHRA and ROD additionally quantified risk due to incidental ingestion of groundwater (5.73E-08 reported in Exhibit 4), whereas the original HHRA elected to not quantify that pathway due to presumed de minimis exposures.
[7] The original HHRA appears to have used the correct averaging time for dermal cancer risk calculations.
[8] Note that the removal of naphthalene—even with the addition of TCE—was sufficient to reduce risk below the NCP criterion (1E-04), even if the inaccurate averaging time were retained. This should have occurred prior to the proposed plan, regardless of any averaging time calculation error.

included no land use or institutional controls and no land use control implementation plan. The ROD instead relied on the determination that reasonably anticipated future land use was limited to industrial with no groundwater use. However, there are currently no restrictions on potential intrusive subsurface activities where workers could be exposed to subsurface soil and groundwater. These exposure potentials are therefore the focus of this review.

3.2. POTENTIAL FOR GROUNDWATER EXPOSURE IN A CONSTRUCTION TRENCH

Because the HHRA failed to evaluate non-cancer hazard associated with construction worker inhalation exposure to groundwater in a trench, the relevance of this pathway is first considered here to determine whether quantification is necessary. The site exhibits perched groundwater a depth ranging from 2 to 6 ft bgs. The site is underlain by silty clay loam and mucky silt loam, which have very low permeability and produce ponding into the 0 to 4 ft of sandy fill above the silty loam. The groundwater investigation at the site was limited to this perched water zone. During soil excavation for the interim remedial action, perched groundwater was observed at approximately 2 ft bgs (U.S. Army 2015). Some of this perched groundwater exhibited sheen and was pumped from the excavation for disposal (approximately 2,000 gal). The soil remedy for achieving unrestricted use (Alternative 3 in the ROD) estimated 92,000 gallons of perched groundwater would require pumping from soil excavations, although no volume estimate was developed for removing all impacted groundwater. Given this information—in conjunction with the lack of institutional controls—direct exposure of construction workers to groundwater in a trench is a potentially complete exposure pathway requiring evaluation.

3.3. EXPOSURE PARAMETERS

The updated HHRA (PARS 2014) incorporated the updated default exposure parameter values released that year by USEPA (2014) OSWER Directive 9200.1-120 for use in Superfund risk assessments. These defaults remain current and the exposure assumptions used at the time of the remedy therefore remain valid.

4. RISK ASSESSMENT METHODS & TOXICITY EVALUATION

4.1. METHODS

The toxicity assessment in the HHRA variously considered carcinogenic and non-carcinogenic effects as non-independent. It also did not consistently apply these endpoints across exposure routes. While the text describes some of these determinations, the basis behind them is unclear. For example, the HHRA states:

> "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." – HHRA Section 7.7.1 and repeated in ROD Section 2.7.1.3
>
> It is unclear why the non-cancer endpoint was evaluated only for dermal exposure but not for ingestion, when the dermal toxicity criterion applied for Aroclor 1254 was based on an oral reference dose (Table 28 in PARS 2014).

> "Risk characterization data for naphthalene is only available as non-cancer risk for dermal exposure, but carcinogenic risk characterization data does exist for inhalation exposure. Therefore, naphthalene in groundwater is evaluated as a non-carcinogen for dermal exposure and as a carcinogen for inhalation exposure." – Original HHRA Section 7.7.1 (PARS 2012)
>
> Although this particular statement was removed from the final HHRA (PARS 2014) due to naphthalene being removed as a COPC, it remains unclear why the non-cancer endpoint for groundwater exposures was evaluated for dermal (Table 28) but not for ingestion or inhalation (Table 30) when all three pathways were evaluated for the cancer endpoint (Table 27), and non-cancer criteria were available for groundwater COPCs (including inhalation criteria for the two volatile COPCs, benzene and trichloroethylene). Likewise, it is unclear why a non-cancer evaluation was not performed for dermal exposure to benzene and trichloroethylene (Table 28), for which reference doses were available, when cancer was evaluated for the dermal route (Table 25).

Overall, non-cancer hazard was evaluated only for dermal contact—to both subsurface soil and groundwater. For both media, this was only for PCBs (specifically the Aroclor 1254 mixture), with hazard not quantified for commensurate incidental ingestion of PCBs. Based on the soil exposure point concentration (EPC) and exposure parameter values reported in the HHRA and ROD, the ingestion route of exposure for PCBs would produce hazard quotients (HQs) of the same order of magnitude as those reported for the dermal pathway (< 0.2) (Table 29 in PARS 2014 and Exhibit 5 in U.S. Army 2015).

