US Army Corps of Engineers
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FINAL
SITE INSPECTION REPORT

Ground Disturbances at the Former Lake Ontario Ordnance Works
Niagara County, New York

Prepared for:

U.S. Army Corps of Engineers
Buffalo District

Contract No.: W912DR-06-D-0002
Delivery Order: 0009
FUDS Project No.: C02NY0025

Prepared by:

ERT, Inc.
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(301) 361-0620

November 2014

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17 October 2014

Date

Project Manager

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14 July 2014

Date

Division Manager

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COMPLETION OF SENIOR TECHNICAL REVIEW

This document has been produced within the framework of the ERT, Inc. quality management system. As such, a senior technical review has been conducted. This included review of all elements addressed within the document, proposed or utilized technologies and alternatives and their applications with respect to project objectives and framework of U.S. Army Corps of Engineers regulatory constraints under the current project, within which this work has been completed.

[redacted]

09 July 2014

Date

Senior Technical Reviewer

COMPLETION OF INDEPENDENT TECHNICAL REVIEW

This document has been produced within the framework of ERT, Inc. total quality management system. As such, an independent technical review, appropriate to the level of risk and complexity inherent in the project, has been conducted. This included review of assumptions (methods, procedures, and material used in analyses), alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the project objectives. Comments and concerns resulting from review of the document have been addressed and corrected as necessary.

[redacted]

11 July 2014

Date

eviewer

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LIST OF ACRONYMS AND ABBREVIATIONS

A/E	Architectural/Engineering
AEC	U.S. Atomic Energy Commission
AFP	Air Force Plant
AGC	U.S. Army Geospatial Center
AOC	area of concern
ASR	Archives Search Report
AST	above ground storage tank
CDD	Central Drainage Ditch
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWM	Chemical Waste Management
C&D	construction and demolition
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DRO	diesel range organics
EA	Ecological Assessment
ERDA	Energy Research and Development Administration
ERT	ERT, Inc.
EU	Exposure Unit
FUDS	Formerly Used Defense Sites
ft	foot/feet
FUSRAP	Formerly Utilized Sites Remedial Action Program
FWIA	Fish and Wildlife Impact Analysis
GPS	global positioning system
GSA	General Services Administration
HTRW	Hazardous, Toxic, and Radioactive Waste
IDIQ	Indefinite Delivery/Indefinite Quantity
INPR	Inventory Project Report
KOA	Kampground of America
LOOW	Lake Ontario Ordnance Works
LPCSD	Lewiston-Porter Central School District
MAP	Management Action Plan
MEC	munitions and explosives of concern
mg/L	milligram(s) per liter
msl	mean sea level
NDAI	no DoD action indicated
NFSS	Niagara Falls Storage Site
NRC	U.S. Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
NYSDOP	New York Statewide Digital Orthoimagery Program
PMAP	Property Management Action Plan
REI	Rust Environmental and Infrastructure
ROE	right of entry
SBC	small-bermed clearing
SI	Site Inspection
SLERA	Screening Level Ecological Risk Assessment

LIST OF ACRONYMS AND ABBREVIATIONS

SOW	Scope of Work
SWDD	Southwest Drainage Ditch
TDS	total dissolved solids
TEC	U.S. Army Topographic Engineering Center
TNT	trinitrotoluene
TPH	total petroleum hydrocarbons
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VP	Vicinity Property
WMA	Wildlife Management Area
WWTP	wastewater treatment plant
°F	degrees Fahrenheit

METRIC CONVERSION CHART

To Convert to Metric			To Convert from Metric		
If you know	**Multiply by**	**To Get**	**If you know**	**Multiply by**	**To Get**
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
acres	0.40469	Hectares	hectares	2.471	acres
Volume					
gallons	3.7854l	liters	liters	0.26417	gallons
Volume					
ounces	0.02835	milligrams	milligrams	35.274	ounces
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9	Celsius	Celsius	Multiply by 9/5 then add 32	Fahrenheit

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EXECUTIVE SUMMARY

This *Site Inspection Report for Ground Disturbances at the Former Lake Ontario Ordnance Works* (hereinafter "SI") was prepared by ERT, Inc. (ERT) in accordance with the Statement of Work (SOW) dated 19 May 2014 for Architectural/Engineering Services at the former LOOW, Niagara County, New York, under Indefinite Delivery/Indefinite Quantity W912DR-06-D-0002, Delivery Order number 0009, dated 25 June 2008. This SOW was issued by the U.S. Army Corps of Engineers (USACE), Baltimore District under the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS). The DERP-FUDS project number for the project is No. C02NY0025-12, which addresses ground disturbances identified in historical aerial photographs that occurred on former Lake Ontario Ordnance Works (LOOW) property during the timeframe of Department of Defense (DoD) use. SI activities were conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act as required by the DERP-FUDS.

The purpose of this SI was to evaluate previously identified ground disturbances and determine if potential environmental impacts may be present that are attributable to former DoD activities. In order to evaluate the potential for environmental impacts, the following activities were performed:

- A preliminary assessment of 20 ground disturbance locations for walkover inspection,
- A walkover inspection of each location, and
- Evaluation of available information and preparation of the SI Report.

The SI was developed based on available information. Ground disturbances were organized and assessed by parcels and parcel groups as determined by a Management Action Plan for the former LOOW (USACE, 2013a). The SI consisted of reviewing historical information and walkover inspections at all accessible locations. Rights of entry (ROEs) were obtained for eight parcels, which permitted the inspection of 17 ground disturbance locations. ROEs were not executed for Parcels 60.00-3-18.12 (ground disturbance 1944-16), 74.00-1-50 (ground disturbances 1944-45 and 1944-46), and 88.00-1-5 (ground disturbance 1944-137). Visual surveys were not conducted at these locations.

Ground disturbances previously identified by USACE primarily occur in areas of the former LOOW that did not support trinitrotoluene production, which was referred to as the buffer zone. Evidence of ground disturbances related to past DoD activities was not identified at most locations. Review of historical records for the former LOOW did not confirm past DoD activities at six of the eight parcels.

There is no evidence of potential source areas or releases of contamination to groundwater, surface water, or soil associated with any of the ground disturbances evaluated in this SI. Based on a review of the history of activities and waste handling, known contaminants, potential pathways of migration of the known contaminants and potential human and environmental receptors no further action is necessary for ground disturbances evaluated in this SI.

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1.0 INTRODUCTION

This Site Inspection Report for Ground Disturbances at the Former Lake Ontario Ordnance Works (hereinafter "SI") was prepared by ERT, Inc. (ERT) in accordance with a Statement of Work (SOW) dated 19 May 2014 for Architectural/Engineering Services at the former Lake Ontario Ordnance Works (LOOW), Niagara County, New York, under Indefinite Delivery/Indefinite Quantity Contract W912DR-06-D-0002, Delivery Order number 0009, dated 25 June 2008. This SOW was issued by the U.S. Army Corps of Engineers (USACE), Baltimore District under the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS). The DERP-FUDS project number for the former LOOW project is C02NY0025-12, which addresses ground disturbances identified in historical aerial photographs that occurred on former LOOW property during the timeframe of Department of Defense (DoD) use. SI activities were conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as required by DERP-FUDS. **Figure 1-1** depicts the general location and orientation of the former LOOW and parcel groupings associated with ground disturbances assessed in this report. The ground disturbances were organized and assessed by parcels and parcel groups as determined by the Management Action Plan (MAP) for the former LOOW (USACE, 2013a). Parcels are areas of real property as defined and described by the Niagara County Department of Real Property. Parcel groupings are a single parcel or multiple parcels with similar characteristics with regard to FUDS property eligibility requirements, location relative to the developed area of the former LOOW, ownership, known or suspected DoD impacts, and land use. **Figure 1-2** presents the ground disturbances at the former LOOW developed area and Buffer Zone (i.e., undeveloped area) that were evaluated in this SI.

Approximately 6,583 acres of the former LOOW were transferred from DoD ownership prior to 17 October 1986 and are under the definition of a FUDS. USACE is responsible for the management and execution of the DERP FUDS program in accordance with legislation, FUDS guidance, and DoD policy. The SI was performed as a Hazardous, Toxic, and Radioactive Waste (HTRW) project under the DERP-FUDS.

1.1 Scope and Objectives

Presented as Project 12 in the Inventory Project Report (INPR) Addendum No. 2 (USACE, 2012a), the scope of the SI is to evaluate ground disturbances previously identified in the Examination of Historical Aerial Photography – Selected Sites, Lake Ontario Ordnance Works, New York (U.S. Army Topographic Engineering Center [TEC], 2002), and the Niagara Falls Storage Site Historical Photographic Analysis, Lewiston Township, New York (U.S. Army Geospatial Center [AGC], 2009). The SOW required the following activities:

- A preliminary assessment of ground disturbances and selection of locations for walkover inspection,
- A walkover inspection of each selected ground disturbance, and
- Evaluation of available information and preparation of the SI Report.

The objective of the SI is to determine if potential environmental impacts may be present at the ground disturbances that are potentially attributable to former DoD activities.

1.2 Report Organization

The SI Report was prepared in accordance with the *Guidance for Performing Site Inspections Under CERCLA, EPA540-R-021* (U.S. Environmental Protection Agency, 1992). The report documents background information, historical data, project objectives, and methodologies, and provides an assessment of each ground disturbance. The document is structured on the basis of parcels, which is consistent with the most recent update to the Management Action Plan for the Former Lake Ontario Ordnance Works, Niagara County, New York (Update 1.2) (USACE, 2013a). The report sections are summarized below.

- Section 1 provides an introduction, project scope, and objectives and summarizes the report organization.
- Section 2 discusses site background, which includes historical information, physical characteristics, and environmental setting of the former LOOW.
- Section 3 summarizes historical documents that were reviewed and discusses how the visual survey was conducted.
- Section 4 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for ground disturbances on parcel group "04-1: Support Facility Administrative Offices."
- Section 5 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for ground disturbances on parcel group "04-1: Support Facility Slurry Pond."
- Section 6 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for ground disturbances on parcel group "04-2: Group R."
- Section 7 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for a ground disturbance on parcel group "04-4: Group N."
- Section 8 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for ground disturbances on parcel group "04-6: Group K."
- Section 9 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for ground disturbances on parcel group "04-9: TEC Group B."
- Section 10 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for a ground disturbance on parcel group "04-9: TEC Group C."
- Section 11 presents parcel-specific operational history, characteristics, and observations and evaluates potential environmental pathways for a ground disturbance on parcel group "04-9: TEC Group D."
- Section 12 provides a summary and conclusions.

