United States Department of the Army

LAND USE CONTROL REMEDIAL DESIGN REPORT

New Brighton/Arden Hills Superfund Site

October 2020

Revision Tracking

Revision No.	Date	Comments
6	October 2020	Expanded to include descriptions of conditions and LUCs in place at OU1 and OU3. Documented the partial delisting of soil and surface water and sediment (not groundwater) at five aquatic sites located within OU2.
5	Mar 2018	Revised LUCs to allow recreational use on 108 acres in the western portion of OU2 to be used as part of the Rice Creek Regional Trail Corridor.
4	Aug 2016	Revised LUCs to eliminate soil LUCs from the “California-Shaped Area” (which is 380 acres of the 427 acres transferred/leased to Ramsey County in 2013), following soil cleanup to levels consistent with unlimited use / unrestricted exposure
3	Mar 2015	Revised LUCs for the remainder of the AHATS cantonment area and the Army Reserve Center to restricted commercial use; updated for the transfer/lease of 427 acres of U.S. Army / BRAC-controlled property to Ramsey County
2	June 2011	Revised LUCs for two portions of AHATS: 1) unrestricted use for watchable wildlife area; and 2) restricted commercial use for part of the cantonment area
1	Sept 2010	Final Document
0	Various	Various draft versions prior to approval

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ACRONYMS AND ABBREVIATIONS

AHATS	Arden Hills Army Training Site
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
EBS	environmental baseline survey
ESD	Explanation of Significant Difference
FFA	Federal Facility Agreement
LUC	land use control
LUCRD	Land Use Control Remedial Design
MDH	Minnesota Department of Health
MPCA	Minnesota Pollution Control Agency
NB/AH	New Brighton/Arden Hills
NBCGRS	New Brighton contaminated groundwater recovery system
NPL	National Priorities List
OU	operable unit
PGRS	plume groundwater recovery system
PTA	Primer/Tracer Area
RCRTC	Rice Creek Regional Trail Corridor
ROD	Record of Decision
TCAAP	Twin Cities Army Ammunition Plant
U.S. Army	United States Department of the Army
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

EXECUTIVE SUMMARY

This Land Use Control Remedial Design Report describes (LUCRD Report) the current land use controls (LUCs) for each of the three operable units (OUs) at the New Brighton/Arden Hills (NB/AH) Superfund Site in Ramsey County, Minnesota. Figure 1 shows the approximate locations of the OUs:

- OU1 encompasses offsite deep groundwater and is also referred to as the North Plume.
- OU2 includes soil, sediment, surface water, and groundwater contamination in the area that comprised the Twin Cities Army Ammunition Plant in 1983 when the NB/AH Superfund Site was placed on the National Priorities List. OU2 also includes the Site A groundwater plume that extends off the north end of the federally owned property.
- OU3 consists of offsite deep groundwater and is sometimes referred to as the South Plume.

This LUCRD Report was originally prepared in September 2010 to describe LUCs at OU2 and has been revised several times to document changes to those LUCs. This revision of the LUCRD Report has been expanded to describe current conditions and LUCs in place at OU1 and OU3 and also documents the most recent LUC changes following the final Notice of Partial Delisting issued by the U.S. Environmental Protection Agency (USEPA) for OU2 soil. USEPA, with the concurrence of the Minnesota Pollution Control Agency (MPCA) and the United States Department of the Army (U.S. Army), has concluded that all appropriate response actions for soil (shallow and deep) located within OU2 and for surface water and sediment at five aquatic sites located within OU2 (Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South, and Pond G) have been completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act. USEPA issued a final Notice of Partial Delisting from the National Priorities List (NPL) on September 23, 2019 and MPCA issued their concurrence on May 1, 2020. The remaining areas at the NB/AH Superfund Site, including OU1, OU3, groundwater in OU2, and a sixth aquatic site (Round Lake) located south west of OU2, will remain on the NPL.

As documented in various decision documents for OU1, OU2 and OU3, LUCs are required as part of the remedies for soil (OU2) and groundwater (OU1, OU2, and OU3). LUCs are needed because the current concentrations of various contaminants of concern are above levels that allow for unlimited use or unrestricted exposure. For groundwater in OU1, OU2, and OU3, the cleanup levels are based primarily on the potential for human exposure through consumption. In certain cases, the cleanup levels also consider the potential for groundwater to discharge to surface water bodies and cause effects for aquatic organisms. The groundwater cleanup levels are based on published rules or guidance values developed by the Minnesota Department of Health (MDH) or USEPA.

In contrast, most of the soil cleanup levels for areas in OU2 with soil LUCs were derived specifically for individual areas within OU2, because the MPCA did not have published rules or guidance values for soil when the remedies were finalized. The cleanup levels derived for the individual areas within OU2 assumed an adult-age person, onsite 250 days per year, with relatively little contact with bare soil. These assumptions were considered representative of an industrial worker or occupant. The industrial use category is appropriate for OU2 soil LUCs as other land use categories (residential use, recreational use, commercial use) do not fit well with historical or current property use.