However, the non-cancer evaluations were quantified with two important errors. First, they incorrectly used the dermally-absorbed dose (mg kg^{-1} d^{-1}) calculated for carcinogenic exposures, which was averaged over a lifetime (i.e. 70 yrs) (Tables 18, 21, 25, 28, and 29 in PARS 2014), whereas it should have been averaged over the exposure duration applicable to the non-cancer criterion. For construction worker exposures, that would be one year (e.g. Section 4.2.2) and for industrial workers, that would be 25 years. The erroneous 70-yr averaging time proportionally underestimated the non-cancer HQ by factors of 70 and 2.8, respectively. Second, the non-cancer evaluations incorrectly adjusted the oral reference dose (RfD) by the dermal absorption efficiency from soil term (ABS_d)—it multiplied the RfD by the absorbed fraction from soil (ABS_d) (Table 29 in PARS 2014), which was already accounted for when calculating the dermally-absorbed dose (Tables 9 and 10 in PARS 2014). The ABS_d term represents the fraction of contaminant in soil (the EPC) that is absorbed through the skin and is intended only to derive the dermally-absorbed dose; the oral RfD is adjusted instead by the gastrointestinal absorption factor (ABS_{gi}) to enable comparison to dermally-absorbed doses (USEPA 2004). The ABS_{gi} term equals one for all COPCs, so no adjustment was necessary, whereas the HHRA incorrectly multiplied RfDs by ABS_d, which is 0.14 for PCBs. This resulted in canceling out the ABS_d term entirely, thereby overestimating HQs by a factor 7.14. These individual errors combined to produce a net overestimation of HQ for industrial workers by a factor of 2.55, and a net underestimation of HQ for construction workers by a factor of 0.102, which is equivalent to an HQ 9.8 times greater than the HQ of 0.0128 reported in the HHRA (Table 29 in PARS 2014). Correcting these errors would thus produce total pathway HQs (ingestion plus dermal) that remain less than the NCP criterion (unity).

Note that the carcinogenic evaluations for dermal exposure also incorrectly adjusted the cancer slope factors by the ABS_d term, resulting in overestimation of cancer risks associated with dermal exposure to PAHs and PCBs (Tables 18 and 21). Similarly, the ABS_{gi} term was incorrectly applied to the ingestion pathway for cancer evaluations (Tables 20, 23, and 26), although ABS_{gi} equals one for all COPCs so it did not affect cancer quantification.

For groundwater exposure, non-cancer hazard associated with dermal exposure was also quantified only for PCBs (Aroclor 1254), with hazard not quantified for commensurate incidental ingestion of PCBs nor

for any applicable exposure route associated with other groundwater COPCs. The PAH groundwater COPCs—benz(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene—do not have applicable non-cancer toxicity criteria for evaluation.[9] However, the two VOC groundwater COPCs—benzene and TCE—do have non-cancer criteria for the ingestion, dermal, and inhalation routes of exposure.

The reported HQ for construction worker dermal exposure to Aroclor 1254 in groundwater was 0.05 (Table 28 in PARS 2014 and Exhibit 5 in U.S. Army 2015). As described above for dermal absorption from soil, the dermally-absorbed dose calculated using the carcinogenic averaging time was incorrectly applied to the non-cancer evaluation. The reported HQ should have thus been 70 times greater, i.e. 3.5, which exceeds the NCP criterion. Note, however, that PCBs have an estimated dermal absorption coefficient (K_p) that falls outside the effective prediction domain established by USEPA (2004) and thus the quantified dermally-absorbed dose contains considerable uncertainty. Due to this, the USEPA's RSL calculator does not quantify dermal absorption of Aroclor 1254 from water. As such, this HHRA deficiency may not substantially affect a determination regarding the health hazard associated with construction worker exposure to groundwater.

The original HHRA (PARS 2012) also did not quantify hazard for dermal absorption of Aroclor 1254 from groundwater, instead doing so only for naphthalene. Naphthalene was subsequently removed as a COPC, and TCE was included as a COPC, in the updated HHRA (see explanation in Section 2), but dermal exposure was not quantified for either TCE or benzene. Based on the groundwater EPCs and exposure parameter values reported, the HQs (ingestion plus dermal) for TCE and benzene would be approximately 8.1E-03 and 1.9E-04, respectively.

4.2. TOXICITY CRITERIA

Updates to both carcinogenic (Table H-1a) and non-carcinogenic (Table H-1b) toxicity criteria that have been issued since the ROD in 2015 were reviewed for relevance to the exposure pathways currently potentially complete. The HHRA (PARS 2014) used the established USEPA (2003) hierarchy for human health toxicity values for Superfund risk assessment, which remains current.

The oral cancer slope factors and inhalation unit risks (IURs) remain current for PCBs (Aroclor 1254 and 1260), benzene, TCE, and naphthalene (Table H-1a). The non-cancer reference doses used for Aroclor 1254 and naphthalene remain current (Table H-1b).

4.2.1. Benzo(a)pyrene

New toxicity data for benzo(a)pyrene have been issued since the decision document was published (U.S. Army 2015). Benzo(a)pyrene was reevaluated by the USEPA's Integrated Risk Information System (IRIS) program, resulting in the issuance in 2017 of an updated carcinogenic oral slope factor, a new carcinogenic inhalation unit risk, and new non-cancer ingestion and inhalation reference criteria (USEPA 2017). The carcinogenic toxicity criteria for benzo(a)pyrene are used to derive carcinogenic toxicity criteria for other PAHs using relative potency factors (RPFs) (USEPA 1993). RPFs apply to the four other PAHs identified as COPCs. The RPFs are not applicable, however, for estimating non-carcinogenic risk for other PAHs (USEPA 1993).

[9] In the original HHRA (PARS 2012), this also included benzo(a)pyrene, but it was removed as a groundwater COPC in the updated HHRA (PARS 2014), apparently due to data reporting discrepancies, similar to that reported in Section 2 for naphthalene. Regardless, benzo(a)pyrene also did not have non-cancer toxicity criteria available until 2017 (see Section 4.2).

The updated benzo(a)pyrene slope factor is 7.3 times less than the previous IRIS slope factor used in the HHRA (PARS 2014). The new IUR is 1.8 times less than the IUR used in the HHRA, which was sourced from California EPA (1993). The downward adjustment in carcinogenicity for benzo(a)pyrene applies equally to the four other PAHs (Table H-1a). These changes would proportionally reduce the reported cancer risks associated with soil ingestion and inhalation of PAHs. The new non-cancer criteria would produce new chemical hazard not previously quantified by the HHRA; based on the EPCs reported in the HHRA, the total soil pathway hazard quotient for benzo(a)pyrene would be approximately 0.01.