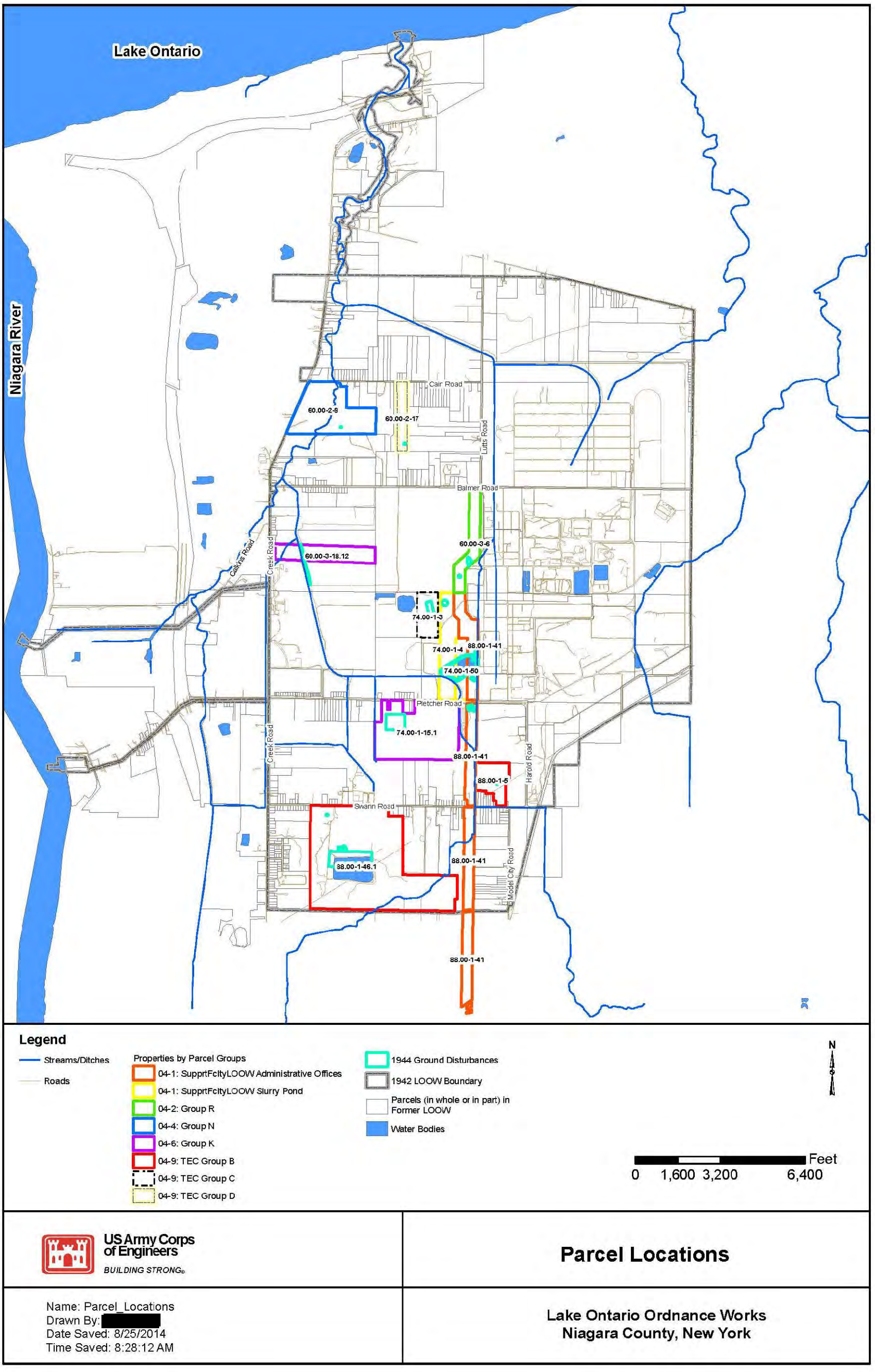

Figure 1-1. Parcel Locations

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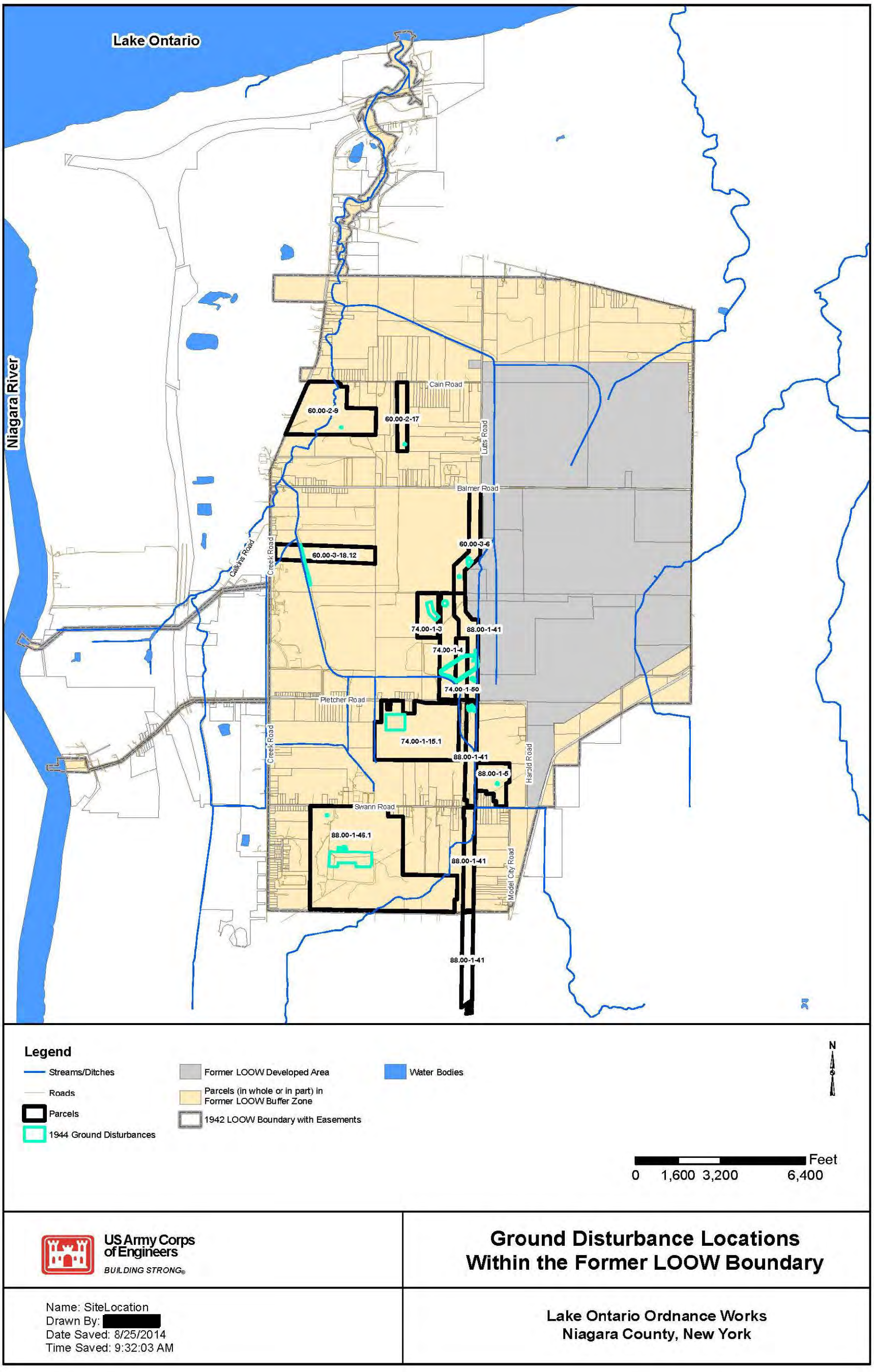

Figure 1-2. Ground Disturbance Locations within the Former LOOW Boundary

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2.0 SITE BACKGROUND

2.1 Site Location and Current Use

The former LOOW is located in Niagara County, New York, approximately 10 miles northeast of Niagara Falls. It occupied approximately 7,500 acres in the towns of Lewiston and Porter. Over 550 parcels are now located on the former LOOW and are used for a variety of purposes. The Niagara Falls Storage Site (NFSS) and Vicinity Properties (VPs), which were formerly used for operation of a boron-10 isotope separation plant and storage and eventual consolidation of radioactive residues, have been reduced to 191-acres. The NFSS and open VPs are currently being addressed under the Formerly Utilized Sites Remedial Action Program.. Chemical Waste Management (CWM) currently owns and operates a 713-acre Resource Conservation and Recovery Act permitted Treatment, Storage, Disposal, and Recovery facility on the south side of Balmer Road in a former trinitrotoluene (TNT) production area. The central and south-central portion of a former U.S. Atomic Energy Commission (AEC) site is currently owned by Modern Disposal Services Inc. and operated as Modern Landfill. Approximately 380 private residences are located within the footprint of the former LOOW. Most are situated along Creek Road, the western section of Cain Road, Balmer Road, and Pletcher Road. The largest residential area is the Youngstown Mobile Park, which is located along Balmer Road. A 13-acre Kampground of America (KOA), which is seasonally open from 1 April through 14 October, is located south of Pletcher Road. The Shrine of Fatima, attracting thousands of visitors each year, is located on the north side of Swann Road. There are also several small farms in the area.

2.2 Site History

In 1942, the U.S. Department of War obtained a parcel proximal to both Lake Ontario and Niagara River in northwestern Niagara County for the construction of a TNT production facility that was designated LOOW. TNT production, product support, and storage occupied 2,500 acres of the eastern portion of LOOW. The remaining 5,000 acres were left undeveloped, acting as a buffer zone and allowing for the possible expansion. In 1943, after nine months of operation, LOOW was decommissioned due to excess TNT production at other facilities.

The eastern 2,500 acres, which made up the production area, was subsequently used by other DoD agencies. These included the Air Force Plant 68 (AFP-68) and the Navy Interim Production Pilot Plant. The Army also used a portion of LOOW for a Nike Missile Base.

In the mid-1940s, 1,500 acres of the southern portion of the former LOOW were transferred to the USACE, Manhattan Engineer District, which later gave rise to the AEC. In 1974, the AEC was abolished and gave rise to the Energy Research and Development Administration (ERDA) and the U.S. Nuclear Regulatory Commission (NRC). In 1977, ERDA became the U.S. Department of Energy. While under operation by the Manhattan Engineer District, radioactive materials were stored on the site. During the 1950s and 1980s, radioactive materials formerly stored on the site were consolidated, removed, and transferred to the current 191-acre NFSS. Areas surrounding the NFSS that was formerly used by the AEC and its predecessor were designated as VPs to facilitate their cleanup and closure. The NFSS and remaining open VPs are currently being addressed under the Formerly Utilized Sites Remedial Action Program (FUSRAP).

2.3 Site Environmental Setting

2.3.1 Climate

Western New York has a humid, continental climate characterized by warm summers and long, cold winters. The mean annual temperature is 48 degrees Fahrenheit (°F) with mean seasonal temperatures ranging between 25°F and 76°F. Mean annual precipitation is approximately 29 inches, distributed fairly evenly throughout the year. Snowfall, predominantly falling between November and March, averages approximately 51 inches per year. Winds are predominantly out of the southwest at average monthly speeds ranging from 10 to 14 miles per hour (USACE, 1999).

2.3.2 Physiography

The former LOOW is located within the Erie-Ontario Lowlands physiographic province of New York State. This province extends from the shores of Lake Erie and Lake Ontario to the Appalachian Uplands Physiographic province.

The Erie-Ontario Lowlands consist of six physiographic regions. These regions are (from north to south):

- Lake Ontario Plain
- Niagara Escarpment
- Lake Tonawanda Plain
- Onondaga Escarpment
- Lake Erie Plain
- Portage Escarpment

The former LOOW is located on the Lake Ontario Plain, an area characterized by relatively flat to gently rolling terrain, which originates at the Niagara Escarpment and slopes gently northward towards Lake Ontario at a rate of approximately 20 feet (ft) per mile. The Niagara Escarpment is a northward facing bluff separating the Lake Ontario Plain to the north from the Lake Tonawanda Plain to the south. Land elevations at the top and bottom of the Niagara Escarpment are approximately 630 ft and 360 ft above mean sea level (msl). The elevation at Lake Ontario is approximately 250 ft above msl (USACE, 1999). The former LOOW is generally level with ground elevations ranging between 315 ft msl and 321 ft msl (USACE, 2011a).

2.3.3 Geology

The western New York region is overlain by a thin cover of unconsolidated glacial deposits that were laid down during the closing phases of the Pleistocene Epoch. These glacial deposits directly and unconformably overlay bedrock in most areas. The bedrock throughout the region consists of nearly flat-lying sedimentary sequences of shale, siltstone, sandstone, dolostone, and limestone, which were deposited during the Ordovician, Silurian, and Devonian Periods of the Paleozoic Era (USACE, 1999).

Extensive geologic investigations have been conducted on the former LOOW that included more than 1,000 borings and test pits. Subsurface data obtained from these investigations indicates that the site is underlain by approximately 30 to 60 ft of unconsolidated glacial deposits overlaying shale bedrock of the Queenston Formation. Eight distinct stratigraphic units have been previously identified at the former LOOW; fill, alluvium, upper glacial till, middle silt till,

glaciolacustrine clay (GLC), glaciolacustrine silt and sand, lodgment till, and bedrock (USACE, 1999).

2.3.3.1 Fill and Surface Soil

Due to various uses of the land at the former LOOW, the natural topography of the surface and near surface soils (soils typically between the ground surface to a depth of approximately 8 to 12 ft) has been altered. Most areas where alterations have occurred are underlying or adjacent to roadways and are associated with underground utilities, former buildings and other structures. Several areas were excavated, graded, and filled during construction of the former TNT production areas. Much of the material used to fill and grade these areas has been supplied from local suppliers and is similar in composition to the native deposits encountered at the site (USACE, 2013b). Surface soil is generally dry, clayey silt with some fine sand. In areas overgrown with vegetation and second growth wooded vegetation, typically the upper one ft contains high organic content.

2.3.3.2 Alluvium

Alluvium underlying the surface fill or surface soil is discontinuous and typically no greater than 5 ft in thickness. The alluvium layer varies in consistency and consists of fine sands, silt, and silty clay (USACE, 2013b).

2.3.3.3 Upper Glacial Till Sequence

Glacial till underlies the surface soil and alluvium (where present), is typically between 15 ft to 20 ft thick, and consists of two distinct strata. An upper silt till overlies an upper clay till and is composed of compact to very dense, brown to purple-brown silt and fine sand with little fine gravel. This layer was observed at maximum thickness of 5 ft (USACE, 2013b).

The upper clay till is commonly composed of stiff to hard, moderate brown to purple-brown silty clay with fine to coarse sand and fine gravel. Occasional deposits of cobbles, discontinuous wet sand, gravel, and silt layers less than 6 inches thick are present and tend to be thicker near the base of the geologic unit. The upper clay till is typically dry with wet sand or gravel lenses at the lower strata (USACE, 2013b).

2.3.3.4 Middle Silt Till Unit

A middle silt till layer is present along the western and northwestern areas of the current CWM property (USACE, 2011a). It divides the glaciolacustrine clay. This unit is composed of a well graded, compact to very dense gray to gray brown silt and coarse to fine sand (USACE, 2013b).

2.3.3.5 Glaciolacustrine Clay

The glaciolacustrine clay underlies the upper glacial till sequence and is typically composed of very soft to firm, gray to gray brown silty clay with traces of fine sand. The unit is typically high in natural moisture content, averaging approximately 28 percent (USACE, 2013b).

2.3.3.6 Alluvial Sand and Gravel

The alluvial sand and gravel unit is approximately three to seven feet thick and occurs between the glaciolacustrine clay and basal till. The unit is thought to be glaciofluvial in origin, normally wet to saturated, and exhibits loose to medium relative density. Typically this unit is thickest where there are depressions in the bedrock (USACE, 2007).

2.3.3.7 Lodgement Till (Basal Till)

Lodgement till is a glacial deposit characterized by compact fissile structures and stones oriented with the long axis parallel to the direction of glacial flow. The lodgement till encountered at the former LOOW is reddish in color, dense, and has a dry hardened texture. Red and green shale fragments originating from the underlying Queenston Formation are common in the lodgement till. It is generally dry to moist, with average moisture content of 11 percent. The unit has a relative density ranging from medium to very dense and is generally non-plastic or only slightly plastic (Golder, 1993).

2.3.3.8 Bedrock

The lowermost bedrock unit exposed in the Niagara Falls area is the Queenston Formation of Upper Ordovician age. The Queenston Formation underlies most of the Ontario Plain in the western New York region. This formation is composed primarily of red or purplish-red finely-bedded to massive shale interbedded with siltstone and silty dolostone. The Queenston commonly contains greenish beds and streaks found along bedding planes and joints. It was deposited in a marine deltaic environment and is reported to be encountered at depths ranging from 70 ft to 90 ft below ground surface and ranges between 700 and 1,200 ft thick (Tesmer, 1981).

2.3.4 Hydrology

2.3.4.1 Regional Hydrogeology

The regional hydrogeology of the unconsolidated overburden is determined by glacial and fluvial deposits. Permeability of the glacial deposits varies from low (within glacial lake deposits) to high (within sand and gravel deposits) (USACE, 1999). Groundwater flow within the unconsolidated deposits and surface water flow are generally influenced by local topography, trending north towards Lake Ontario and northwest towards the Niagara River. Subsurface hydrostratigraphy at the site is divided into three units or zones (e.g., Zone 1, Zone 2, and Zone 3).