Currently, there are blanket LUCs issued for groundwater in OU1, OU2, and OU3, as follows:

- A blanket LUC restricting well installation has been implemented that requires approval prior to installing any well that withdraws water from a contaminated aquifer, so as to prevent unacceptable human exposure and prevent interference with the hydraulic performance of the groundwater remedies. Wells must first be approved by the U.S. Army, MDH, MPCA, USEPA. Wells or other devices that do not withdraw water (e.g., geothermal heat exchangers) are not restricted.
- A blanket LUC restricting activities that would interfere with or disrupt the effectiveness of the infrastructure needed for the groundwater remedies has been implemented. Such infrastructure includes, but is not limited to monitoring wells, extraction wells, treatment equipment, and water conveyances. For example, existing monitoring wells used for long-term monitoring activities conducted as part of remedy implementation should not be removed or damaged.

Currently, there are blanket LUCs issued for soil in OU2, as follows:

- A blanket LUC has been implemented for soil that restricts uses to those that involve being on the property less than 250 days per year. Land use activities that are considered compatible with these exposure assumptions include, but are not limited to: indoor and outdoor military training, vehicle/equipment maintenance and storage, natural resource management, utility services, raw storage facilities, refined material storage facility, and manufacturing facilities engaged in the mechanical or chemical transformation of materials or substances into new products. Users under the age of 18 are allowed limited use including hunting, wildlife, and some excursions.
- For individual areas that have a soil cover as part of the remedy, a blanket LUC has been implemented to restrict activities that would disrupt the effectiveness of the cover. Activities that would penetrate through the cover (e.g., utility work) must be first approved by the U.S. Army, MPCA, and USEPA. Signage has been placed to identify the soil cover LUC areas.

The blanket soil LUCs does not apply to the portions of OU2 transferred to Ramsey County, Site F, and the “watchable wildlife area,” which met unrestricted residential release criteria and therefore no soil LUCs are required.

The U.S. Army completes annual inspections and reporting to verify and document the effectiveness of LUCs. This annual inspection is included in the Annual Performance Report. It is anticipated that there will be changes in conditions over time; for example, additional property transfers or eventual completion of groundwater cleanup. This document sets forth a framework for modifying or terminating LUCs as future conditions warrant.

1 OVERVIEW

This Land Use Control Remedial Design (LUCRD) Report describes the current land use controls (LUCs) for the three operable units (OUs) at the New Brighton/Arden Hills (NB/AH) Superfund Site in Ramsey County, Minnesota. Figure 1 shows the approximate locations of the three OUs.

The original LUCRD Report was prepared in September 2010 to document the LUCs that applied to the former TCAAP property (OU2). This LUCRD Report has been revised, as necessary, to document changes in LUCs for OU2. This revision of the LUCRD Report has been expanded to describe current conditions and LUCs in place at OU1 and OU3 and also documents the most recent LUC changes at OU2 following the final Notice of Partial Delisting for OU2 issued by the U.S. Environmental Protection Agency (USEPA). USEPA, with the concurrence of the Minnesota Pollution Control Agency (MPCA) and the United States Department of the Army (U.S. Army). The delisting concluded that appropriate response actions for soil (shallow and deep) within OU2 and surface water and sediment at five aquatic sites located within OU2 (Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South, and Pond G) have been completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). USEPA issued the final Notice of Partial Delisting from the National Priorities List (NPL) on September 23, 2019 and MPCA issued its concurrence on May 1, 2020. The remaining areas at the NB/AH Superfund Site, including OU1, OU3, groundwater in OU2, and a sixth aquatic site (Round Lake) located south west of OU2, will remain on the NPL.

This LUCRD Report describes the soil (OU2) and groundwater (OU1, OU2, and OU3) LUCs that serve as part of the selected remedies at the NB/AH Superfund Site and outlines a process for implementing and maintaining those LUCs. Specifically, this LUCRD Report:

- Describes the NB/AH Superfund Site and regulatory history of the OUs (remainder of Section 1)
- Summarizes the areas of concern (Section 2; Appendix A)
- Discusses the exposure assumptions associated with land uses (Section 3)
- Identifies LUC performance objectives (Section 4.1) and the LUCs that have been implemented (Section 4.2)
- Establishes procedures for monitoring and reporting (Section 5), modification and termination of LUCs (Section 6), and LUC enforcement (Section 7).

It is anticipated that conditions will change over time (such as additional property transfers or eventual completion of groundwater cleanup); therefore, this LUCRD Report will be updated, as needed, to incorporate changes related to LUCs for the NB/AH Superfund Site. Supplemental information and supporting documentation for revisions made to this LUCRD Report to date are documented in Appendices B through F.