4.2.2. Trichloroethylene

Construction worker exposure to trichloroethylene in groundwater was only ever evaluated in the HHRA (PARS 2014) for the carcinogenic endpoint (Sections 4.1 and 4.3), using current carcinogenic toxicity criteria (Table H-1a). Non-cancer toxicity criteria were also available at the time from IRIS (USEPA 2011) (Table H-1b), which should have been used to evaluate non-carcinogenic endpoints.

In 2019, the Agency for Toxic Substances and Disease Registry (ATSDR)—an agency within the U.S. Department of Health and Human Services, administrated by the Centers for Disease Control and Prevention—issued a toxicological profile for trichloroethylene. ATSDR is required under CERCLA to prepare toxicological profiles for hazardous substances included on a priority list developed jointly by ATSDR and USEPA.[10] The toxicological profiles include derivations of minimum risk levels (MRLs), which are estimates of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse non-cancer health effects over a specified route and duration of exposure. MRLs are considered Tier 3 toxicity criteria under the USEPA's (2003) hierarchy, whereas IRIS is the Tier 1 source. However, IRIS evaluates only criteria applicable to chronic exposures, whereas MRLs are issued for both chronic and subchronic exposures, and an evaluation of subchronic exposure is required per USEPA (1989) risk assessment guidance.

Subchronic criteria are particularly relevant to construction worker exposures, which were assumed to occur for just 180 days (PARS 2014). While chronic criteria are evaluated by averaging this exposure over a one-year duration, evaluating subchronic exposures may require averaging over shorter durations if such shorter durations are applicable to the sub-chronic toxicity criterion (USEPA 1989). The toxicological basis behind the subchronic MRL for TCE was reviewed to determine the appropriate averaging time required to evaluate construction worker exposures to TCE in groundwater during trenching activities.

The intermediate duration inhalation MRL was adopted from the chronic duration inhalation MRL—itself adopted from the IRIS chronic RfC_i (2 µg m^{-3}) (ATSDR 2019). This RfC_i is based on oral exposure studies observing decreased thymus weight in mice (Keil et al. 2009) and fetal heart malformations in rats (Johnson et al. 2003).

Intermediate duration MRLs are intended to generally apply to exposures ranging from 15 to 364 days (ATSDR 2019), and so could be applied by averaging the construction worker exposure over a corresponding duration (e.g. 180 d averaged over 230 d [to account for a reasonable frequency of off-days interspersing the 180 exposure days], or even 15 d of continuous exposure averaged over 15 d). In the specific case of TCE, however, the intermediate duration MRL was set based on a 52-wk simulation using the same exposure model used to derive the chronic IRIS criterion. The USEPA (2011) used physiologically based pharmacokinetic (PBPK) modeling to calculate internal dose points of departure (idPOD), perform route-to-route extrapolation (from oral to inhalation doses), and estimate human equivalent doses. The PBPK model used to calculate the idPOD for the chronic RfC_i used a 100-wk

[10] https://www.atsdr.cdc.gov/programs/substance-priority-list.html

simulation of human exposure (shown to be robust for evaluating continuous lifetime exposure), with the additional simulation for 52-wk exposure resulting in the same idPOD. ATSDR (2019) therefore used the chronic criterion for the intermediate duration MRL, as the idPOD applies to the upper end of the intermediate duration range (i.e. 364 d), and the co-critical studies themselves exposed animals for intermediate durations—30 weeks (Keil et al. 2009) and 21 days (Johnson et al. 2003). Applying the MRL to a shorter averaging time for human exposure, however, is not supported. As such, the 180 d of construction worker exposure to TCE in groundwater was evaluated using the ATSDR intermediate duration MRL and averaged over one year. Note that no acute duration inhalation MRL was derived due to the lack of adequate human or animal data for inhalation exposures less than 15 days (ATSDR 2019).

4.3. TRENCH MODEL

As described in Section 3.2, there is unrestricted potential for exposure of construction workers to groundwater within a trench or through similar subsurface intrusive activities. The HHRA (PARS 2014) had evaluated this exposure by quantifying cancer risk associated with dermal contact and incidental ingestion for all groundwater COPCs, and inhalation of volatilized benzene and trichloroethylene. It had quantified non-cancer hazard associated only with dermal contact with Aroclor 1254. Non-cancer toxicity criteria are not available for the three PAHs or Aroclor 1260 (Sections 4.1 and 4.2), and the two volatile COPCs—benzene and TCE—have relatively low K_p that would not produce much dermally-absorbed dose. The incidental groundwater ingestion rate assumed for construction workers for quantifying cancer risk was 0.02 L/d (PARS 2014), which would likewise not produce much non-cancer hazard.[11] As such, the critical pathway not evaluated was non-cancer endpoints associated with the inhalation of volatile groundwater COPCs encountered in a construction trench.

The HHRA employed a trench inhalation model from Virginia Department of Environmental Quality (VDEQ 2023) to quantify an inhalation EPC volatilized from groundwater into a confined trench atmosphere. This model was replicated and implemented as part of this review to specifically evaluate the non-cancer hazard associated with volatilized groundwater COPCs. Two groundwater COPCs—benzene and TCE—were identified with physical parameters producing sufficient volatilization to be evaluated for inhalation from a construction trench.