Zone 1 consists of unconfined water within the upper silt till, upper clay till, alluvium, and fill, and is identified as the upper water bearing zone. It lacks a contiguous, dominant flow system. Where devoid of sand lenses, the hydraulic properties of the upper clay till are similar to an aquitard and thus the term “aquifer” is not used (USACE, 2007). Flow in the Upper Water Bearing Zone generally proceeds toward the northwest with localized and seasonal variations. Vertical gradients in the Upper Water Bearing Zone are typically downward, but vary depending on the season and lithologic variations. Low permeability of near surface materials abates recharge to the Upper Water Bearing Zone and result in a swampy landscape with poor surficial drainage.

Zone 2 consists of moist, relatively impermeable material in the glaciolacustrine clay and middle silt till. It forms an aquitard that confines the lower water bearing zone. The aquitard is continuous across the former LOOW, saturated and homogeneous.

Zone 3 consists of a confined water-bearing zone predominantly within the glaciolacustrine silt and sand and is identified as the lower water bearing zone. It consists of alluvial sand and gravel and the Upper Queenston Formation. A Basal Red Till serves as a secondary, discontinuous aquitard which further confines localized zones of the Upper Queenston Formation. Flow in the Lower Water Bearing Zone is to the northwest, with localized deviations due to lithologic

heterogeneities (USACE, 2007). Seasonal influences do not have the pronounced impact on flow directions (USACE, 2007). The Lower Water Bearing Zone has a greater transmissivity than the Upper Water Bearing Zone. The Zone is recharged by a combination of connate water from the Queenston Formation, regional sources and to a lesser degree, the overlying glaciolacustrine clay aquitard.

The hydraulic conductivities of each formation vary considerably with Zone 3 being the most permeable. **Table 2-1** summarizes hydraulic conductivity for each zone.

Table 2-1. Regional Hydraulic Conductivity

Zone	Stratigraphic Unit	Hydraulic Conductivity (ft/day)	
		Vertical	Horizontal
1	Upper Clay Till	2×10^{-3}	6×10^{-3}
	Upper Silt Till	2×10^{-3}	6×10^{-3}
	Middle Silt Till	3×10^{-4}	9×10^{-3}
2	Glaciolacustrine Clay	6×10^{-5}	1×10^{-4}
3	Glaciolacustrine Silt and Sand	8.5×10^{-5}	
	▪ Stratified Coarse Sand		6×10^{-1}
	▪ Non-Stratified Silt and Fine Sand		9×10^{-2}
	▪ Stratified Silt and Fine Sand		3×10^{-2}
	▪ Interlayed Silt, Sand and Clay		9×10^{-3}

Legend:
ft/day: feet per day
Source: Golder, 1993
Notes:
1) Values presented in the table were derived from rising head tests following the bail-down of piezometers
2) Subsequent investigations have been performed augmenting this hydraulic conductivity dataset and produced values of similar range for each lithologic layer (USACE, 2007)

Groundwater within the Queenston Formation is moderately to highly mineralized, with total dissolved solids (TDS) concentrations averaging 2,600 milligrams per liter (mg/L). High TDS concentrations are generally attributed to elevated levels of sodium, calcium and chloride in connate water within the formation (Johnston, 1964). Connate water refers to water that was deposited simultaneously with the bedrock and became trapped in rock pore space. Essentially connate waters exhibit zero flow, both vertically and horizontally.

2.3.4.2 Surface Hydrology

During operation of the former LOOW, a system of drainage ditches was constructed and maintained in order to drain surface water runoff to the Central Drainage Ditch (CDD). The system of drainage ditches, ephemeral in nature, consists of pre-existing agricultural ditches used to irrigate farmland, and drainage ditches constructed during development of the former LOOW. The system of drainage ditches is no longer maintained, which results in impeded flow, acute flash flooding, and erosion of the banks during heavy precipitation events. Six Mile Creek, which originally flowed across the former LOOW, was diverted to the Central Drainage Ditch and ultimately discharges into Four Mile Creek. The Southwest Drainage Ditch (SWDD) traversed the former LOOW from southeast to northwest independent of the primary drainage system associated with the CDD, ultimately discharging into Four Mile Creek as well. Six Mile Creek is described by the New York State Department of Environmental Conservation

(NYSDEC) as a Class C fresh water source, indicating that it is suitable for fishing, and primary and secondary recreational use. Four Mile Creek is described by NYSDEC as a Class B water body from its mouth at Lake Ontario to approximately 0.9 mile upstream (located 0.3 mile southeast of the intersection of Lake Road and Creek Road) and the remaining upstream portion is classified as a Class C water body (USACE, 1999). Classification as a Class B water body indicates the water body is suitable for primary and secondary recreational use. It is not considered suitable as a potable water source (USACE, 2011a).

2.3.4.3 Groundwater Usage

Public water supplies from the upper Niagara River have been utilized by nearly all county residences for decades (Niagara County Department of Health, 2006). Prior to the installation of a public water system, groundwater from private wells adjacent to the LOOW property were used as the primary source of drinking water for local residents. Due to poor groundwater yield from the Queenston Shale the use of private wells near the former LOOW is uncommon (USACE, 2007).

The Niagara County Water District and Niagara County Department of Health have previously confirmed that all residences in the towns of Lewiston and Porter have access to District potable water supplies. In March of 2006, the Niagara County Department of Health identified 11 private potable wells within the vicinity of the former LOOW, of which six were identified as secondary groundwater sources (i.e., public water was the primary drinking water source). Sampling results of a Niagara County Department of Health private well study indicated that five of the 11 wells in the vicinity of the former LOOW exceeded the regulatory maximum contaminant levels for a single parameter and in each case it was a different parameter (i.e., chloride, phenol, arsenic, manganese, and lead). The New York State Department of Health issued advisories to well owners whose wells exceed the regulatory criteria (USACE, 2007). In 2007, the Niagara County Department of Health updated its well inventory to include nine private potable wells (two of which were identified as a sole source of drinking water), eight non-potable wells, and 77 idle wells within the survey area. Based on the 2007 Niagara County Department of Health inventory, groundwater is not considered the main source of drinking water. Groundwater in the vicinity of the former LOOW in both the upper and lower water-bearing zones consistently exceeds sodium and sulfate Class GA standards, exhibiting over 1,000 mg/L TDS and commonly over 100 mg/L chloride. By definition, these levels indicate saline groundwater classified as GSA saline groundwater (Title 6 NYCRR Part 701.16) (USACE, 2012b).

2.3.5 Ecology

2.3.5.1 Sensitive Ecosystems

According to the U.S. Fish and Wildlife Service (USFWS), the site is not located within or adjacent to an established critical habitat for endangered and/or threatened species. No federally threatened or endangered flora or fauna species are located at the site (USFWS, 2014a and 2014b).

The former LOOW includes a freshwater forested/shrub wetland considered a sensitive habitat, (USFWS, 2014c) that is located within parcels 74.00-1-3, 60.00-3-6 and 60.00-2-17 according to aerial imagery available at *New York State Orthos Online for Niagara County* (New York Statewide Digital Orthoimagery Program [NYSDOP], 2014) (**Figure 2-1**). In addition, a State-

listed endangered tree, the Cork Elm, (*Ulmus thomasii*), was recorded on the NYSDEC web site which is a rare plant on the Threatened and Endangered list. It was recorded as one of 40 groves still left in the state of NY. These three parcels contain ground disturbances assessed in this SI.

The former LOOW is not located within or adjacent to a wildlife refuge boundary. The closest refuge is the Iroquois National Wildlife Refuge located approximately 30 miles east of the site (USFWS, 2014d). The former LOOW is not located within or adjacent to an established wildlife management area. The Spicer Creek wildlife management area is located approximately 14 miles south of the site in Erie County and the Hartland Swamp wildlife management area is located over 20 miles east of the site in Hartland, New York (NYSDEC, 2014). A wilderness preserve maintained by the Niagara River Anglers Association is located within the LOOW buffer zone. It is used as an outdoor recreational area for club members (USACE, 2008).

2.3.5.2 Local Flora

In 2004 a reconnaissance of Exposure Unit (EU) 1 through EU6 was performed to identify local flora at the former LOOW. Results were presented in the Final *Screening-Level Ecological Risk Assessment at Selected Exposure Units within the former Lake Ontario Ordnance Works, Niagara County, New York* (USACE, 2008) – hereinafter the "LOOW SLERA." The reconnaissance determined that the site is generally overgrown with pasture grass and northern shrub; second growth wooded areas are dominated by maple, ash, and oak trees. While the reconnaissance did not include the entire former LOOW, the parcels are sufficiently similar that the findings were determined applicable for the entire site.

Inquiries and research associated with the environmental investigations have identified no endangered flora species in the former LOOW. Review of the most recent *Federally Listed Threatened and Endangered Species and Candidate Species in Niagara County*, current as of July 2014, indicates that the eastern prairie fringed orchid (historic) is known to occur in Niagara County. The eastern prairie fringed orchid is a threatened species that may potentially inhabit ecosystems within one-half mile of the former LOOW (USFWS, 2014b). **Table 2-2** summarizes the local flora species observed during reconnaissance activities in 2004.

Table 2-2. Flora Species Observed at the Former LOOW

Herbs	Shrubs and Vines	Trees
Birdsfoot trefoil	Canada honeysuckle	Basswood
Cinquefoil	Gray-stemmed dogwood	Black locust
Daisy fleabane	Hawthorn	Black willow
Goldenrod	Highbush blueberry	Eastern cottonwood
Hemp	Poison ivy	Pig nut
Indian	Staghorn sumac	Quaking aspen
Oxeye daisy	Tartarian honeysuckle	Scarlet oak
Sedge	Virginia creeper	Slippery elm
Spikerush	Winter grape	White ash
Teasel	---	White oak
Yellow hawkweed	---	---

Source: USACE, 2008

2.3.5.3 Local Fauna

In 1995, Rust Environmental and Infrastructure (REI) conducted an *Ecological Assessment/Fish and Wildlife Impact Analysis* (hereinafter EA/FWIA) as part of the *Site-Wide Corrective Measures Study, Model City TSD Facility* (REI, 1995) for CWM. This facility is located in the developed area of the former LOOW. The major findings of the EA/FWIA with respect to fish and wildlife are summarized below:

- According to the USFWS, NYSDEC Wildlife Resource Center, and NYSDEC Region 9 Office, there are no known occurrences of federally or state-listed endangered, threatened, or special concern wildlife species, animals or natural communities within the boundary of the former LOOW.
- A variety of mammals, amphibians, reptiles, fish, and bird species utilize the area within a one-half mile radius of the former LOOW. These species include the Black-capped Chickadee, Northern Cardinal, American Crow, Red-tailed Hawk, Great Blue Heron, Blue Jay, Canada Goose, Mallard, Red-winged Blackbird, Woodchuck, and White-tailed Deer.
- Species, including those of a sensitive status, could potentially inhabit areas within one-half mile of the former LOOW.

Subsequent inquiries and research associated with environmental investigations have identified no threatened or endangered fauna potentially inhabiting the former LOOW.

In addition to the EA/FWIA, a reconnaissance to identify local fauna was completed at EU 1 through EU 6 in 2004 and presented in the LOOW SLERA (USACE, 2008). **Table 2-3** summarizes the local fauna observed during the reconnaissance.

Table 2-3. Fauna Species Observed at the Former LOOW

Birds	Mammals	Reptiles
American crow	Eastern gray squirrel	American toad
Song sparrow	White-tailed deer	Snake (unidentified)
Yellow warbler	---	Tadpole
Source: USACE, 2008		

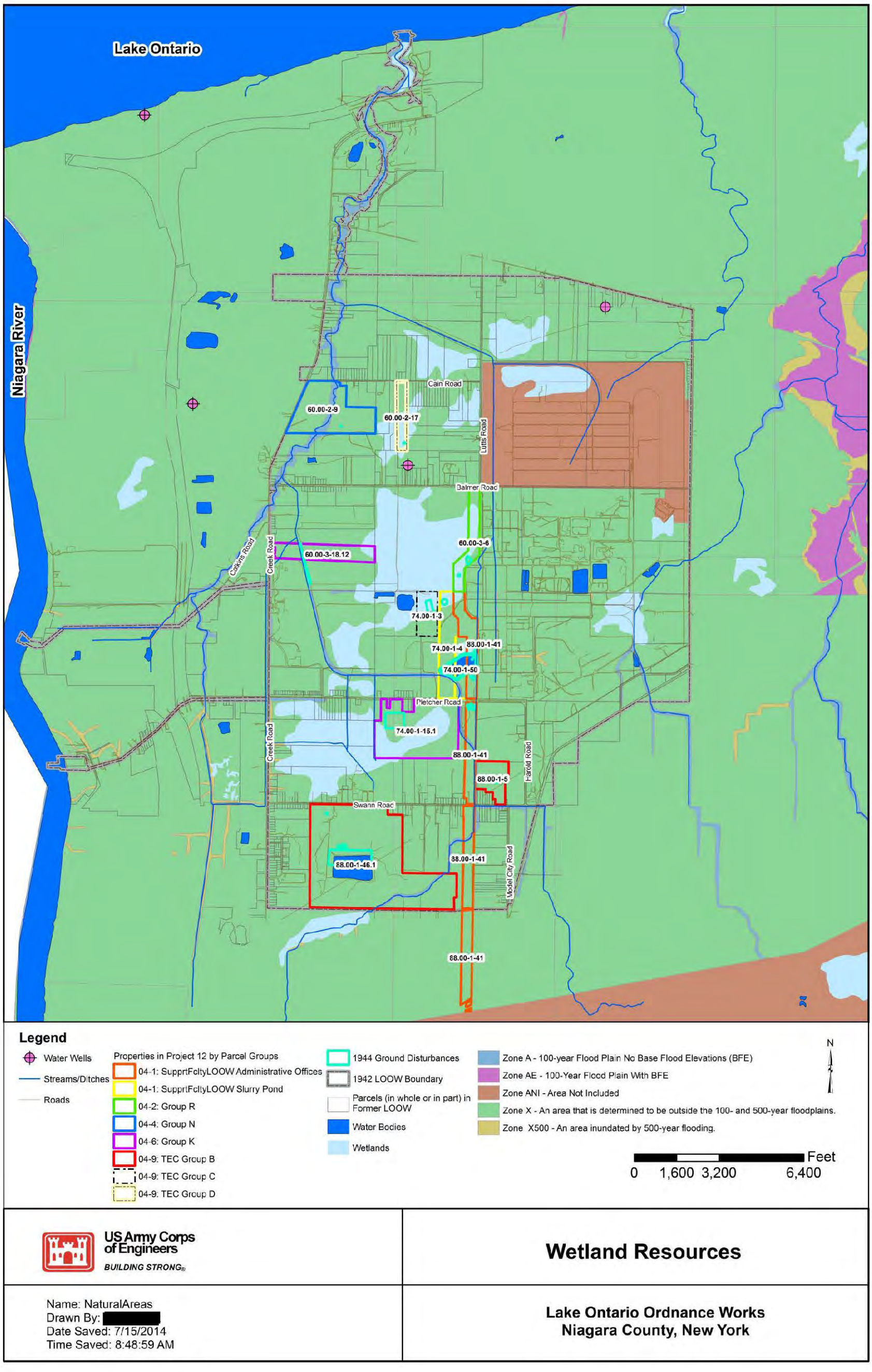

Figure 2-1. Wetland Resources

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3.0 DATA COLLECTION

3.1 Historical Records Review

The following historical records were reviewed and utilized in assessing the ground disturbances and potential DoD activities at various parcels where ground disturbances were identified.