1.1 Site Description

The Twin Cities Army Ammunition Plant (TCAAP), which was placed on the NPL as the NB/AH Superfund Site in 1983, was constructed between August 1941 and January 1943 in the northern portion of the

Minneapolis (St. Paul metropolitan area) in Ramsey County and is surrounded by the cities of New Brighton, Arden Hills, Mounds View, and Shoreview, Minnesota. The TCAAP primarily produced and proof-tested, small-caliber ammunition and related materials for the U.S. Army. Other uses included manufacture of munitions-related components, handling/storage of strategic and critical materials for other government agencies, and various non-military activities. Production began in 1942, and operations alternated between periods of activity and standby related to wars until manufacturing ceased in 2005. During active periods, solvents were used as part of some manufacturing operations. Disposal of solvents and other wastes resulted in soil and groundwater contamination that migrated beyond the original TCAAP boundary.

Groundwater impacts were first discovered in July 1981, leading to soil and groundwater investigations onsite and offsite. In 1983, when it was determined the source of impacts and groundwater contamination were from the TCAAP, the NB/AH Superfund Site was placed on the NPL. The U.S. Army is directing CERCLA response actions at the NB/AH Superfund Site to remediate contamination that could pose a threat to human health or the environment. Work is being conducted with regulatory oversight by the USEPA and the MPCA under a Federal Facility Agreement (FFA) signed in 1987. As part of CERCLA work, the NB/AH Superfund Site was divided into three designated OUs (Figure 1):

- OU1 encompasses offsite deep groundwater and is also referred to as the North Plume.
- OU2 includes soil, sediment, surface water, and groundwater contamination in the area that comprised the TCAAP in 1983 when the NB/AH Superfund Site was placed on the NPL. OU2 also includes the Site A groundwater plume that extends off the north end of the federally owned property.
- OU3 consists of offsite deep groundwater and is sometimes referred to as the South Plume.

Since 1983, the size of the federal portion of TCAAP has periodically decreased due to property transfers. Some property within OU2 has been transferred out of federal ownership to Ramsey County and the City of Arden Hills. Other property is still owned by the federal government, but control has been reassigned to the U.S. Army Reserve or the National Guard Bureau, which has licensed property to the Minnesota Army National Guard (Figure 2).

1.2 Regulatory History

As described in Section 1.1, groundwater impacts were discovered in July 1981, followed by multiple rounds of site investigation and evaluation under the oversight of USEPA and MPCA. Remedies to address contamination that could pose a threat to human health or the environment are described in the Records of Decision (RODs) that have been signed for each OU:

- OU1 ROD signed in 1993; amended in 2006
- OU2 ROD signed in 1997; amended in 2007, 2009, 2012, and 2014
- OU3 ROD signed in 1992; amended in 2006.

The RODs, and subsequent amendments and Explanations of Significant Differences (ESDs), present the major components of the final remedies, including LUCs, for the media of concern. The RODs for each OU are described in the subsections below.

1.2.1 Operable Unit 1

In 1993, the U.S. Army, USEPA, and MPCA signed the ROD for OU1 that identified the remedy for impacted groundwater (USEPA 1993). The 1993 OU1 ROD was amended in 2006 (USEPA 2006a) to formalize the adoption of groundwater quality statistical analysis. The current deep groundwater remedial action, as describe in the ROD, is accomplished by the New Brighton contaminated groundwater recovery system (NBCGRS). The NBCGRS includes extracting contaminated groundwater from the North Plume using six municipal wells and conveying it to New Brighton's water treatment plant, where is it treated. Following treatment, the water is discharged to the New Brighton municipal distribution system. The remedy also includes restricting installation of new private wells and monitoring groundwater to verify effectiveness of the remedy.

In early 2015, the City of New Brighton was notified by the Minnesota Department of Health (MDH) that 1,4-dioxane had been detected in New Brighton's water supply. A 'remedy time-out' was placed and operation of the NBCGRS stopped on April 15, 2015. The City of New Brighton initially switched to draw groundwater from non-impacted deeper aquifer wells while evaluating removal technologies and later connected to the City of Minneapolis water distribution system until a 1,4-dioxane remedy had been added to the NBCGRS. In 2017, the City of New Brighton and the U.S. Army selected a new treatment technology for removing 1,4-dioxane from NBCGRS effluent. Upgrades to the New Brighton water treatment plant were completed and implemented in November 2018 and pumping from the six municipal wells that comprise the NBCGRS was restarted with additional treatment to address 1,4-dioxane.

1.2.2 Operable Unit 2

In 1997, the U.S. Army, USEPA, and MPCA signed the ROD for OU2 that identified remedies for contamination in soil and groundwater at various areas within OU2 (USEPA 1997). Since 1997, the U.S. Army has modified the 1997 OU2 ROD several times to amend the selected remedies at certain areas within OU2. A primary focus of these amendments was to add the use of long-term LUCs to the soil, sediment, or groundwater remedies.

In 2007, ROD Amendment #1 for OU2 (USEPA 2007) was signed and issued by the U.S. Army, USEPA, and MPCA. This amendment modified the remedy for shallow soils at Site C-2 and added remedies for shallow groundwater, surface water, and sediment, which were found during initial remedial-related investigations to also be contaminated. As part of ROD Amendment #1 for OU2, LUCs were added to Site C-2 soil, sediment, and groundwater remedies.