The HHRA reported using Eq. 3-1 and 3-4 from the VDEQ guidance, which are Eq. 2-1 and 2-4 within Appendix A2.0 of the current VDEQ (2023) guidance. Eq. 2-4 derives a chemical-specific volatilization factor for shallow groundwater pooled in the bottom of a trench; Eq 2-1 then produces the contaminant concentration in the trench atmosphere based on the contaminant concentration in groundwater and the derived volatilization factor. The model was parameterized as shown in Table H-2 and was validated by first replicating the volatilization factors and trench atmosphere concentrations reported in the HHRA (Table 15 in PARS 2014), and secondly by replicating the cancer risks reported for groundwater inhalation in the HHRA (Table 24 in PARS 2014) and the ROD (Exhibit 4 in U.S. Army 2015). The model was then used to evaluate non-cancer hazard associated with the inhalation of benzene and TCE.

The non-cancer HQ attributable to benzene inhalation was 0.03 based on subchronic exposure for a construction worker. The non-cancer HQ attributable to subchronic (Section 4.3.1.3) TCE inhalation was 4.32 (Table H-2), which exceeds the NCP criterion of unity (HQ of 1) and therefore requires further evaluation.

4.3.1. Weight-of-evidence evaluation

[11] The original HHRA (PARS 2012) considered incidental ingestion of exposed groundwater during construction or trenching activities to be potentially complete but negligible and unquantifiable.

The non-cancer hazard estimate associated with construction worker inhalation of TCE volatilized from groundwater pooled in a trench was further evaluated using a weight-of-evidence framework. This entailed scrutinizing the robustness of the EPC, the extent of TCE contamination in groundwater, and the realism of trench exposure parameters.

4.3.1.1. Exposure point concentration

The EPC for TCE in groundwater reported in the ROD was 7.8 µg/L, which was the maximum of two detections (n = 19). EPCs—which represent the average contaminant concentration in an exposure medium to which a receptor would be exposed over the duration of their exposure—are generally calculated as the 95% upper confidence limit (UCL_{95}) on the mean to provide a conservative estimate of the average concentration for exposure (USEPA 1992, 2002, Singh et al. 2006). The HHRA (PARS 2012, 2014) reported that "the UCL_{95} was not calculated because there were not enough detected values to compute meaningful or reliable statistics and estimates," thus the maximum detection was instead selected as the EPC. This section further evaluates the suitability of the maximum detection to serve as the EPC and alternative EPC estimation methods that may provide more accuracy.

EPA guidance (Singh and Singh 2013, 2015, Neptune 2022), however, has explicitly recommended against employing maximum detected concentrations as EPCs. Maximum concentrations perform poorly at providing the two key properties desirable of an EPC estimate—accuracy and coverage (i.e. probability that the population mean is less than or equal to the estimate). Maximum values cannot reliably provide accuracy for the mean estimate because their measurement is intended to represent only the single sample, and they cannot provide the target coverage (95%) without large sample sizes (e.g. > 20).[12]

The ProUCL software (v. 5.0) used by the HHRA did recommend using a UCL (while also issuing warnings about limited data), based on the 97.5% Chebyshev estimate using Kaplan-Meir (KM) estimation (4.067 µg/L) (Appendix F in PARS 2014). This estimate is very near the arithmetic mean of the two detected concentrations (4.19 µg/L). The KM estimation method is a statistical technique for left-censored data analysis that uses an estimator that incorporates the number of detections and non-detections above or below each detected value. It was used with the Chebyshev estimate—a nonparametric statistical inequality that bounds the probability of a random variable deviating from its mean, which tends to produce stable (i.e. not inflated) but conservative estimates of the mean (Singh and Singh 2015). The greater confidence coefficient (97.5%) was recommended based on sample size, skewness, and degree of censorship (USEPA 2002, Singh and Singh 2015, Neptune 2022).

All TCE groundwater sample results were entered in the current ProUCL software (v. 5.2) to evaluate alternative EPC estimation methods. The software computed the 97.5% Chebyshev KM estimate reported by the HHRA (4.067 µg/L), but now instead recommends the 95% Student's *t* statistic KM estimate (1.596 µg/L), which assumes a normal distribution. Although distributional goodness-of-fit tests could not be performed due to the limited detections, the current software now generally leverages the robustness of normally-distributed Student's *t* estimates, which perform well even on skewed data due to the central limit theorem (Neptune 2022).[13]

Another method for resolving EPC estimation problems due to limited detections is to use bounding (USEPA 2002), which assumes non-detections were detected concentrations and calculates a UCL_{95} that constitutes a worst-case scenario is often more realistic than using the maximum detected concentration

[12] Historically (USEPA 1992), maximum detections were used as EPCs in favor of greater UCL_{95} estimates only due to computational limitations.

[13] The latest software incorporated a philosophical shift away from coverage (i.e. 95% confidence) and toward accuracy (i.e. nearness of the recommended UCL to the point estimate of the mean), resulting in fewer recommendations of non-parametric estimates in many cases, including the Chebyshev estimate.

(when the non-detections are primarily less than the detected concentrations). ProUCL recommended a bounded EPC based on the 95% Student's *t* statistic (1.403 µg/L). Although the uncensored data did not conform to a statistical distribution (normal, lognormal, or gamma)—likely due to the empirical distribution clustering around the detection limits (0.23 and 0.46 µg/L)—the normally-distributed Student's *t* estimate was favored, as above for the censored analysis.