3.1.1 Lake Ontario Ordnance Works Completion Report (USACE, 1943)

The *Lake Ontario Ordnance Works Completion Report* (USACE, 1943) documents the construction of the former LOOW; the U.S. Army directives for the establishment of the facility; the purpose of acquiring and developing the 7,500-acre TNT production facility; the environmental conditions prior to development; geology; and construction activities. The report provides as-built drawings of the various TNT production facilities, production support facilities, and storage areas. In addition, the document provides construction details associated with the facility.

3.1.2 History Search Report (USACE, 1998)

The *History Search Report* (USACE, 1998) provides a detailed review of the former LOOW history of operations and assesses the potential for environmental impacts resulting from DoD use of the area from approximately 1938 to 1986. The history search was performed to identify the types and locations of past operations that occurred on the former LOOW. The information presented in this report provided a basis for identifying possible areas of concern (AOCs) attributable to DoD-related activities (USACE, 1998). None of the AOCs included the ground disturbances that are evaluated in this SI.

The findings of the history search indicate that in 1942 the War Department acquired a total of 7,453 acres in fee and 114.8 acres easement within the towns of Lewiston and Porter in Niagara County, New York for the construction of LOOW. Six TNT production lines, as well as several storage facilities for raw materials and finished products, were constructed on approximately 2,500 acres on the east-central portion of LOOW. The remaining area consisting of approximately 5,000 acres (excluding the easements) functioned as a buffer zone. TNT was first produced on 16 October 1942 (USACE, 1998). Four of the ground disturbances evaluated in this SI were located adjacent to the westernmost developed areas.

Due to production levels that exceeded expectations at several other ordnance plants, LOOW was ordered to cease TNT production on 31 July 1943 and was subsequently closed. Approximately 5,000 acres outside of the production area (i.e., the buffer zone) were declared excess in 1945 by the War Department and transferred to the General Services Administration (GSA) for disposal to private landowners. The GSA was responsible for transferring real estate between government agencies, or from a government agency to a private landowner. Currently, these 5,000 acres consist of residential areas, small farms, churches, a conservation club, a recreational area, and various privately owned operations. Because most of this acreage was used as a buffer zone and was not actively used by the DoD, it is not discussed at length in the History Search report. Exceptions include former LOOW underground utilities traversing the buffer zone, the Acome Landfill, and the J.T. Salvage Yard. The Acome Landfill was privately owned and operated from approximately 1958 to 1960. The area received municipal waste from the Towns of Lewiston and Porter; Villages of Lewiston, Youngstown, and Fort Niagara; and may also have received Army refuse from areas still operating on the active LOOW (USACE, 1998). The J.T.

Salvage Yard, although not associated with DoD waste, is located adjacent to the former LOOW storage area and was listed as an uncontrolled hazardous waste site by NYSDEC in the 1980s (USACE, 1998). The remaining 2,500 acres were transferred to the USACE–North Atlantic Division in 1944. This land was later transferred to other government agencies and private land owners for various uses including a USAF experimental rocket fuel plant, a NIKE Missile Base, chemical and radioactive waste storage facilities, municipal and hazardous waste landfills, and testing of experimental communications equipment (USACE, 1998).

3.1.3 Examination of Historical Aerial Photography – Selected Sites (TEC, 2002)

The *Examination of Historical Aerial Photography – Selected Sites* (TEC, 2002) assessed the potential for environmental impacts associated with DoD use from approximately 1938 to 1986. Aerial photographs from 1938, 1942, 1944, 1951, 1956, 1958, 1960, 1963, 1972, 1978, 1981, 1985, 1990, 1995, and 1997 were evaluated. The findings of the report identify numerous ground disturbances within a former magazine area, the actively used section, the NFSS, and the former buffer zone (TEC, 2002). The information presented in this report prompted the further assessment of ground disturbances during subsequent projects, including this SI.

3.1.4 Small-Bermed Clearing Supplemental Investigation Summary Report (USACE, 2004)

The *Small-Bermed Clearing Supplemental Investigation Summary Report* (USACE, 2004) documented an investigation performed to determine if contamination was present at ground disturbances called “small-bermed clearings” (SBCs) a result of past DoD-activities(USACE, 2004). USACE determined that the SBCs were likely used as open burn pits based on anecdotal evidence, their proximity to the former TNT plant, past practices at ordnance facilities, and the physical characteristics of the SBCs.

A subset of the SBCs was investigated through sampling and analysis for TNT and petroleum hydrocarbons (USACE, 2004). Soil samples were collected and analyzed from 12 locations on four properties in the undeveloped area. All of the samples were analyzed for TNT, TNT degradation products, and total petroleum hydrocarbons-diesel range organics (TPH-DRO). None of the samples exhibited detectable levels of TNT, though some samples did exhibit low levels of TPH-DRO. However, the TPH present was determined to be associated with hydrocarbons typical of motor oil. Based on the analytical data, the hypothesis that the SBCs were used as burn pits by DoD could not be confirmed (USACE, 2004). In order to address community concerns over possible radioactive and chemical contamination, a subset of the soil samples were analyzed for volatile organic compounds, semi-volatile organic compounds, metals, polychlorinated biphenyls, herbicides, pesticides, and explosives and a limited number of samples were analyzed for radioactive isotopes. Reported concentrations for radioactive isotopes were consistent with background levels. Reported concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals were consistent with local background levels or typical of the northeastern United States. Reported concentrations of pesticides were minimal and attributed to past agricultural activities in the area (USACE, 2004).

The results of this investigation indicated there has been no release nor is there a threat of release of DoD-related contaminants at the SBCs that may present a significant threat to public health or the environment. The SBCs were eliminated from further DERP-FUDS activities (USACE, 2004).

3.1.5 Niagara Falls Storage Site Historical Photographic Analysis (AGC, 2009)

The *Niagara Falls Storage Site Historical Photographic Analysis* (AGC, 2009) assessed the potential for DoD-related environmental impacts associated with the NFSS and a section of the Lewiston-Porter Central School, Lewiston, New York property.

The AGC analyzed historical photographic records of the NFSS area to identify potential AOCs. Ground scars, disturbed ground, trenches, and ditches, were identified and mapped. This analysis expanded on the *Examination of Historical Aerial Photography – Selected Sites* (TEC, 2002).

Photographic analysis of historical aerial photography, both vertical and oblique, was the primary method of identifying man-made and natural occurring ground disturbances at the NFSS and a section of the Lewiston-Porter Central School District (LPCSD) campus. The analysis in this report was primarily based upon interpretation of black and white and color aerial photography over the project area for the period 1938 to 2005. The report concluded that some of the identified ground disturbances were likely "benign" as it was not always possible to determine the surface altering activity. In addition, future field work and additional information was recommended to determine the relevance of the identified ground disturbances (AGC, 2009).

3.1.6 Military Munitions Response Program Archives Search Report (USACE, 2010)

The *Military Munitions Response Program (MMRP) Archives Search Report (ASR)* (USACE, 2010) was completed to address data gaps identified as a result of the historical documents reviews during previous studies, as well as the *History Search Report* (USACE, 1998). The MMRP ASR was also performed to obtain information regarding potential MMRP activities conducted on the former LOOW (e.g., training ranges, chemical warfare materiel activities, open burn/open detonation ranges, etc.).

The MMRP ASR is a compilation of information obtained through historical research at various archives and records holding facilities. The investigation was a textual, cartographic, and photographic research and analysis effort. No sampling or field assessments were conducted. Emphasis was placed on establishing the potential types, quantities, and areas of munitions and explosives of concern (MEC), and chemical warfare materiel activities.

3.1.7 Site Inspection – Lewiston-Porter Central School District (USACE, 2011b)

In 2011 USACE investigated 10 anomalies identified in historical aerial photographs as "mounds," "trenches," or "pits." Their appearances in historical aerial photographs are consistent with some of the ground disturbances being assessed in this SI. Field screening and analytical testing did not identify contamination associated with previous DoD activities. Visual observations of the mounds suggest that they were likely displaced native soils, possibly from either the construction of the SWDD, the 30-inch outfall line, or past agriculture activities.

The investigation determined that the mounds, trenches, or pits did not contain anthropogenic fill or evidence of waste disposal. Field screening and laboratory analytical results did not identify contaminants in soil, sediment, and water samples at concentrations that would pose a risk to the community.

3.1.8 Inventory Project Report Addendum No. 2 (USACE, 2012a)

The LOOW INPR Addendum No. 2 determined that various ground disturbances throughout approximately 85 acres in the undeveloped area of the former LOOW were FUDS eligible. The eligible ground disturbances were identified in aerial photographs of the former LOOW during the timeframe of past DoD use (i.e., between 1944 and 1946), were not present prior to DoD use (i.e., pre-1938), and have not been addressed by other hazardous, toxic, and radioactive waste (HTRW) projects.

3.1.9 Management Action Plan – Update 1.2 (USACE, 2013a)

The MAP and associated Property Management Action Plans (PMAPs) present a summary of the USACE strategy for completing and closing, on a real property basis, parcels on the former LOOW that meet the definition of a FUDS under the DoD DERP. To date, the environmental response at LOOW has been performed at several AOCs on properties owned by various owners. Due to the size and complexity of the former LOOW site, the USACE developed a strategy to establish manageable units based on parcels, or groups of parcels, and to review the history, impacts, and environmental response based on current property ownership. The intent is to present a concise representation of the past DoD activities and potential impacts at each parcel (or parcel group), the strategy for addressing potential impacts, and the current status of the environmental response at each parcel.

There are over 550 parcels (as defined by the Niagara County Department of Real Property Tax) that comprise the former LOOW. Many of the parcels have similar attributes with regard to land use and past DoD activities. Therefore, the MAP grouped the parcels into 33 parcel groups based on a hierarchical and parameter based methodology. For each parcel group, an evaluation of the eligibility of potential hazards from past DoD use was made with regard to the five project types under DERP-FUDS:

- HTRW hazards.
- Containerized HTRW hazards.
- Military munitions response program hazards.
- Building demolition and debris removal hazards.
- The possibility of impact from other potentially responsible parties.

3.2 Visual Survey

Visual surveys were performed on 23 – 24 April and 6 May to verify the presence of the ground disturbances, to identify evidence of potential past DoD activities, and to evaluate the current site conditions. Rights of entry (ROEs) were executed for eight properties that enabled the inspection of 17 disturbances. ROEs were not obtained for Parcel 60.00-3-18.12, which contains ground disturbance 1944-16 and for Parcel 74.00-1-50, which contains ground disturbances 1944-45 and 1944-46. These two ground disturbance were observed from adjacent parcels.

Table 3-1 present the ground disturbances included in this report. Ground disturbance 1944-21 was eliminated because it had been previously assessed under a separate DERP-FUDS project (Site Inspection-Lewiston-Porter Central School District, USACE, 2011b).

The location of each ground disturbance was determined in the field using a global positioning system (GPS) and coordinate data from the TEC and AGC reports. Photographs were taken at

each location and are provided in **Appendix A**. Observations are discussed in the following sections.

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Table 3-1. Project-12 Ground Disturbances

No.	Type	Property Owner	Group Name	Parcel No.	Visual Survey Date	Figure	SI Section
1944-16#	Mounded Material	[redacted] Property	Group K	60.00-3-18.12	None – No ROE	Figure 3-1, Figure 3-2	8.2
1944-45	Berm	Guardian Corporation	Support Facility Administrative Offices	74.00-1-4	24 April 2014	Figure 3-2	5.1
		[redacted] Property		74.00-1-50	None – No ROE		5.2
		National Grid		88.00-1-41	24 April 2014		4.1
1944-46	Trench	Guardian Corporation	Support Facility Administrative Offices	74.00-1-4	24 April 2014	Figure 3-2	5.1
		[redacted] Property		74.00-1-50	None – No ROE		5.2
		National Grid		88.00-1-41	24 April 2014		4.1
1944-47	Mounded Material	National Grid	Support Facility Administrative Offices	88.00-1-41	23 April 2014	Figure 3-2	4.1
1944-48	Pit(s)	National Grid	Support Facility Administrative Offices	88.00-1-41	23 April 2014	Figure 3-2	4.1
1944-121	Disturbed Ground/Scar	National Grid	Support Facility Administrative Offices	88.00-1-41	23 April 2014	Figure 3-2	4.1
1944-137	Material/Mounded Material	[redacted] Property	TEC Group B	88.00-1-5	None – No ROE	Figure 3-3	9.2
1944-138	Disturbed Ground/Scar	National Grid	Support Facility Administrative Offices	88.00-1-41	23 April 2014	Figure 3-3	4.1
1944-147	Other	Modern Landfill, Inc.	Group K	74.00-1-15.1	6 May 2014	Figure 3-3	8.1
1944-153	Disturbed Ground/Scar	National Grid	Support Facility Administrative Offices	88.00-1-41	23 April 2014	Figure 3-2	4.1
1944-161	Disturbed Ground/Scar	Three F Club	TEC Group B	88.00-1-46.1	23 April 2014	Figure 3-3	9.1
1944-162	Tracks/Trail	Three F Club	TEC Group B	88.00-1-46.1	23 April 2014	Figure 3-3	9.1
1944-163	Other	Guardian Corporation	Support Facility Administrative Offices	74.00-1-4	24 April 2014	Figure 3-2	5.1
1944-170	Other	[redacted] Property	TEC Group C	74.00-1-3	24 April 2014	Figure 3-2	10.1
1944-173	Disturbed Ground/Scar	National Grid	Group R	60.00-3-6	23 April 2014	Figure 3-1	6.1
1944-174	Pond	National Grid	Group R	60.00-3-6	23 April 2014	Figure 3-1, Figure 3-2	6.1
1944-177	Material/Mounded Material	Three F Club	TEC Group B	88.00-1-46.1	23 April 2014	Figure 3-3	9.1
1944-180	Material/Mounded Material	[redacted] Property	TEC Group D	60.00-2-17	23 April 2014	Figure 3-1	11.1
1944-192	Other	[redacted] Property	Group N	60.00-2-9	23 April 2014	Figure 3-1	7.1

Legend:
ROE: right of entry
Three F Club: Fin, Fur, and Feather Conservation Society
Other: "Other" defines a ground disturbance that is not a "ground scar or disturbed ground," "pits/cleared areas," "mounded material," or "open storage areas" (TEC, 2002).
The size and shape of each ground disturbance is depicted to scale on Figures 3-1, 3-2, and 3-3.
#: Although included in the INPR for LOOW Project 12, was previously evaluated. The ground disturbance was evaluated on the LPCSD property but extends onto the [redacted] property.