In 2009, two ESDs and two ROD amendments were signed and issued by the U.S. Army, USEPA, and MPCA, as described below:

- ROD Amendment #2 for OU2: Site I Groundwater (USEPA 2009a) modified certain elements of the Site I shallow groundwater remedy, including removing the extraction and discharge element, which had proven infeasible due to site geologic conditions. ROD Amendment #2 for OU2 also added the use of LUCs for Site I groundwater and to prevent human exposure to contaminated soils remaining beneath the former Building 502 (Ramsey County has since completed remediation of these soils to cleanup levels that allow for unlimited use and unrestricted exposure for soils).

- ROD Amendment #3 for OU2 (USEPA 2009b) modified the remedy for five OU2 areas containing soil contamination (Sites D, E, G, H, and 129-15), which were included in the original 1997 ROD (USEPA 1997). ROD Amendment #3 for OU2 also provided final remedies for five OU2 areas with soil contamination (the Grenade Range, Outdoor Firing Range, 135 Primer/Tracer Area (PTA) Stormwater Ditch, Trap Range, and Water Tower Area) that were not part of the original 1997 ROD. At these areas, either previous removal actions had been completed that reduced soil contamination to below cleanup levels, or subsequent investigations had determined that no action or no further action was needed. As part of ROD Amendment #3 for OU2, LUCs were selected as part of the final remedy for two of these areas (the Grenade Range and Outdoor Firing Range).
- ESD #1 for OU2, Changes for Groundwater Sites (USEPA 2009c) added the use of LUCs to the remedies for the Sites A and K shallow groundwater plumes and the deep groundwater remedy and to prevent human exposure to contaminated soils remaining beneath the slab of former Building 103 (Ramsey County has since completed remediation of these soils to cleanup levels that allow for unlimited use and unrestricted exposure for soils).
- ESD #2 for OU2, Changes for Soil Sites (USEPA 2009d) added the use of long-term LUCs to the remedies for soil at Sites A, C-1, 129-3, and 129-5.

In 2012, ROD Amendment #4 for OU2 (USEPA 2012) was signed and issued by the U.S. Army, USEPA, and MPCA. This amendment documented that the use of LUCs for Building 102 groundwater was part of the final selected remedy.

In 2014, ROD Amendment #5 for OU2 (USEPA 2014) was signed and issued by the U.S. Army, USEPA, and MPCA. This amendment documented that the use of soil LUCs was part of the final selected remedy at the soil areas of concern at Site A, the 135 PTA, and the Minnesota Army National Guard environmental baseline survey (EBS) areas (these areas were originally addressed as soil removal actions in 2013).

In 2017, ROD Amendment #6 for OU2 (USEPA 2017) was signed and issued by the U.S. Army, USEPA, and MPCA. This amended documented that monitored natural attenuation would be used for Site A shallow groundwater in lieu of two remedy components specified in the 1997 ROD: groundwater containment and mass removal and discharge of extracted groundwater to a publicly-owned treatment works.

As noted in Section 1, the USEPA issued a final Notice of Partial Delisting from the NPL on September 23, 2019 for soil (shallow and deep) located within OU2 and for surface water and sediment (not groundwater) at five aquatic sites located within OU2 (Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South, and Pond G). MPCA issued its concurrence with the partial delisting on May 1, 2020.

1.2.3 Operable Unit 3

The OU3 ROD, signed September 1992 (USEPA 1992), prescribed four major remedy components, including the extraction and treatment of groundwater for the removal of volatile organic compounds (VOCs) through a treatment system called the plume groundwater recovery system (PGRS). A ROD amendment for OU3 was finalized in August 2006 that changed the remedy for OU3 (USEPA 2006b). The basis for the ROD amendment for OU3 was a statistical evaluation showing the South Plume had

been receding since at least 1996, including a period after 2001 when the PGRS was shut down. The South Plume had receded upstream of the PGRS such that it was basically pumping clean water. The amendment removed the need for a pump and treat remedy, eliminating the PGRS extraction well and treatment train. The ROD Amendment for OU3 prescribes the following components for the selected remedy:

- Monitored natural attenuation
- Monitoring groundwater to verify the effectiveness of the selected remedy and the natural attenuation of the South Plume
- Continued implementation of the drilling advisory that regulates the installation of new private wells within OU3.

2 AREAS OF CONCERN

This section provides an overview for the areas of concern at the NB/AH Superfund Site that require LUCs. More information on the history of remedial actions in these areas is provided in Appendix A.

2.1 Operable Unit 1

OU1 consists of the North Plume of VOC groundwater contamination (Figure 1). OU1 is off-site of the former TCAAP property and therefore no soil LUCs apply. As described in Section 1.2, the current remedy for OU1 consists of pumping from municipal wells in both the Prairie du Chien and Jordan aquifers, treating the extracted groundwater, and discharging the treated water to the New Brighton water supply system for distribution as potable water.