Table H-3 presents and compares these various EPC estimates and the resulting HQ associated with exposure to TCE in groundwater within a construction trench. This weight-of-evidence evaluation also back-calculated the EPC that would be required to produce an HQ exceeding the NCP criterion, which would be 2.75 µg/L.[14] Considering the uncertainties associated with the various EPC estimation methods, on balance the true EPC for TCE in groundwater is likely less than 2.75 µg/L and would thus not produce an HQ exceeding unity.

4.3.1.2. Extent of contamination

TCE was detected in just 2 of 19 groundwater samples collected across eight well points in 2011 and thirteen well points in 2012 (two wells were dry). The first detection (0.58 µg/L) was in 2011, located at SP-32 along the former fire protection main and adjacent to the former reservoir drain. The second detection (7.8 µg/L) was in 2012, located approximately 250 ft further north at TW-5 adjacent to Building 18 (Figure 10 in PARS 2014). No more recent groundwater sampling occurred. While the detections generally span the spatial extent of the investigative area, and match the scale of a potential construction project, only one detection exceeded the back-calculated EPC required to produce an unacceptable HQ (2.75 µg/L) (Section 4.3.1.1). The true extent of a potential groundwater plume with TCE concentrations exceeding 2.75 µg/L remains unknown, but it is likely quite limited given the single exceedance and the several non-detections interspersed among the two detections (Figure 10 in PARS 2014).

4.3.1.3. Exposure parameters

The other critical component of determining whether an unacceptable hazard exists based on TCE contamination in groundwater, in addition to estimating the TCE concentrations and extent, is the exposure parameters assumed for a construction worker performing trench work. The HHRA assumed construction workers would be exposed in a trench for 8 hours per day for 180 days over one year. Both the HHRA and ROD acknowledged that "these exposure assumptions are highly conservative given the small size of the site," with the uncertainty evaluation concluding that this produced an overestimate of risk (Exhibit 6 in U.S. Army 2015). This conservative exposure duration—coupled with the likely true extent of TCE contamination in groundwater (Section 4.3.1.2)—suggests that the HQ associated with inhalation of TCE in a construction trench calculated here is likely overestimated. As a sensitivity analysis, an exposure duration of 63 days was back-calculated as the minimum exposure duration required to produce an unacceptable HQ (2) based on the original EPC (7.8 µg/L) (Section 4.3.1.1).

The HHRA assumed that the exposure would occur in a 8-ft deep trench. The trench inhalation model is driven by depth such that shallow depths afford less dilution of contaminant vapors emanating from the subsurface due to a smaller trench volume—deeper trenches provide larger volumes of ambient air for mixing within the model. For modeling deeper trenches, the air exchange rate could be decreased to limit mixing, however, the model guidance (VDEQ 2023) does not provide potential alternatives to the default of two exchanges per hour, which was used in the HHRA. Absent alternative air exchange rates, a depth of 8 ft would produce a relatively conservative result while effectively modeling a depth presenting a confined breathing zone.[15] Trenches deeper than 8 ft are of course possible, but they would produce lower

[14] The back-calculated value was based on exceeding the criterion when rounded to one significant figure, to be consistent with the criterion itself and per USEPA (1989); i.e. HQ = 2)

[15] Although the model guidance does not specify, the model should presumably be limited to some minimum depth to capture a realistic scenario.

volatilization factors for a given air exchange rate, and considerably deeper trenches are also likely to be constructed with benching, thereby mitigating the confined breathing zone. Neither trench length nor width have an impact on the model results, as their individual effects are perfectly balanced between providing volatilization/mass transfer (area of the trench floor) and providing uncontaminated air mixing (volume of the trench).

Overall, a reasonable combination of exposure duration, EPC, and trench depth were determined to be insufficient to produce unacceptable non-cancer hazard.

5. SIGNIFICANT FINDINGS

The HHRA contained several deficiencies that required review here. The final updated version of the HHRA (PARS 2014) had corrected one critical deficiency (an incorrect averaging time) that had produced an elevated estimate of cancer risk for construction worker exposure to groundwater in a trench. The ROD (U.S. Army 2015) thus reported the corrected cancer risk, updated from that published in the proposed plan (U.S. Army 2013) that generated RAOs, but the ROD erroneously retained the RAOs. The first five-year review recommended that these erroneous RAOs be withdrawn through an ESD document (USACE 2020).

This second five-year review identifies additional deficiencies with the HHRA. The broadest deficiency was that non-cancer hazard was not comprehensively evaluated, instead being quantified only for dermal absorption and only for PCBs. This quantification itself was incorrect, as the dermally-absorbed dose calculated for evaluating carcinogenic endpoints, averaged over a 70-yr lifetime, was incorrectly applied for evaluating the non-carcinogenic endpoint. This resulted in the non-cancer hazard reported for construction worker dermal exposure to PCBs in groundwater being 70 times lower than it should have been (Section 4.1). Correcting this error would produce an HQ of 3.5, but the dermal absorption of PCBs from water contains considerable uncertainty overall, as the K_p falls outside the USEPA's effective prediction domain. As such, this HHRA deficiency may not substantially affect a determination regarding the health hazard associated with construction worker exposure to groundwater.