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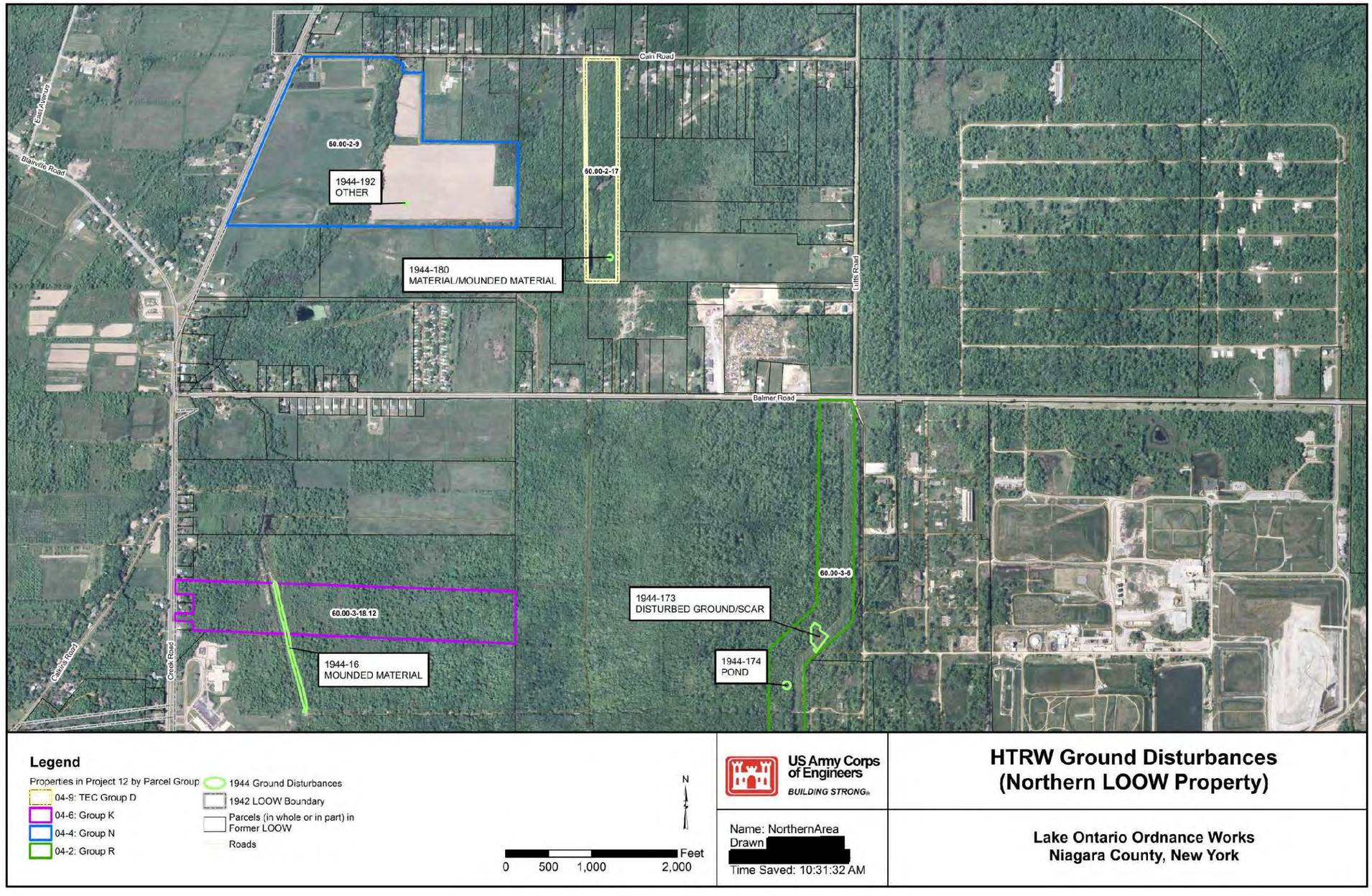

Figure 3-1. HTRW Ground Disturbances in the Northern Area of the Former LOOW

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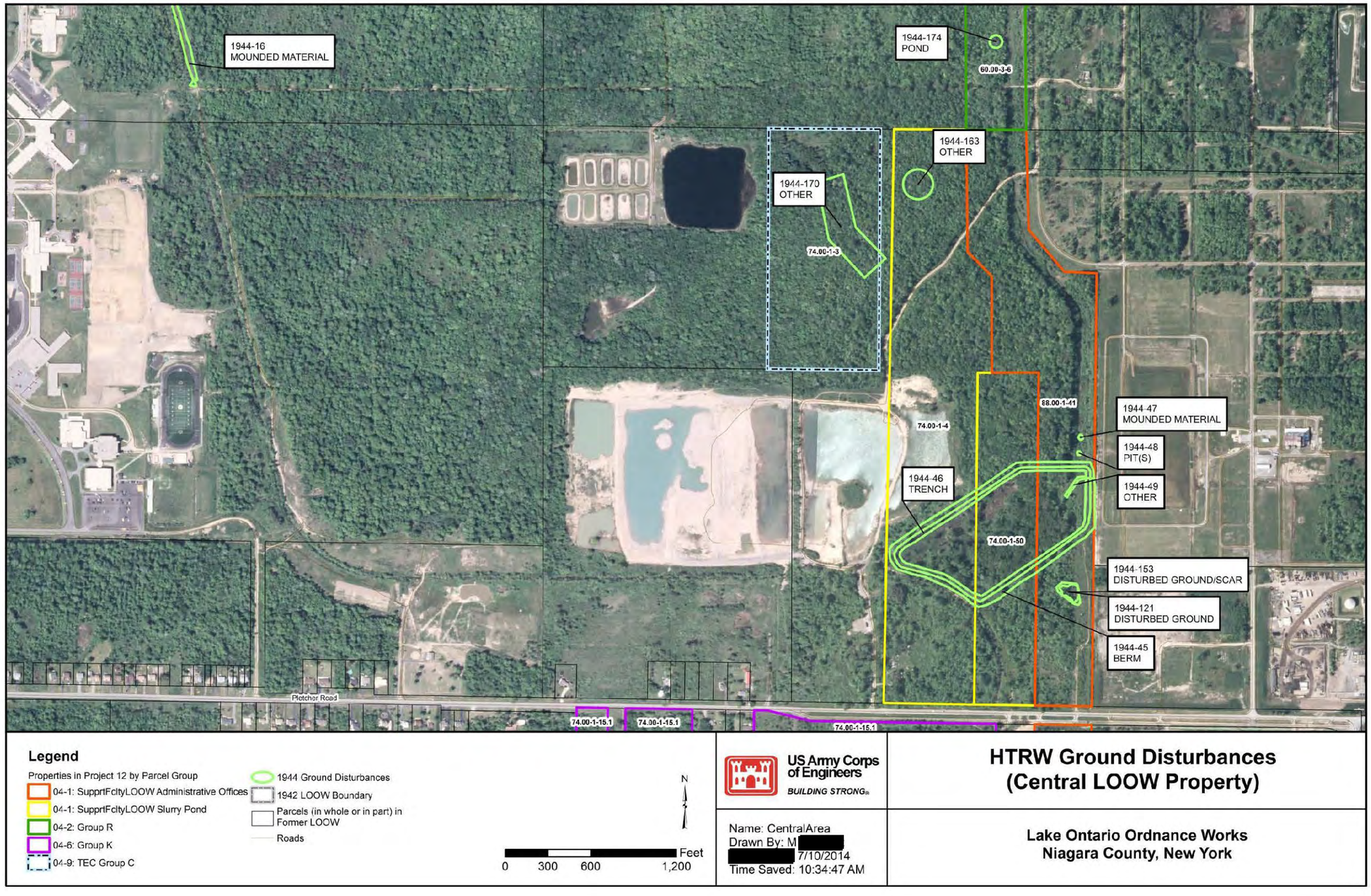

Figure 3-2. HTRW Ground Disturbances in the Central Area of the Former LOOW

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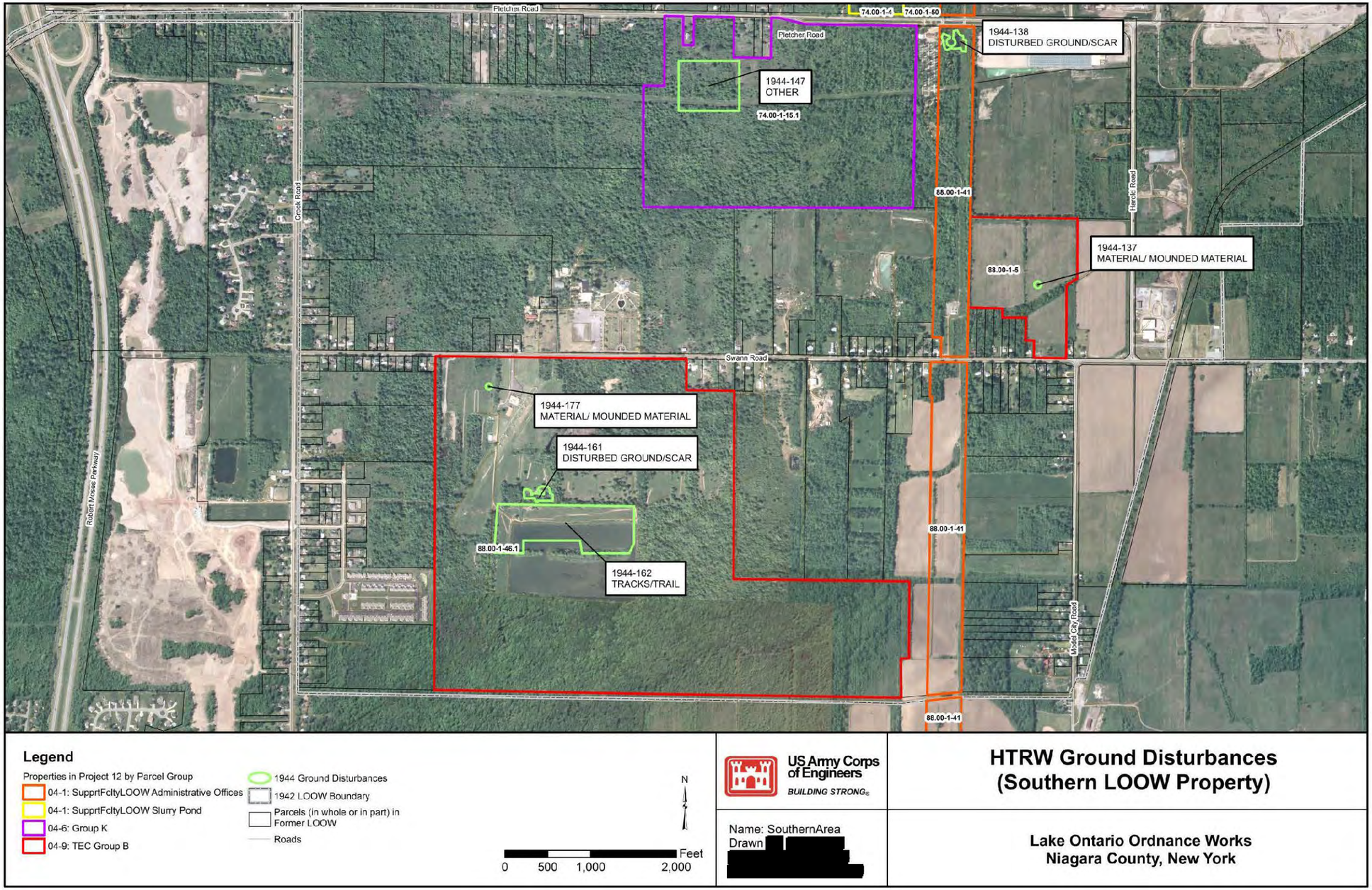

Figure 3-3. HTRW Ground Disturbances in the Southern Area of the Former LOOW

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4.0 SUPPORT FACILITY ADMINISTRATIVE OFFICES

4.1 State Parcel: 88.00-1-41

4.1.1 Operational History and Characteristics

Prior to 1942, Parcel 88.00-1-41 was comprised of two tracts (i.e., A-23 and A-50) and was part of the undeveloped "buffer zone" of the LOOW. The LOOW administrative offices and part of the freshwater treatment plant were located on this parcel. In June and November 1942, the U.S. War Department purchased outright the tracts. The parcel is approximately 148 acres and was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, a slurry pond was constructed on a portion of this parcel. The slurry pond, which is related to ground disturbance 1944-45 and 1944-46, was 1,200-ft by 400-ft and was constructed west of the water treatment plant, for the collection of sludge from water treatment plant softening activities. The water treatment plant operated for a short period of time between 1944 and 1945, when the parcel was declared excess. Raw Niagara River water entered the water treatment plant through a surge tank that was connected to the slurry pond via a series of canals. Water treated at the plant was used as process water for the LOOW production activities. Drinking water was provided to the LOOW by the City of Niagara Falls municipal water supply. The treatment process for production water included the use of accelerators where the water was softened and treated. Softening of water is conducted with the application of sodium chloride or sodium hydroxide to raise the pH and precipitate out carbonate and noncarbonated hardness compounds. During this process, lime is added to the flash mixer and the water is flocculated, where the carbonate compounds precipitate into the sediment and sludge. After precipitation, acid is then applied to the softened water to reduce the pH via the introduction of carbon dioxide, sulfuric acid, hydrochloric acid, or polyphosphate. The slurry pond would have been the storage point for sludge that resulted from the coagulation and flocculation process, and the re-carbonation process. Primarily, lime sludge would have contained salts and be disposed of at landfills, but can also be applied to agricultural fields to reduce the acidity of soils. There are no records of how the sludge associated with the water treatment process was disposed. Precipitates that would possibly have been included in the sludge discharged to the slurry pond would primarily have included, sodium, chlorine, calcium, and magnesium. The DoD investigated the slurry pond for DoD marker compounds as part of the Phase I RI and it has been determined that there is insufficient evidence to warrant further investigation of the area (USACE, 1999).