2.2 Operable Unit 2

Consistent with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan, the studies and investigations performed for OU2 focused on locations most likely to have had a release of hazardous substances to the environment and led to identifying a number of known or suspected areas for waste disposal and/or a release to the environment. These areas became the focus of remedial investigation type work and were designated as "sites." Development of cleanup levels and selection of remedial actions were then undertaken for each area, including determining the need for LUCs. The areas of concern in OU2 with LUCs are summarized in Table 1, below, and general locations are shown on Figure 3. More information on these areas and investigation and remedial activities are provided in Appendix A.

Table 1 – OU2 Areas of Concern

Area of Concern	Description
Site A	Site A is located near the northern boundary of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Site C	Site C is located immediately east of Mounds View Road within the central portion of OU2. Site C has been transferred to Ramsey County as part of the 108-acre portion of the Rice Creek Regional Trail Corridor (RCRTC)
Site D	Site D is located in the central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Site E	Site E is located in the central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Site G	Site G is located in the central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

Area of Concern	Description
Site H	Site H is located near the southeastern corner of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Site I	Site I is located near the south-central portion of OU2 on property owned by Ramsey County.
Site K	Site K is located near the western portion of OU2 on property owned by Ramsey County.
Site 129-3	Site 129-3 is located in the central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Site 129-5	Site 129-5 is located in the central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Site 129-15	Site 129-15 is located in the central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Grenade Range	The Grenade Range is located in the northeast portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Outdoor Firing Range	The Outdoor Firing Range is located in the southeast portion of OU2 on property owned by the federal government and controlled by the U.S. Army. Most of the firing range is on property where the control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard. A small portion of the firing range (the southeastern-most corner where the firing structure was located) is on property where the control has been delegated to the U.S. Army Reserve.
135-PTA	135 PTA is located immediately east of Mounds View Road in the north-central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the Base Realignment and Closure (BRAC) Division. The 108-acre portion of the RCRTC includes Parcel B comprising the westernmost portion of the 135-PTA, which has been transferred to Ramsey County for recreational use.
535-PTA	535 PTA is located in the south-central portion of OU2 on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Building 102	Former Building 102 is located near the west-central portion of OU2. The contaminated groundwater plume originating from the northwest corner of the former Building 102 is located on property owned by Ramsey County.
Units 3 and 4 Deep Groundwater	Activities at Sites D, G, and I resulted in contamination of the Hillside Sand/Prairie du Chien/Jordan aquifer beneath the southwest portion of OU2. The Hillside Sand is known as Unit 3, while the combined Prairie du Chien/Jordan are regarded as Unit 4. Because the groundwater contamination from the three sites co-mingles, it has been addressed collectively, together known as the Units 3 and 4 Deep Groundwater. The groundwater contamination in Units 3 and 4 Deep Groundwater affects not only OU2, but also has migrated beyond the original TCAAP boundary and is being addressed through OU1 and OU3.

Area of Concern	Description
EBS Areas on Arden Hills Army Training Site (AHATS)	Two soil areas of concern referred to as the Minnesota Army National Guard EBS Areas are located west of Snelling Avenue in the south-central portion of OU2. The EBS Areas are on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.
Ramsey County Property	The 108-acre portion of the RCRTC is located in the western portion of OU2 (Figure 3). It includes four parcels: • Parcel A – contains Site C and the area immediately surrounding it. Parcel A also contained the 120-Series Magazine Area, a collection of small buildings formerly used to store containerized explosives and self-contained explosive items. Explosive residue was removed in 1998. Ramsey County demolished all existing structures in 2016. • Parcel B - includes the westernmost end of the former 135-PTA. The larger 135-PTA was used for the manufacture of primers and tracers, which are the ignition components of ballistic rifle ammunition. The portion of 135-PTA that comprises Parcel B was not intensively used for production; most of the former buildings on Parcel B were used for storage of raw and finished materials. • Parcel C – located north of the 135-PTA, was once occupied by the western end of a long narrow building, which served as an indoor firing range. • Parcel D - is an approximately 150-foot-wide strip that borders the north and east side of the 380-acre California-shaped area. Ramsey County has acquired Parcels A, B, and D from the federal government. Parcel C will remain with the federal government, but Ramsey County will be granted a perpetual easement to allow use of the parcel for the trail corridor.

2.3 Operable Unit 3

OU3 contains the South Plume of VOC groundwater contamination (Figure 1). As described in Section 1.2, the remedy for OU3 includes monitoring natural attenuation. The sampling data for OU3 continue to show stable to declining VOC concentration trends at the center and edge of the South Plume.

3 RISK ASSESSMENTS AND CLEANUP LEVELS

This section describes the risk assessments performed and development of cleanup levels, including the assumptions made concerning land use and exposure scenarios.

3.1 Ecological Risk Assessment

The U.S. Army conducted an ecological risk assessment for terrestrial habitats at the TCAAP in 1991 (U.S. Army Environmental Hygiene Agency 1991). This ecological risk assessment addressed risks to plants and animals and concluded that no significant risks exist at the TCAAP.