The most critical evaluation gap identified was non-cancer hazard associated with the inhalation of groundwater COPCs from a construction trench. The same trench inhalation model employed by the HHRA for evaluating carcinogenic effects was used here to evaluate non-carcinogenic effects. This identified an elevated HQ (4.32) for construction workers associated with TCE inhalation, which required a weight-of-evidence evaluation to make a further determination regarding the likelihood of potential site exposures to produce adverse health effects. This entailed scrutinizing the robustness of the EPC, the extent of TCE contamination in groundwater, and the realism of trench exposure parameters. The EPC used in the HHRA (7.8 µg/L) was determined to be very likely overestimated, with more accurate statistical estimates (~1.5 µg/L) being less than the back-calculated EPC required to produce an HQ exceeding the NCP criterion (2.75 µg/L) (Section 4.3.1.1). The extent of TCE contamination in groundwater was found to be relatively limited. Just 2 of 19 groundwater samples detected TCE, and while the two detections spanned an area congruent with an extended construction project, only one of those detections exceeded the back-calculated threshold EPC (2.75 µg/L), with several interspersed non-detections. The exposure duration assumed for construction workers (180 days per year) was determined to overestimate exposure in a trench. Based on the original, overestimated EPC (7.8 µg/L), the minimum exposure duration required to produce an unacceptable HQ (2) was back-calculated as 63 days.

Overall, the weight-of-evidence evaluation found that the combination of a realistic EPC, spatial extent, and exposure duration applied for TCE contamination in groundwater was unlikely to produce unacceptable non-cancer hazard. Therefore, while the HHRA did not evaluate non-cancer health

endpoints for this key exposure pathway, the remedy remains protective of construction workers exposed to volatile groundwater contaminants in a confined trench atmosphere.

Other elements of this risk assessment and toxicology evaluation found no significant issues affecting remedy protectiveness. The HHRA primarily used default values for exposure parameters, which remain current (Section 3.3). Toxicity criteria for COPCs used in the HHRA remain current, with the exception of carcinogenic slope factors for benzo(a)pyrene and other PAHs (Section 4.2.1). PAH carcinogenicity has decreased in toxicity by a factor of ~7, resulting in the associated cancer estimates reported in the HHRA being overestimated relative to current estimates. There are also newly published non-cancer criteria for benzo(a)pyrene, which would produce new chemical hazard not previously quantified by the HHRA, which was determined to be negligible (Section 4.2.1).

Overall, the no further action ROD was found to remain protective of human health and the environment. The existing RAOs associated with limiting exposure to groundwater during construction activities are not required to ensure protectiveness, and the previous five-year review recommendation that the RAOs should be withdrawn via ESD remains appropriate.

6. REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2019. Toxicological profile for trichloroethylene. U.S. Department of Health and Human Services. Atlanta, Georgia.

California Environmental Protection Agency. 1993. Benzo[*a*]pyrene as a Toxic Air Contaminant. Part B. Health Effects of Benzo[*a*]pyrene. Office of Environmental Health Hazard Assessment (OEHHA). Air Toxicology and Epidemiology Section. Berkeley, CA.

Johnson PD, Goldberg SJ, Mays MZ, et al. 2003. Threshold of trichloroethylene contamination in maternal drinking waters affecting fetal heart development in the rat. (Erratum in: Environ Health Perspect 113(1):A18; Erratum in: Environ Health Perspect 122(4):A94). Environ Health Perspect 111(3):289-292.

Keil DE, Peden-Adams MM, Wallace S, et al. 2009. Assessment of trichloroethylene (TCE) exposure in murine strains genetically-prone and non-prone to develop autoimmune disease. J Environ Sci Health A Tox Hazard Subst Environ Eng 44(5):443-453.

Neptune and Company, Inc. ProUCL Version 5.2.0 Technical Guide. Statistical software for environmental applications for data sets with and without nondetect observations. Prepared for: Office of Research and Development, U.S. Environmental Protection Agency. Washington, DC.

PARS. 2012. Final – Remedial Investigation/Interim Remedial Action Report and Human Health Risk Assessment. Niagara Falls Armed Forces Reserve Center, 9400 Porter Road, Niagara Falls, NY. Volume I of II. Prepared for: U.S. Army Corps of Engineers-Louisville District. Prepared by: PARS Environmental, Inc. Robinsonville, NJ. April 2012.

PARS. 2014. 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. Prepared for: U.S. Army Corps of Engineers-Louisville District. Prepared by: PARS Environmental, Inc. Robinsonville, NJ. December 2014.

Singh, A. and A. K. Singh. 2013. ProUCL Version 5.0.00. Technical Guide. Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. Prepared for: U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. EPA/600/R-07/041. September 2013.

Singh, A. and A. K. Singh. 2015. ProUCL Version 5.1 Technical Guide. Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. Prepared for: U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC. EPA/600/R-07/041. October 2015.

Singh et al. 2006. On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations.

U.S. Army. 2013. Proposed Plan. Niagara Falls Armed Forces Reserve Center, Niagara Falls, New York. April 2013.

U.S. Army. 2015. FINAL No Further Action Record of Decision. Niagara Falls Armed Forces Reserve Center. 9400 Porter Road, Niagara Falls, New York. February 2015.

U.S. Army Corps of Engineers (USACE). 2020. Five Year Review. Niagara Falls Armed Forces Reserve Center (AFRC), 9400 Porter Road, Niagara Falls, New York. Prepared by: USACE Louisville District. October 2020.

U.S. Environmental Protection Agency (USEPA). 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A), USEPA 540/1-89/002, December 1989, PB90-155581.

U.S. Environmental Protection Agency (USEPA). 1992. Supplemental Guidance to RAGs: Calculating the Concentration Term. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington DC. Publication 9285.7-081. Intermittent Bulletin Volume 1, Number 1. May 1992.

U.S. Environmental Protection Agency (USEPA). 1993. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. Office of Research and Development. Washington, D.C. EPA/600/R-93/089.