The parcel was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in May 1946; however one area immediately north of Pletcher road was retained by the USACE Manhattan Engineering Division until the mid-1950s before being sold to a private land owner. The parcel is currently owned by National Grid and was previously owned for many years by the Niagara Mohawk Power Corporation. The parcel is located between Balmer Road and Ridge Road (New York State Route 104) within the town of Lewiston. The parcel is currently traversed by the southwest drainage ditch (SWDD) and 42-inch freshwater intake line. The current land-use designation is industrial.

4.1.2 Visual Survey

On 23 April 2014, a visual survey of seven ground disturbances (1944-45, 1944-46, 1944-47, 1944-48, 1944-121, 1944-138, and 1944-153) was completed. The parcel includes overhead power transmission lines; no other improvements, structures (temporary or permanent), distressed vegetation, or stained soil were observed within the footprint of the ground disturbances. **Appendix A** includes the photographic record for the visual survey.

4.1.2.1 Ground Disturbance 1944-45

This ground disturbance was classified as a "berm" based on an examination of 1944 aerial photographs and extended across three separate parcels; 74.00-1-4, 74.00-1-50, and 88.00-1-41 (TEC, 2002 and AGC, 2009). Ground disturbance 1944-45 is associated with and adjacent to ground disturbance 1944-46. The visual survey did not reveal any evidence of the disturbance on this parcel or a potential source of contamination. The DoD investigated the slurry pond for DoD marker compounds as part of the Phase I RI and it has been determined that there is insufficient evidence to warrant further investigation of the area (USACE, 1999).

4.1.2.2 Ground Disturbance 1944-46

This ground disturbance was classified as a "trench" based on examination of 1944 aerial photographs. It extended across three separate parcels; 74.00-1-4, 74.00-1-50, and 88.00-1-41 (TEC, 2002 and AGC, 2009). The visual survey did not reveal any evidence of the disturbance on this parcel or a potential source of contamination.

4.1.2.3 Ground Disturbance 1944-47

This ground disturbance was classified as "mounded material" based on examination of the 1944 aerial photographs (TEC, 2002 and AGC, 2009). No additional descriptive information is available in historical documents regarding this ground disturbance. The TEC report indicates that many of the mounded material ground disturbances observed in the 1944 photographs may be associated with farming (the area was agricultural prior to the development of LOOW).

The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

4.1.2.4 Ground Disturbance 1944-48

This ground disturbance was classified as "pits" based on examination of the 1944 aerial photographs (TEC, 2002 and AGC, 2009). No additional descriptive information is available in historical documents regarding this ground disturbance. The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

4.1.2.5 Ground Disturbance 1944-121

This ground disturbance was classified as "disturbed ground" based on examination of the 1944 aerial photographs (TEC, 2002 and AGC, 2009). No additional descriptive information is available in historical documents regarding this ground disturbance. The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

4.1.2.6 Ground Disturbance 1944-138

This ground disturbance was classified as "disturbed ground/scar" based on examination of the 1944 aerial photographs (TEC, 2002 and AGC, 2009). No additional descriptive information is

available in historical documents regarding this ground disturbance. The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

4.1.2.7 Ground Disturbance 1944-153

This ground disturbance was classified as "disturbed ground/scar" based on examination of the 1944 aerial photographs (TEC, 2002 and AGC, 2009). No additional descriptive information is available in historical documents regarding this ground disturbance. The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

4.1.3 Groundwater Pathway

The visual survey did not reveal any evidence of the ground disturbances or potential sources of contamination. There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

4.1.4 Surface Water Pathway

The SWDD runs south to north traverses the parcel, and then trends northwest ultimately feeding Four Mile Creek. No additional potential surface water pathways were observed relative to the ground disturbances. There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no surface water pathway of concern.

4.1.5 Soil Exposure and Air Pathways

The parcel is adjacent to the eastern portion of the LOOW slurry pond. The visual survey did not reveal any evidence of the disturbances or a potential source of contamination.

The soils observed were consistent and indistinguishable from each other. There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no soil pathway of concern..

4.1.6 Summary

Based on the operational history records, characteristics, and observations associated with ground disturbances 1944-45, 1944-46, 1944-47, 1944-48, 1944-121, 1944-138, and 1944-153 on Parcel 88.00-1-41, no further evaluation or environmental investigation is warranted.

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5.0 SUPPORT FACILITY SLURRY POND

5.1 State Parcel: 74.00-1-4

5.1.1 Operational History and Characteristics

Prior to 1948, Parcel 74.00-1-4 was comprised of two tracts (i.e., A-56 and A-58) and was part of the undeveloped "buffer zone" of the LOOW. The LOOW administrative offices and part of the freshwater treatment plant, including the freshwater slurry pond, were located on this parcel. In addition, construction of the 42-inch freshwater intake line, the 10-inch drinking water line, and the SWDD traverse the parcel. In November 1942 and March 1948, the U.S. War Department purchased the tracts. The parcel, approximately 57 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, a slurry pond was built on a portion of the parcel. The DoD investigated the slurry pond for DoD marker compounds as part of the Phase I RI and it has been determined that there is insufficient evidence to warrant further investigation of the area (USACE, 1999). It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in February 1946. A more detailed description of the slurry pond is presented in Section 4.1.1.

The parcel is one of a series of parcels currently owned by the Guardian Corporation and is located within the town of Lewiston. Guardian continues to excavate and sell clay present on their land. Large borrow pits are visible on aerial photographs extending from the west into the parcel group. Currently, this parcel appears to be undeveloped. The parcel is situated between Balmer Road and Pletcher Road, adjacent to the north side of Pletcher Road. It is currently traversed by the SWDD and a 42-inch freshwater intake line. The current land-use designation is industrial.

5.1.2 Visual Survey

On 24 April 2014, a visual survey of ground disturbances 1944-45, 1944-46, and 1944-163 was completed. No structures (i.e., temporary or permanent), distressed vegetation, or stained soil were observed. Improvements observed included a "berm" (ground disturbance 1944-45) and an adjacent "trench" (ground disturbance 1944-46) of the slurry pond. No improvements were observed at ground disturbance 1944-163. **Appendix A** includes the photographic record for the visual survey.

5.1.2.1 Ground Disturbance 1944-45

This ground disturbance was classified as a "berm" based on an examination of 1944 aerial photographs. It extends across three parcels; 74.00-1-4, 74.00-1-50, and 88.00-1-41 (TEC, 2002 and AGC, 2009). Ground disturbance 1944-45 is associated with and adjacent to ground disturbance 1944-46. The berm appeared intact upon visual inspection and had an approximate footprint consistent with historical aerial photographs of the slurry pond. The earthen sidewalls of the berm were approximately 8 ft from ground surface to crest and covered with mature flora and underbrush. The interior of the bermed area held water of an unknown depth and source. Additionally, mature flora, including mature trees were observed in the interior of the berm. The visual survey did not reveal any indications of a potential source of contamination.

5.1.2.2 Ground Disturbance 1944-46

This ground disturbance was classified as a "trench" based on examination of 1944 aerial photographs. It extends across three parcels; 74.00-1-4, 74.00-1-50, and 88.00-1 41 (TEC, 2002 and AGC, 2009). It appears that ground disturbance 1944-46 is the trench from which native material was excavated to construct the adjacent berm (ground disturbance 1944-45). Ground disturbance 1944-46 is located on the inside of the former slurry pond footprint and is immediately adjacent to the ground disturbance 1944-45 "berm." This disturbance appeared intact upon inspection and had an approximate footprint consistent with historical aerial photographs of the slurry pond. The interior of the trench held water of an unknown depth and source.

5.1.2.3 Ground Disturbance 1944-163

This ground disturbance was classified as "other" based on an examination of 1944 photographs (TEC, 2002 and AGC, 2009), and no other descriptive information is available in the historical records. Due to its location approximately 2,000 ft north of the constructed slurry pond, it is not likely that this ground disturbance was associated with the construction of the DoD slurry pond facility, SWDD, 42-inch intake or 10-inch water line. The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

5.1.3 Groundwater Pathway

It is possible that groundwater underlying the slurry pond may be potentially recharged through downward percolation of surface water and potentially represents a groundwater pathway. Although, the DoD investigated the slurry pond for DoD marker compounds as part of the Phase I RI and it has been determined that there is insufficient evidence to warrant further investigation of the area (USACE, 1999).

There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

5.1.4 Surface Water Pathway

There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Additionally, the DoD investigated the slurry pond for DoD marker compounds as part of the Phase I RI and it has been determined that there is insufficient evidence to warrant further investigation of the area (USACE, 1999). Therefore, there is no surface water pathway of concern.

5.1.5 Soil Exposure and Air Pathways

There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Additionally, the DoD investigated the slurry pond for DoD marker compounds as part of the Phase I RI and it has been determined that there is insufficient evidence to warrant further investigation of the area (USACE, 1999). Therefore, there is no soil pathway of concern.

There are no structures located on or adjacent to the footprint of the ground disturbance that would constitute a potential air pathway, and there is no indication of a release to the air pathway or air pathway of concern.

5.1.6 Summary

Based on the operational history, characteristics, and observations associated with ground disturbance 1944-45, 1944-46, and 1944-163, no further evaluation or environmental investigation is warranted.

5.2 State Parcel: 74.00-1-50

5.2.1 Operational History and Characteristics

In March 1942, Parcel 74.00-1-50, formerly tract number A-58, was taken outright by the U.S. War Department. The parcel was part of the undeveloped "buffer zone" of the LOOW. The LOOW administrative offices and part of the freshwater treatment plant, including a portion of the freshwater treatment plant were located on this parcel. In addition, construction of the 42-inch freshwater intake line, the 10-inch drinking water line, and the SWDD traverse the parcel. The parcel, approximately 23 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, a slurry pond was built on a portion of this parcel. The DoD investigated the slurry pond for DoD marker compounds as part of the Phase I RI and it has been determined that there is insufficient evidence to warrant further investigation of the area (USACE, 1999). The parcel was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in May 1946. The parcel included in this parcel group is zoned for industrial use, and activities at the parcels are limited by the zoning requirements. A more detailed description of the slurry pond is presented in Section 4.1.1.

The parcel is located between Balmer Road and Pletcher Road, adjacent to the north side of Pletcher Road in the town of Lewiston. The parcel is currently traversed by the SWDD and a 42-inch freshwater intake line. The current land-use designation is industrial.

5.2.2 Visual Survey

On 24 April 2014, a visual survey of ground disturbances 1944-45 and 1944-46 was completed. They were not observed from Parcel 74.00-1-50 because a ROE was not obtained. The historical record and uniformity of these ground disturbances observed on Parcel 74.00-1-4 suggest that similar conditions exist on Parcel 74.00-1-50.

5.2.2.1 Ground Disturbance 1944-45

This ground disturbance was classified as a "berm" based on examination of 1944 aerial photographs. It extended across three parcels, 74.00-1-4, 74.00-1-50, and 88.00-1-41 (TEC, 2002 and AGC, 2009). Information associated with this ground disturbance is presented in Section 5.1.2.1.

5.2.2.2 Ground Disturbance 1944-46

This ground disturbance was classified as a "trench" based on examination of 1944 aerial photographs (TEC, 2002 and AGC, 2009). Information associated with this ground disturbance is presented in Section 5.1.2.2.

5.2.3 Groundwater Pathway

A groundwater pathway analysis is presented in Section 5.1.3 for features 1944-45 and 1944-46.

5.2.4 Surface Water Pathway

A surface water pathway analysis is presented in Section 5.1.4 for features 1944-45 and 1944-46.

5.2.5 Soil Exposure and Air Pathways

A soil exposure and air pathways analysis is presented in Section 5.1.5 for features 1944-45 and 1944-46.

5.2.6 Summary

Ground disturbances 1944-45 and 1944-46 could not be inspected on Parcel 74.00-1-50 during the visual survey. However, the historical record and uniformity of the ground disturbances observed on Parcel 74.00-1-4 suggest that similar conditions exist on Parcel 74.00-1-50. No further evaluation or environmental investigation is warranted.

6.0 GROUP R

6.1 State Parcel: 60.00-3-6

6.1.1 Operational History and Characteristics

Prior to 1942, Parcel 60.00-3-6 was comprised of two tracts (i.e., B-127 and B-129). In July and August 1942, the U.S. War Department purchased outright the tracts. The parcel, approximately 40 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, the parcel remained undeveloped and there are no documented government activities that occurred on this parcel other than the construction of the 30-inch outfall line. It is traversed by a 30-inch outfall line from a former LOOW wastewater treatment plant (WWTP). During operation of the LOOW, discharges from the LOOW WWTP were released to the 30-inch outfall line. The LOOW WWTP handled sanitary sewage, and acid and TNT wastewater from the production of TNT. It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in June 1946. Subsequent to DoD use, the 30-inch outfall was utilized by other parties including AEC (Boron-10 Production Plant), the Akron, New York Carborundum Metals Company Plant and the town of Lewiston.