3.2 Human Health Risk Assessment and Cleanup Levels

A human health risk assessment was performed for the NB/AH Superfund Site by the USEPA in 1991 (PRC Environmental Management, Inc. 1991). The risk assessment evaluated potential health risks associated with contaminated groundwater both on and off the original TCAAP (OU1, OU2, and OU3) and contaminated soil within OU2. The risk assessment evaluated the pathways by which people could be exposed to the contaminants.

During the mid-1990s, cleanup levels were developed for groundwater and soil through the feasibility study process. The cleanup levels were documented in the ROD for each OU and the subsequent amendments and ESDs.

For groundwater in OU1, OU2, and OU3, the cleanup levels are based primarily on the potential for human exposure through consumption. In certain cases, the cleanup levels also consider the potential for groundwater to discharge to surface water bodies and cause effects for aquatic organisms. The groundwater cleanup levels are based on published rules or guidance values developed by the MDH or USEPA.

In contrast, most of the soil cleanup levels were derived for the individual areas within OU2. The soil cleanup levels are based on both the potential for direct exposure to humans (through ingestion, inhalation, and dermal absorption) and indirect exposure through leaching to groundwater and subsequent consumption.

It is common to speak in terms of categories for different land uses when referring to soil cleanup levels, such as residential use, recreational use, commercial use, and industrial use. The categories are intended to convey a general sense of the type of activity that is permissible for the associated cleanup levels. However, the categories can be somewhat ambiguous or leave room for subjectivity in interpretation. As an example, recreation can include a range of uses from open space (vegetated, with very little human contact with soil) to playgrounds (bare soil, with considerable human contact with soil).

The TCAAPs mission included the following land uses:

- Industrial manufacturing or management of industrial waste
- Indoor or outdoor training of soldiers and associated vehicle/equipment maintenance and storage
- Tracts of open space – these were buffer areas or unused areas.

In OU2, the preliminary assessment and remedial investigation/feasibility study process focused on the areas with the highest probability of having a past release of hazardous substances to the environment. The primary focus was on areas used for management and/or disposal of wastes from the manufacturing operations. Thus, when the soil cleanup levels were approved for these areas in 1997, the industrial use category was applied. The following assumptions relative to receptors and exposure are applicable to the cleanup levels for the industrial use category:

- People who might be at risk from exposure to contaminated soil at one of the individual areas include workers or occupants. A worker or occupant is assumed to be present daily with an average exposure frequency of 250 days per year for 25 years. Incidental ingestion and dermal contact were considered the only significant pathway for receptors to be exposed to contaminants in surface soils. If future activities require excavation, workers may be exposed to contaminants by inhalation, as well as through incidental ingestion and dermal contact.
- People who might be at risk from exposure to contaminated groundwater include workers or occupants within OU2 whose potable water supply is provided by a well impacted by contamination. Presently, there are no water supply wells within OU2. The potential pathways by which these receptors might be exposed include ingestion, inhalation during showering, and absorption through the skin (dermal contact) during showering or bathing with contaminated groundwater.

The risk assessment also involved calculating the potential increase in the risk of cancer and the potential risk of non-cancer effects, such as liver damage and reproductive abnormalities. The cancer risk evaluation was based on the exposure assumption that an individual would be exposed to contaminated soils via dermal contact and ingestion or would either use untreated, contaminated groundwater for an exposure period of an average lifetime over an exposure period of 25 years. The calculation of soil cleanup levels was based on a worker (an adult receptor with a body weight of 70 kilograms), ingesting soil (50 milligrams per day occurring 250 days per year). A chemical was identified as a contaminant of concern (COC) when the increased cancer risk reached one in one million. For a non-cancer risk, a chemical was identified as a COC when the hazard index was greater than 1.

The industrial use category was applied when developing the soil cleanup levels for the individual waste management and/or disposal areas in OU2, and the key assumption was that the property would remain industrial (not residential). Industrial standards are not applicable to areas designated for residential or recreational use; therefore, appropriate cleanup levels for residential or recreational use were developed. The only properties in OU2 that had cleanup levels developed for residential or recreational use are:

- The approximately 380 of the 427 acres included in the 2013/2017 property transfers to Ramsey County (referred to as the “California-shaped area”). In this case, cleanup levels were developed for the soils across the entire 380 acres and, thus, included both the soils within and between the individual sites, such as Site I, Site K, and Building 102. The selected cleanup levels allow for unlimited use and unrestricted exposure with respect to soils in this area. Therefore, as a result of the additional soil investigation and remediation completed by Ramsey County to reach these cleanup levels, and as approved by the MPCA and USEPA, soil LUCs were deemed no longer necessary in 2017 (LUCRD Report, Revision 4) for these 380 acres.
- The approximately 108 acres of OU2 transferred to Ramsey County for the RCRTC. Cleanup levels were developed for the soils across the entire 108 acres and, thus, included both the soils within and

between the individual sites, such as Site C and the westernmost end of the 135-PTA. The selected cleanup levels allow for recreational use, which is here defined as public use of property by people of all ages for recreational activities. Therefore, as a result of additional soil investigation and remediation completed by Ramsey County to reach these cleanup levels, and as approved by the MPCA and USEPA, soil LUCs on the 108 acres have been changed to allow recreational use.