U.S. Environmental Protection Agency (USEPA). 2002. Calculating upper confidence limits for exposure point concentrations at hazardous waste sites. Office of Emergency and Remedial Response. Washington, D.C. OSWER No. 9285.6-10.

U.S. Environmental Protection Agency (USEPA). 2003. Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53. December.

U.S. Environmental Protection Agency (USEPA). 2004. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005, OSWER 9285.7-02EP, Office of Solid Waste and Emergency Response, Washington, DC (including 2007 updates on-line)

U.S. Environmental Protection Agency (USEPA). 2011. Toxicological Review of Trichloroethylene (CAS No. 79-01-6). In support of summary information on the Integrated Risk Information System (IRIS). National Center for Environmental Assessment. Washington, DC. EPA/635/R-09/011F.

U.S. Environmental Protection Agency (USEPA). 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120.

U.S. Environmental Protection Agency (USEPA). 2017. Toxicological Review of Benzo[a]pyrene. Integrated Risk Information System (IRIS), National Center for Environmental Assessment. EPA/635/R-17/003Fa. URL: https://www.epa.gov/iris/

Virginia Department of Environmental Quality (VDEQ). 2023. Virginia Unified Risk Assessment Model – VURAM User Guide for Risk Assessors. Updated August 2023.

Table H-1a. Cancer Toxicity Criteria

Constituents of Potential Concern (COPCs)	CAS #	Oral Slope Factors						Inhalation Unit Risk					
		HHRA (PARS 2014)			Current			HHRA (PARS 2014)			Current		
		$(mg/kg\text{-}day)^{-1}$	Ref	Date	$(mg/kg\text{-}day)^{-1}$	Ref	Date[3]	$(\mu g/m^3)^{-1}$	Ref	Date	$(\mu g/m^3)^{-1}$	Ref	Date[3]
PAHs													
Benzo(a)pyrene	50-32-8	7.30E+00	I	1992	1.00E+00	I	2017	1.10E-03	C	1993	6.00E-04	I	2017
Benzo(a)anthracene	56-55-3	7.30E-01	RPF	1993	1.00E-01	RPF	1993	1.10E-04	C	1993	6.00E-05	RPF	1993
Benzo(b)fluoranthene	205-99-2	7.30E-01	RPF	1993	1.00E-01	RPF	1993	1.10E-04	C	1993	6.00E-05	RPF	1993
Dibenz(a,h)anthracene	53-70-3	7.30E+00	RPF	1993	1.00E+00	RPF	1993	1.20E-03	C	1993	6.00E-04	RPF	1993
Indeno(1,2,3-c,d)pyrene	193-39-5	7.30E-01	RPF	1993	1.00E-01	RPF	1993	1.10E-04	C	1993	6.00E-05	RPF	1993
PCBs													
Aroclor 1254	11097-69-1	2.00E+00	RSL	1996	2.00E+00	RSL	1996	5.70E-04	RSL	1996	5.71E-04	RSL	1996
Aroclor 1260	11096-82-5	2.00E+00	RSL	1996	2.00E+00	RSL	1996	5.70E-04	RSL	1996	5.71E-04	RSL	1996
VOCs													
Benzene	71-43-2	5.50E-02	I	2000	5.50E-02	I	2000	7.80E-06	I	2000	7.80E-06	I	2000
Trichloroethylene	79-01-6	4.60E-02	I	2011	4.60E-02	I	2011	4.10E-06	I	2011	4.10E-06	I	2011
Naphthalene	91-20-3	Not quantified			1.20E-01	C	2004	3.40E-05	C	2004	3.40E-05	C	2004

Table H-1b. Non-cancer Toxicity Criteria

Constituents of Potential Concern (COPCs)	CAS #	Oral Reference Dose Values						Inhalation Reference Concentration Values					
		HHRA (PARS 2014)			Current			HHRA (PARS 2014)			Current		
		(mg/kg-day)	Ref	Date	(mg/kg-day)	Ref	Date[3]	(mg/m^3)	Ref	Date	(mg/m^3)	Ref	Date[3]
PAHs													
Benzo(a)pyrene	50-32-8	N/A			3.00E-04	I	2017	N/A			2.00E-06	I	2017
Benzo(a)anthracene	56-55-3	N/A			N/A			N/A			N/A		
Benzo(b)fluoranthene	205-99-2	N/A			N/A			N/A			N/A		
Dibenz(a,h)anthracene	53-70-3	N/A			N/A			N/A			N/A		
Indeno(1,2,3-c,d)pyrene	193-39-5	N/A			N/A			N/A			N/A		
PCBs													
Aroclor 1254	11097-69-1	2.00E-05	I	1994	2.00E-05	I	1994	N/A			N/A		
Aroclor 1260	11096-82-5	N/A			N/A			N/A			N/A		
VOCs													
Benzene	71-43-2	Not quantified			4.00E-03	I	2003	Not quantified			3.00E-02	I	2003
Benzene (subchronic)	71-43-2	Not quantified			1.00E-02	P	2009	Not quantified			8.00E-02	P	2009
Trichloroethylene	79-01-6	Not quantified			5.00E-04	I	2011	Not quantified			2.00E-03	I	2011
Trichloroethylene (subchronic)	79-01-6	Not quantified			5.00E-04	A	2019	Not quantified			2.15E-03	A	2019
Naphthalene	91-20-3	2.00E-02	I	1998	2.00E-02	I	1998	Not quantified			3.00E-03	I	1998

I = Integrated Risk Information System (IRIS)
RPF = relative potency factor
RSL = regional screening levels table and user's guide
C = California Environmental Protection Agency (Cal EPA)
P = provisional peer-reviewed toxicity values (PPRTV)
A = Agency for Toxic Substances and Disease Registry (ATSDR)

Table H-2. Trench inhalation model for construction worker exposure to groundwater.