The parcel is currently owned by National Grid and is located within the town of Lewiston. It is located between Balmer Road and Pletcher Road, adjacent to the south side of Balmer Road. The current land-use designation is industrial.

6.1.2 Visual Survey

On 23 April 2014, a visual survey of ground disturbances 1944-173 and 1944-174 was completed. No improvements, structures (i.e., temporary or permanent), distressed vegetation, or stained soil were observed. **Appendix A** includes the photographic record for the visual survey.

6.1.2.1 Ground Disturbance 1944-173

This ground disturbance was classified as “disturbed ground” based on examination of 1944 aerial photographs (TEC, 2002). The ground disturbance was located in the southern portion of the parcel. No additional descriptive information is available in historical documents regarding this ground disturbance. The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

6.1.2.2 Ground Disturbance 1944-174

This ground disturbance was classified as “pond” based on examination of 1944 aerial photographs (TEC, 2002). The ground disturbance was located in the southern portion of the parcel. No additional descriptive information is available in historical documents regarding this ground disturbance. The visual survey did not reveal any evidence of the pond or a potential source of contamination.

6.1.3 Groundwater Pathway

No water wells are located on the parcel; the closest well is approximately 0.5-mile to the northwest.

There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

6.1.4 Surface Water Pathway

No creeks, streams, or drainage ditches intersect or are contiguous with the parcel. A majority of the parcel and these ground disturbances are located within the boundary of a New York State regulated wetland. Standing water was observed in the ground disturbance areas during the visual survey.

There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no surface water pathway of concern.

6.1.5 Soil Exposure and Air Pathway

The soils observed within the ground disturbance areas and in surrounding areas were consistent and indistinguishable from each other.

There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no soil exposure pathway of concern.

There are no structures located on or adjacent to the footprint of the ground disturbance that would constitute a potential air pathway, and there is no indication of a release to the air.

6.1.6 Summary

Based on the operational history records, characteristics, and observations associated with ground disturbances 1944-73 and 1944-74, no further evaluation or environmental investigation is warranted.

7.0 GROUP N

7.1 State Parcel: 60.00-2-9

7.1.1 Operational History and Characteristics

In February 1943, Parcel 60.00-2-9, formerly tract number B-170, was taken outright by the U.S. War Department. The parcel, approximately 109 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, the parcel remained undeveloped. Based on historical records, DoD activities on the Group N parcels were limited to the construction of the SWDD and the CDD. Parcel 60.00-2-9 does not contain either the SWDD or CDD, but Four Mile Creek, which receives discharge from both the SWDD and CDD, traverses the parcel. One ground disturbance categorized as "other" was identified in a 1944 aerial photo and described as an unidentified raised object. The object was not identified in a 1942 aerial photo, and a 1951 photo of the same are identified what appeared to be a ground scar in the same location. It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in March 1946. There is no evidence that the parcel was actively used by the DoD.

The parcel is located between Cain Road and Balmer Road, contiguous with the east side of Creek Road and the south side of Cain Road within the town of Porter. The current land-use designation is agricultural/rural.

7.1.2 Visual Survey

On 23 April 2014, a visual survey of ground disturbance 1944-192 was completed. This ground disturbance was classified as "other" based on examination of 1944 aerial photographs (TEC, 2002). No structures (i.e., temporary or permanent), distressed vegetation, or stained soil were observed within the footprint of the ground disturbance. The eastern half of the property is used for agricultural purposes and the disturbance area is within an active farm field. The property owner indicated that previous clay mining activities resulted in the excavation and removal of the upper 5 ft of soil from the eastern portion of the parcel. Furthermore, this area was re-graded to improve drainage. **Appendix CA** includes the photographic record for the visual survey.

The visual survey did not reveal any evidence of the ground disturbance or a potential source of contamination.

7.1.3 Groundwater Pathway

No water wells are located on the parcel; two water wells are located in the surrounding area. The closest well is approximately 0.25-mile to the southeast and the other is approximately 0.5-mile to the west.

There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

7.1.4 Surface Water Pathway

No drainage ditches or wetlands are located on the parcel. Four Mile Creek bisects the parcel from north to south and is located east of the ground disturbance area.

There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no surface water pathway of concern.

7.1.5 Soil Exposure and Air Pathways

The soils observed within the disturbance area and surrounding areas were consistent and indistinguishable from each other.

There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no soil exposure pathway of concern.

There are no structures located on or adjacent to the disturbance area that would constitute a potential air pathway and there is no indication of a release to the air.

7.1.6 Summary

Based on the operational history records, characteristics, and observations associated with ground disturbance 1944-192, no further evaluation or environmental investigation is warranted.

8.0 GROUP K

8.1 State Parcel: 74.00-1-15.1

8.1.1 Operational History and Characteristics

In June 1942, Parcel 74.00-1-15.1, formerly tract number A-50, was purchased outright by the U.S. War Department. The parcel, approximately 148 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, the parcel remained undeveloped and there are no documented government activities that occurred on this parcel. The ground disturbance located in the northwest portion of this parcel is classified as "other" and may have been an open storage area utilized during DoD ownership (TEC, 2002). It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in February 1946.

The parcel is currently owned by the Modern Landfill, Inc., and traversed by the SWDD. It is located between Pletcher Road and Swann Road, contiguous with the south side of Pletcher Road within the Town of Lewiston. The current land-use designation is industrial.

8.1.2 Visual Survey

On 06 May 2014, the visual survey of ground disturbance 1944-147 was completed. No improvements, structures (i.e., temporary or permanent), distressed vegetation, or stained soil were observed. **Appendix A** includes the photographic record for the visual survey.

This ground disturbance was classified as "other" based on an examination of 1944 aerial photographs (TEC, 2002). The visual survey did not reveal any evidence of the disturbance or a potential source of contamination.

8.1.3 Groundwater Pathway

No water wells are located on the parcel; the closest well is located greater than 1.0-mile to the north.

There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

8.1.4 Surface Water Pathway

No surface water bodies, drainage ditches, or wetlands are located at the ground disturbance. Approximately one third of the parcel is within the boundary of a New York State regulated wetland, and the SWDD runs south to north along the eastern boundary of the parcel, ultimately draining into Four Mile Creek.

There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no surface water pathway of concern.

8.1.5 Soil Exposure and Air Pathways

The soils observed at the disturbance area and surrounding areas were consistent and indistinguishable from each other.

There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no soil pathway of concern.

There are no structures located on or adjacent to the location of the disturbance that would constitute a potential air pathway and there is no indication of a release to the air.

8.1.6 Summary

Based on the operational history records, characteristics, and observations associated with ground disturbance 1944-147, no further evaluation or environmental investigation is warranted.

8.2 State Parcel: 60.00-3-18.12

8.2.1 Operational History and Characteristics

In May 1943, Parcel 60.00-3-18.12, formerly tract number B-122, was taken outright by the U.S. War Department. The parcel, approximately 53 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, the parcel remained undeveloped. It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner on an unknown date.

This parcel is traversed by the SWDD, and available records indicate that any possible DoD activities associated with this parcel is likely associated with the construction of the SWDD. No anomalies were identified in aerial photographs from DoD ownership of the parcel. The TEC report indicates that many of the mounded material ground disturbances observed in the 1944 photographs may be associated with farming (the area was agricultural prior to the development of LOOW).

The parcel is located between Balmer Road and Pletcher Road, contiguous with the east side of Creek Road within the town of Porter. The current land-use designation is undeveloped/parks/ recreational/ wildlife.

8.2.2 Visual Survey

A visual survey of ground disturbance 1944-16 was not completed because a ROE was not obtained for Parcel 60.00-1-12. Ground disturbance 1944-46 was classified as “mounded material” in the TEC report.

The aerial photographs showing the mounded material are consistent with previously investigated mounds on an undeveloped portion of the LPCSD property. These mounds were displaced native soils associated with construction of the SWDD. The previous investigation found no evidence of environmental impacts or contamination at these mounds (Site Inspection-Lewiston-Porter Central School District, USACE, 2011b).

8.2.3 Groundwater Pathway

The mounded material is believed to be displaced native soil from the construction of the SWDD. Evaluation of the groundwater pathway is unwarranted.

8.2.4 Surface Water Pathway

The mounded material is believed to be displaced native soil from the construction of the SWDD. Evaluation of the surface water pathway is unwarranted.

8.2.5 Soil Exposure and Air Pathway

The mounded material is believed to be displaced native soil from the construction of the SWDD. Evaluation of the soil exposure and air pathways is unwarranted.

8.2.6 Summary

Ground disturbance 1944-16 is a mound located adjacent to the southwest drainage ditch on the undeveloped portion of the former LOOW. The shape and location of this ground disturbance suggest that it is displaced native soil from the construction of the SWDD. Previous soil analytical data from similar ground disturbances on the undeveloped portion of the LPCSD property did not identify contamination. No further evaluation or environmental investigation is recommended.

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9.0 TEC GROUP B

Most of the anomalies in this parcel have been classified as SBCs, while some were classified as disturbed ground/ground scars, track/trail ground disturbances, or mounded material. Based on the information available regarding these different types of anomalies, it was previously determined that the SBC anomalies had the greatest potential to exhibit impacts from historic DoD activities because they had physical characteristics resembling open burn pits, and possible used possibly for the disposal of explosives and ordnance. The potential for hazards associated with the SBCs has been investigated, and no hazards were identified (USACE, 2004). Therefore, USACE has concluded that there is no evidence of DoD impacts to SBCs or this parcel.

9.1 State Parcel: 88.00-1-46.1

9.1.1 Operational History and Characteristics

Prior to 1942, Parcel 88.00-1-46.1 was comprised of nine tracts (i.e., A-10, A-11, A-12, A-25, A-26, A-70, A-71, A-72, and A-73). In 1942, tract numbers A-10, A-11, and A-12 were purchased outright and tract numbers A-72 and A-73 were taken outright by the U.S. War Department. In 1943, tract number A-71 was purchased outright, and tract numbers A-25 and A-26 were taken outright by the U.S. War Department. The parcel, approximately 371 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, the parcel remained undeveloped and there are no documented government activities that occurred on this parcel. It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners.

Most of the anomalies in this parcel have been classified as SBCs, while some were classified as disturbed ground/ground scars, track/trail ground disturbances, or mounded material. Based on the information available regarding these different types of anomalies, it was previously determined that the SBC anomalies had the greatest potential to exhibit impacts from historic DoD activities because they had physical characteristics resembling open burn pits, and possible used possibly for the disposal of explosives and ordnance. The potential for hazards associated with the SBCs has been investigated, and no hazards were identified (USACE, 2004). Therefore, USACE has concluded that there is no evidence of DoD impacts to SBCs or this parcel.

The GSA sold the parcel to a private landowner on an unknown date. The parcel is currently owned by the Fin, Feather, and Fur Conservation Society and is located between Swann Road and Ridge Road (New York State Route 104) within the town of Lewiston. The current land-use designation is industrial.

9.1.2 Visual Survey

On 23 April 2014, a visual survey of ground disturbances 1944-161, 1944-162, and 1944-177 was completed. Nearly half of the parcel is not occupied by a pond that is used for the water fowl habitat by the Fin, Feather, and Fur Conservation Society. No distressed vegetation or stained soils were observed within the disturbance areas. **Appendix A** includes the photographic record for the visual survey.

9.1.2.1 Ground Disturbance 1944-161

This ground disturbance was classified as “disturbed ground/scar” based on examination of 1944 aerial photographs (TEC, 2002). A small mound of rocks was identified at the location. A

seasonal pond was present immediately west of the rocks and a drainage channel was located to the east. There was no evidence of anthropogenic fill or contamination at this location.

9.1.2.2 Ground Disturbance 1944-162

This ground disturbance was classified as "tracks/trail" based on examination of 1944 aerial photographs (TEC, 2002 and AGC, 2009). Numerous tracks and trails were observed during the survey that appeared to be related to recent activities by the property owner. Construction and demolition (C&D) debris from recent site improvements was also present at the east end of the area. The piled and sorted C&D material consisted of approximately 20 cubic yards of timbers, and 15 cubic yards of piled concrete floor slab. The current property owner had removed the C&D material during recent upgrades to the main building walkways and parking area. Nearly half of the area is now occupied by a pond that is used for waterfowl habitat.

9.1.2.3 Ground Disturbance 1944-177

This ground disturbance was classified as "material/mounded material" based on examination of 1944 aerial photographs (TEC, 2002 and AGC, 2009). The survey did not reveal any evidence of the disturbance or a potential source of contamination.

9.1.3 Groundwater Pathway

No water wells are located on the parcel; the closest is located greater than 1.0-mile to the north.

There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

9.1.4 Surface Water Pathway

A pond and drainage ditch are present on the parcel. The pond is located within the footprint of ground disturbance 1944-162. The visual survey did not identify any distinguishing ground disturbances that represent the historical ground disturbance. A drainage ditch runs east to west in the southern portion of the parcel and connects to Four Mile Creek.

There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no surface water pathway of concern.

9.1.5 Soil Exposure and Air Pathways

The soils observed within the ground disturbance areas and the surrounding areas were consistent and indistinguishable from each other. There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no soil pathway of concern.

There are no structures located on or adjacent to the ground disturbance areas that would constitute a potential air pathway and there is no evidence of a contaminant release to the air.

9.1.6 Summary

Based on the operational history, characteristics, and observations associated with ground disturbances 1944-161, 1944-162, and 144-177, no further evaluation or environmental investigation is warranted.

9.2 State Parcel: 88.00-1-5

9.2.1 Operational History and Characteristics

In January 1943, Parcel 88.00-1-5, formerly tract number A-17, was purchased outright by the U.S. War Department. The parcel, approximately 36 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, this parcel remained undeveloped and there are no documented government activities that occurred on this parcel. It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in May 1946.

The parcel is located between Pletcher Road and Swann Road, contiguous with the north side of Swann Road within the town of Lewiston. The current land-use designation is industrial.