3.3 Summary of Site Risks Necessitating Land Use Controls

Based on the past assumptions used to develop the cleanup levels for groundwater and soil and the past presumptions regarding the land area outside the individual areas of concern, following is a summary of the conditions necessitating the need for LUCs at the NB/AH Superfund Site.

3.3.1 Soil

At the following OU2 sites (soil remediation was not conducted in OU1 or OU3), soils were remediated to an industrial cleanup level:

- At Sites A, C, D, E, H, 129-3, 129-5, Grenade Range, Outdoor Firing Range, the 135 PTA, the 535 PTA, and the Minnesota Army National Guard EBS Areas soil was excavated to achieve an industrial cleanup level.
- Soil was treated with soil vapor extraction at Sites A, D, and G to achieve an industrial cleanup level.

Because these areas were not remediated to levels that allow unlimited use or unrestricted exposure, soil LUCs are required.

In areas where some contamination remains in place at concentrations greater than the site-specific cleanup levels, soil covers were constructed to reduce the exposure potential to residual contamination in soil. Soil caps are present at the following sites:

- Sites C, D, E, G, H, 129-15, and the Outdoor Firing Range.

Residual soil contamination underlying the covers at these areas includes one or more of the following: metals, asbestos-containing material, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and/or VOCs. Because these remedies rely upon a cover, there is a need for LUCs for the soil covers.

As the NB/AH Superfund Site progressed through the BRAC process and property within OU2 was released to other entities, some revisions were made to LUC requirements as described below:

- Area in the western portion of OU2 began transfer to Ramsey County in 2013 and has been remediated to unrestricted use/unlimited exposure levels for soil to allow recreational use
- Site F was remediated to unrestricted use levels for soil
- An area known as the Watchable Wildlife Area was cleared for unrestricted use for soil.

In addition, with this revision (Revision 6) of the LUCRD Report, the cantonment area within the AHATS and the Army Reserve Center is considered an industrial scenario. Under this scenario, users under the age of 18 are allowed limited use, including hunting and some excursions.

It is likely that other portions of the remaining land within OU2 that currently have soil LUCs are also suitable for less restrictive uses (and exposure assumptions), including unlimited use or unrestricted exposure. The U.S. Army (or the U.S. Army in conjunction with any future property owner following any future property transfers from the U.S. Army) has the option to demonstrate to the USEPA and MPCA that less restrictive uses are acceptable. In the absence of such agreements, it is assumed that all federally owned property (with the exceptions noted above) need a soil LUC to restrict activities to those consistent with the exposure assumptions used to develop the cleanup levels for the individual areas (see Figure 4).

3.3.2 Groundwater

Shallow groundwater and/or deep groundwater remedial actions have been implemented at OU1, OU2 (Sites A, C, D, G, I, K, Building 102, and the Units 3 and 4 Deep Groundwater), and OU3. The objectives of the remedial actions at these areas are to reduce the concentrations of contaminants to below the cleanup levels that are based on human consumption and use. Concentrations of COCs are greater than the cleanup levels; therefore, there is a need for groundwater LUCs restricting well installation.

Although not directly related to potential human exposure or risk, it is also important that the groundwater infrastructure (monitoring wells, extraction wells, etc.) and hydraulic conditions are not disturbed in a manner that would disrupt the effectiveness of the groundwater remedies. Thus, there is a need for LUCs for groundwater infrastructure/ hydraulic conditions.

4 LAND USE CONTROLS

This section defines the remedial performance objectives for the LUCs and describes the LUCs that have been implemented at NB/AH Superfund Site to meet the performance objectives.

4.1 LUC Performance Objectives

The decision documents for OU2 include implementation and maintenance of LUCs to achieve remedial performance objectives. These performance objectives include:

- **Prevent uses of contaminated groundwater**. For the purposes of this LUCRD Report, contaminated groundwater is defined as groundwater with contaminant concentrations above the respective cleanup levels set forth in the decision document for each individual area of concern. As defined for this LUCRD Report, contaminated groundwater poses an unacceptable risk for human consumption. Other uses (e.g., construction dewatering) are to be evaluated on a case-by-case basis with approval required by the U.S. Army, MDH, MPCA, and USEPA.
- **Prevent activities that would reduce the effectiveness of groundwater remedial actions** set forth in decision documents and subsequent design or monitoring plans for each individual area. An example is an activity that could damage extraction or monitoring wells, treatment systems, or a water conveyance system. Another example is an activity that could alter the hydraulic performance of a groundwater remedial action through infiltration or withdrawal of water.
- **Prevent exposure to contaminated soil at levels that pose an unacceptable risk to human health**. Contaminated soil is defined as soil with contaminant concentrations above levels that would allow unlimited use or unrestricted exposure or residential use.
- **Prevent disturbance of soil covers.** Disturbing the cover would result in exposure to the underlying contaminated soil of sufficient magnitude as to pose an unacceptable risk to human health. The OU2 decision documents allowed certain portions of sites to leave contamination in-place at concentrations above the cleanup levels. The decision documents prescribe the construction of soil covers to serve as a barrier for prevention of human exposure to the underlying contaminated soil. At Site G only, the cover was also designed and constructed to minimize infiltration, because the cleanup level for TCE is based on the potential for leaching to groundwater. The land area on top of a cover can have unlimited use as long as the use does not result in exposure to the underlying contaminated soil. Any uses that penetrate the cover (e.g., utility work) will be evaluated and approved by the U.S. Army, USEPA, and MPCA prior to commencing the use.