Parameter	Units	Value	Reference	Benzene	TCE
$C_{groundwater}$	µg L^{-1}	EPC	HHRA (PARS 2014) Table 15	1.6	7.8
VF	L m^{-3}	chemical-specific	VDEQ (2023) Appendix A2, Eq. 2-4	9.34	7.24
C_{trench}	µg m^{-3}	chemical-specific	VDEQ (2023) Appendix A2, Eq. 2-1	14.95	56.47
RfC_i (chronic)	mg m^{-3}	chemical-specific	IRIS PPRTV (benzene)	3.00E-02	2.00E-03
RfC_i (subchronic)	mg m^{-3}	chemical-specific	ATSDR MRL (TCE)	8.00E-02	2.15E-03
IUR	(µg m^{-3})$^{-1}$	chemical-specific	IRIS	7.80E-06	4.10E-06
HQ (chronic)	unitless	chemical-specific	Derived	8.19E-02	4.64E+00
HQ (subchronic)	unitless	chemical-specific	Derived	3.07E-02	4.32E+00
Risk	unitless	chemical-specific	Derived	2.74E-07	5.44E-07
ET	h d^{-1}	8	HHRA (PARS 2014) Table 15		
EF	d yr^{-1}	180	HHRA (PARS 2014) Table 15		
ED	yr	1	HHRA (PARS 2014) Table 15		
ADD_{trench}	µg m^{-3}	chemical-specific	Derived	2.46E+00	9.28E+00
K_i	cm s^{-1}	chemical-specific	VDEQ (2023) Appendix A2, Eq. 2-5	1.27E-03	0.000981415
TR-L	m	2.44	VDEQ (2023) Table A2.0-1 (immaterial; only depth matters)[2]	2.44	2.44
TR-W	m	0.91	VDEQ (2023) Table A2.0-1 (immaterial; only depth matters)[2]	0.91	0.91
TR-D	m	2.44	HHRA (PARS 2014) Section 7.6.7	2.44	2.44
W:D	unitless	0.37	Derived	0.37	0.37
A	m^2	2.2204	Derived	2.2204	2.2204
F	unitless	1	Assumed	1	1
ACH	hr^{-1}	2	VDEQ (2023) Table A2.0-1	2	2
V	m^3	5.42	Derived	5.4	5.4
CF_1	L cm^{-3}	0.001	Unit conversion	0.001	0.001
CF_2	cm^2 m^{-2}	10000	Unit conversion	10000	10000
CF_3	s hr^{-1}	3600	Unit conversion	3600	3600
K_{iL}	cm s^{-1}	chemical-specific	VDEQ (2023) Appendix A2, Eq. 2-6	0.00128006	0.000987
K_{iG}	cm s^{-1}	chemical-specific	VDEQ (2023) Appendix A2, Eq. 2-7	0.50958743	0.428120838
H_i	atm-m^3 mol^{-1}	chemical-specific	RSLs parameter table	5.60E-03	9.90E-03
R	atm-m^3 mol-K^{-1}	8.20E-05	VDEQ (2023) Table A2.0-1	8.20E-05	8.20E-05
T	K	298	VDEQ (2023) Table A2.0-1	298	298
MW_{O2}	g mol^{-1}	31.999	VDEQ (2023) Table A2.0-1	31.999	31.999
MW_{H2O}	g mol^{-1}	18.01528	VDEQ (2023) Table A2.0-1	18.01528	18.01528
MW_i	g mol^{-1}	chemical-specific	RSLs parameter table	78.115	131.39
$K_{L,O2}$	cm s^{-1}	0.002	VDEQ (2023) Table A2.0-1	0.002	0.002
$K_{G,H2O}$	cm s^{-1}	0.833	VDEQ (2023) Table A2.0-1	0.833	0.833

[1] Risk calculations in this spreadsheet model were validated in two ways: (1) against RSL calculator outputs using the calculator's default Andelman's VF (0.5 L m^{-3}) for residential tapwater volatalization (K parameter in supporting equations); and (2) replicating results reported in the site HHRA (PARS 2014) and ROD (U.S. Army 2015).

[2] Length and width are immaterial because their effects are perfectly balanced between providing volatilization/mass transfer (area of the trench floor) and providing uncontaminated air mixing (volume of the trench).

Table H-3. Comparison of methods for estimating exposure point concentration of trichloroethene in groundwater.

Estimation Method	Exposure Point Concnetration (EPC)	Hazard Quotient (HQ)
Maximum detection[1]	7.8	4.32
Mean of detections[1]	4.19	2.32
Chebyshev inequality (left-censored)[2] (97.5%)	4.067	2.25
Student's t (left-censored)[2] (95%)	1.596	0.88
Bounding[3] (uncensored) (95%)	1.403	0.78
Back-calculated [4]	2.75	2

[1] n = 2 dections of 19 samples

[2] Left-censored analysis retains all non-detect samples and estimates an upper confidence limit (UCL) on the mean using Kaplan-Meier estimation (see text).

[3] Bounding calculates a UCL on the mean using uncensored analysis—assuming all non-detections were detections at the given detection limit (see text).

[4] The EPC required to produce an HQ exceeding the NCP criterion (rounded to one significant figure; i.e. HQ = 2) was back-calculated for comparison.