9.2.2 Visual Survey

A visual survey was not completed for ground disturbance 1944-137 because a ROE could not be obtained. This ground disturbance was classified as "material/mounded material" based on examination of 1944 aerial photographs (TEC, 2002). The TEC report indicates that many of the mounded material ground disturbances observed in the 1944 photographs may be associated with farming (the area was agricultural prior to the development of LOOW). Recent aerial photographs and backdrops for **Figures 3-1**, **3-2**, and **3-3** show that this area is used as an agricultural field. Due to the historical use as agricultural land, there is little likelihood that any mounded material is present after years of agricultural activities. Additionally, the presence of a healthy and unstressed crop is further evidence that the ground disturbance 1944-137 does not present a potential source of contamination.

9.2.3 Groundwater Pathway

The feature may be related to prior agricultural activity and may no longer be present. Evaluation of the groundwater pathway could not be performed.

9.2.4 Surface Water Pathway

The feature may be related to prior agricultural activity and may no longer be present. Evaluation of the surface water pathway could not be performed.

9.2.5 Soil Exposure and Air Pathways

The feature may be related to prior agricultural activity and may no longer be present. Evaluation of the soil exposure and air pathways could not be performed.

9.2.6 Summary

The mounded material observed in 1944 aerial photographs may be related to prior agricultural activity. The area is currently used as an agricultural field. No further evaluation or environmental investigation is warranted.

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10.0 TEC GROUP C

10.1 State Parcel: 74.00-1-3

10.1.1 Operational History and Characteristics

In April 1945, Parcel 74.00-1-3, formerly tract number A-57, was taken outright by the U.S. War Department. The parcel, approximately 30 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, the parcel remained undeveloped and there are no documented government activities that occurred on this parcel. It was declared excess in 1945 by the War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner in February 1946. This parcel was historically used for the Acome landfill between 1958 and 1960, and there is anecdotal evidence to suggest that the landfill may have accepted waste from the DoD facilities; although the landfill operated after the closing of the LOOW.

The parcel is located south of a 30-inch outfall line from a former LOOW WWTP. It is located in the town of Lewiston. The current land-use designation is industrial.

10.1.2 Visual Survey

On 24 April 2014, a visual survey of ground disturbance 1944-170 was completed. No improvements, structures (i.e., temporary or permanent), distressed vegetation, or stained soil were observed within the ground disturbance area. Vehicle tire tracks were observed. **Appendix A** includes the photographic record for the visual survey.

This ground disturbance was classified as "other" based on an examination of 1944 aerial photographs (TEC, 2002). The visual survey did not reveal evidence of contamination or a potential source of contamination.

10.1.3 Groundwater Pathway

No water wells are located on the parcel; the closest well is located approximately 1.0-mile to the north.

There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

10.1.4 Surface Water Pathway

No surface water bodies or drainage ditches are located within the parcel; however, the northern half of the parcel and ground disturbance 1944-170 are located within a New York State regulated wetland. Standing water was observed in the surrounding area during the visual survey.

There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no surface water pathway of concern.

10.1.5 Soil Exposure and Air Pathways

The soils observed within the ground disturbance area and the surrounding areas were consistent and indistinguishable from each other.

There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no soil exposure pathway of concern.

There are no structures located on or adjacent to the ground disturbance area that would constitute a potential air pathway and there is no indication of a release to the air.

10.1.6 Summary

Based on the operational history records, characteristics, and observations associated with ground disturbance 1944-170, no further evaluation or investigation is warranted.

11.0 TEC GROUP D

11.1 State Parcel: 60.00-2-17

11.1.1 Operational History and Characteristics

In July 1942, Parcel 60.00-2-17, formerly tract number B-165, was purchased outright by the U.S. War Department. The parcel, approximately 22 acres, was located within the former LOOW buffer zone and retained in case plant expansion was necessary. While under Government ownership, the parcel remained undeveloped and there are no documented government activities that occurred on this parcel. It was declared excess in 1945 by the U.S. War Department and transferred to the GSA for disposal to private landowners. The GSA sold the parcel to a private landowner on an unknown date. The ground disturbance identified on this parcel is classified as "material/mounded material" and identified in a 1944 aerial photo. It was further described as having a berm and vehicle tracks leading to and from it. The TEC report indicates that many of the mounded material ground disturbances observed in the 1944 photographs may be associated with farming (the area was agricultural prior to the development of LOOW). Due to the historical use as agricultural land, there is little likelihood that any mounded material is present after years of agricultural activities.

The parcel is located between Cain Road and Pletcher Road in the town of Porter. The current land-use designation is undeveloped/parks/recreation/wildlife.

11.1.2 Visual Survey

On 24 April 2014, a visual survey of ground disturbance 1944-180 was completed. No structures (i.e., temporary or permanent), distressed vegetation, or stained soil were observed within the ground disturbance area. A small mound of soil was observed that appeared to be displaced native soils associated with past agricultural or drainage improvement activities. **Appendix A** includes the photographic record for the visual survey.

This ground disturbance was classified as "material/mounded material" based on an examination of 1944 aerial photographs (TEC, 2002). The visual survey did not reveal a potential source of contamination.

11.1.3 Groundwater Pathway

No water wells are located on the parcel; the closest well is located less than 0.25-mile to the south.

There is no known release of any hazardous material to the groundwater. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no groundwater pathway of concern.

11.1.4 Surface Water Pathway

No surface water bodies or drainage ditches are located within the boundaries of the parcel. The southern half of the parcel and the ground disturbance are located within a New York State regulated wetland. Standing water was observed in the area during the survey.

There is no known release of any hazardous material to the surface water. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no surface water pathway of concern.

11.1.5 Soil Exposure and Air Pathways

There is no known release of any hazardous material to the soil. No obvious signs of distressed vegetation or soil contamination were observed. Therefore, there is no soil pathway of concern.

There are no structures located on or adjacent to the ground disturbance area that would constitute a potential air pathway and there is no indication of a release to the air.

11.1.6 Summary

Based on the operational history, characteristics, and observations associated with ground disturbance 1944-180, no further evaluation or environmental investigation is warranted.

12.0 SUMMARY AND CONCLUSIONS

12.1 Summary

The purpose of this SI was to evaluate previously identified ground disturbances and determine if potential environmental impacts may be present that are attributable to former DoD activities.

The following activities were performed:

- A preliminary assessment of ground disturbances identified from 1944 aerial photographs and selection of ground disturbances for walkover inspection,
- A walkover inspection of each location, and
- Evaluation of available information and preparation of the SI.

The SI was based on historical information and walkover inspections at accessible locations. ROEs were obtained for eight properties that enabled the inspection of 17 ground disturbances.

The ground disturbances were located in areas of the former LOOW that did not support TNT production (the buffer zone). Based on the results of the walkover inspection, evidence of the ground disturbances or past DoD activities was not identified at most locations. Historical data evaluated for the SI did not identify past DoD activities at six of the eight parcels that may have resulted in adverse environmental impacts. At parcels 88.00-1-4 and 74.00-1-4 evidence of past DoD activities were identified (1944-45, berm and 1944-46, trench). These disturbances are associated with a slurry pond that was used for settling solids from a raw water treatment process. Evidence of potential contamination was not observed at these areas.

ROEs were not obtained for Parcel 60.00-3-12, and the ground disturbance at this area (1944-16, mounded material) was not observed. The mounded material is located adjacent to the southwest drainage ditch and is believed to consist of displaced soils from construction of the ditch. Previous investigations of mounded material from areas adjacent to the ditch confirmed this assessment (USACE, 2011b). Analytical data from the previous investigations did not identify contamination within the mounds that would present a risk to the community. Based on this information, disturbance 1944-16 is not considered to be contaminated.

12.2 Conclusions

There is no evidence of potential source areas or releases of contamination to groundwater, surface water, or soil associated with any of the ground disturbances evaluated in this SI. Based on a review of the history of activities and waste handling, known contaminants, potential pathways of migration of the known contaminants and potential human and environmental receptors no further action is necessary for ground disturbances evaluated in this SI.

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Appendix A
Visual Survey Photographic Record

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Parcel Group:	**Tax Parcel ID:**
Support Facility Administration Offices	88.00-1-41
Feature:	**Property Owner:**
1944-47 (Mound Material)	National Grid
Notes:	**Date:**
view west; nothing observed	23 April 2014

Parcel Group:	**Tax Parcel ID:**
Support Facility Administration Offices	88.00-1-41
Feature:	**Property Owner:**
1944-121 (Disturbed Ground) & 1944-153 (Disturbed Ground/Scar)	National Grid
Notes:	**Date:**
view west from N Grid ROW; nothing observed	23 April 2014

Parcel Group:	**Tax Parcel ID:**
Support Facility Administration Offices	88.00-1-41
Feature:	**Property Owner:**
1944-138 (Disturbed Ground/Scar)	National Grid
Notes:	**Date:**
view south; nothing observed	23 April 2014

Parcel Group:	**Tax Parcel ID:**
Support Facility Slurry Pond	74.00-1-4
Feature:	**Property Owner:**
1944-45 (Berm)	Guardian Corporation
Notes:	**Date:**
view southeast of former sedimentation pond berm	24 April 2014

Parcel Group:	**Tax Parcel ID:**
Support Facility Slurry Pond	74.00-1-4
Feature:	**Property Owner:**
1944-45 (Berm)	Guardian Corporation
Notes:	**Date:**
view west of former sedimentation pond berm	24 April 2014

Parcel Group:	**Tax Parcel ID:**
Support Facility Slurry Pond	74.00-1-4
Feature:	**Property Owner:**
1944-46 (Trench)	Guardian Corporation
Notes:	**Date:**
view north from former sedimentation pond berm	24 April 2014

Parcel Group:	**Tax Parcel ID:**
Support Facility Slurry Pond	74.00-1-4
Feature:	**Property Owner:**
1944-163 (Other)	Guardian Corporation
Notes:	**Date:**
view south; nothing observed	24 April 2014

Parcel Group:	**Tax Parcel ID:**
Group R	60.00-3-6
Feature:	**Property Owner:**
1944-173 (Disturbed Ground)	National Grid
Notes:	**Date:**
view north; nothing observed	24 April 2014

Parcel Group:	**Tax Parcel ID:**
Group R	60.00-3-6
Feature:	**Property Owner:**
1944-173 (Disturbed Ground)	National Grid
Notes:	**Date:**
view of feature northwest corner; nothing observed	24 April 2014

Parcel Group:	**Tax Parcel ID:**
Group R	60.00-3-6
Feature:	**Property Owner:**
1944-174 (Pond)	National Grid
Notes:	**Date:**
view east; nothing observed	24 April 2014

Parcel Group:	**Tax Parcel ID:**
Group N	60.00-2-9
Feature:	**Property Owner:**
1944-192 (Other)	[redacted] Property
Notes:	**Date:**
view north; nothing observed	23 April 2014

Parcel Group:	**Tax Parcel ID:**
Group K	74.00-1-15.1
Feature:	**Property Owner:**
1944-147 (Other)	Modern Landfill Inc.
Notes:	**Date:**
view west from NE corner of mapped feature; nothing observed	6 May 2014

Parcel Group:	**Tax Parcel ID:**
Group K	74.00-1-15.1
Feature:	**Property Owner:**
1944-147 (Other)	Modern Landfill Inc.
Notes:	**Date:**
view south from NE corner of mapped feature; nothing observed	6 May 2014

Parcel Group:	**Tax Parcel ID:**
Group K	74.00-1-15.1
Feature:	**Property Owner:**
1944-147 (Other)	Modern Landfill Inc.
Notes:	**Date:**
view west from southern end of mapped feature (on gas pipeline ROW); nothing observed	6 May 2014

Parcel Group:	**Tax Parcel ID:**
Group K	74.00-1-15.1
Feature:	**Property Owner:**
1944-147 (Other)	Modern Landfill Inc.
Notes:	**Date:**
view north from southern end of mapped feature (on gas pipeline ROW); nothing observed	6 May 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group B	88.00-1-46.1
Feature:	**Property Owner:**
1944-161 (Disturbed Ground/Scar)	Three F Club
Notes:	**Date:**
small mound of rocks	23 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group B	88.00-1-46.1
Feature:	**Property Owner:**
1944-161 (Disturbed Ground/Scar)	Three F Club
Notes:	**Date:**
view west; ponded area	23 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group B	88.00-1-46.1
Feature:	**Property Owner:**
1944-161 (Disturbed Ground/Scar)	Three F Club
Notes:	**Date:**
view east, drainage channel	23 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group B	88.00-1-46.1
Feature:	**Property Owner:**
1944-162 (Tracks/Trail)	Three F Club
Notes:	**Date:**
view east; tracks are recent features on Three F Property	23 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group B	88.00-1-46.1
Feature:	**Property Owner:**
1944-162 (Tracks/Trail)	Three F Club
Notes:	**Date:**
view northeast (Three F Property) C&D debris from recent property improvement	23 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group B	88.00-1-46.1
Feature:	**Property Owner:**
1944-162 (Tracks/Trail)	Three F Club
Notes:	**Date:**
view northeast (Three F Property) C&D debris from recent property improvement	23 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group B	88.00-1-46.1
Feature:	**Property Owner:**
1944-177 (Material/Mounded Material)	Three F Club
Notes:	**Date:**
view north (on Three F Property); nothing observed	23 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group C	74.00-1-3
Feature:	**Property Owner:**
1944-170 (Other)	[redacted]
Notes:	**Date:**
view east; vehicle track scars on property	24 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group C	74.00-1-3
Feature:	**Property Owner:**
1944-170 (Other)	[redacted]
Notes:	**Date:**
view northeast; vehicle track scars on property	24 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group C	74.00-1-3
Feature:	**Property Owner:**
1944-170 (Other)	[redacted]
Notes:	**Date:**
view north; vehicle track scars on property	24 April 2014

Parcel Group:	**Tax Parcel ID:**
TEC Group D	60.00-2-17
Feature:	**Property Owner:**
1944-180 (Material/Mounded Material)	Guardian Corporation
Notes:	**Date:**
small mound of native soil; appears to be related to excavations for drainage	23 April 2014