4.2 Description of Implemented LUCs

To address the performance objectives listed in Section 4.1, blanket LUCs for soil and/or groundwater were developed. These blanket LUCs apply to large portions the NB/AH Superfund Site. Several areas within OU2 were remediated to residential levels and are exempt from the blanket soil LUCs described below. These include portions of OU2 released to Ramsey County, Site F, and the Watchable Wildlife Area.

Prevent uses of contaminated groundwater.

To prevent contaminated groundwater from being used a blanket LUC restricting well installation was implemented. This LUC requires approval prior to installing any well that withdraws water from a contaminated aquifer, to prevent unacceptable human exposure and prevent interference with the hydraulic performance of the groundwater remedies. Wells must first be approved by the U.S., Army, MDH, MPCA, and USEPA. Wells or other devices that do not withdraw water (e.g., geothermal heat exchangers) are not restricted. [*Note: The MDH has permitting authority for wells in Minnesota, and has authority for determining if the intended use of the well is safe for humans. Thus, the MDH is primarily concerned about water supply wells that are intended for human consumption, and their location relative to the portion of the aquifer with contaminant concentrations above the cleanup levels. As a resource, refer to the most current Annual Performance Report for the areal and vertical extent of contamination in groundwater. The MDH also has authority to determine if other well types and uses are safe for humans (e.g., construction dewatering wells). With the MDH having the lead authority for regulating safe uses of groundwater, the approval/disapproval role of the MPCA and USEPA is primarily to ensure that proposed wells will not reduce the effectiveness of the groundwater remedy through hydraulic interference*.]

Prevent activities that would reduce the effectiveness of groundwater remedial actions.

To address this performance objective, a blanket LUC restricting activities that would interfere with or disrupt the effectiveness of the infrastructure needed for the groundwater remedies has been implemented. Such infrastructure includes, but is not limited to monitoring wells, extraction wells, treatment equipment, and water conveyances. For example, existing monitoring wells used for long-term monitoring activities conducted as part of remedy implementation should not be removed or damaged.

Prevent exposure to contaminated soil at levels that pose an unacceptable risk to human health.

A blanket LUC has been implemented for soil that restricts uses to those that involve being on the property less than 250 days per year. Land use activities that are considered compatible with these exposure assumptions include, but are not limited to: indoor and outdoor military training, vehicle/equipment maintenance and storage, natural resource management, utility services, raw storage facilities, refined material storage facility, and manufacturing facilities engaged in the mechanical or chemical transformation of materials or substances into new products. Users under the age of 18 are allowed limited use including hunting, wildlife observation, and some excursions.

Prevent disturbance of soil covers.

For individual areas that have a soil cover as part of the remedy, a blanket LUC has been implemented to restrict activities that would disturb the cover. Activities that would penetrate through the cover (e.g., utility work) must be first approved by the U.S. Army, MPCA, and USEPA. Signage has been placed to identify the soil cover LUC areas (see Appendix G for soil cover sign details).

LUCs are summarized in Table 2, below, for the areas of concern. The locations of soil LUCs are shown on Figure 4 and Figures 5 through 11 depict the soil cover LUCs.

Table 2 – OU2 Land Use Control Summary

Operable Unit	Area of Concern	Blanket LUC Preventing Use of Contaminated Groundwater	Blanket LUC Preventing Activities that Reduce the Effectiveness of Groundwater Remedial Actions	Blanket LUC Preventing Exposure to Contaminated Soil at Levels that Pose an Unacceptable Risk to Human Health	Blanket LUC Preventing Disturbance of Soil Covers
OU1	Deep Groundwater	X	X		
OU2	Site A	X	X	X	
	Site C[a]	X	X		X
	Site D	X	X	X	X
	Site E	X	X	X	X
	Site G	X	X	X	X
	Site H	X	X	X	X
	Site I[a]	X	X		
	Site K[a]	X	X		
	Site 129-3	X	X	X	
	Site 129-5	X	X	X	
	Site 129-15	X	X	X	X
	Grenade Range	X	X	X	
	Outdoor Firing Range	X	X	X	X
	135 PTA			X	
	535 PTA	X	X	X	
	Building 102[a]	X	X		
	Units 3 and 4 Deep Groundwater[a]	X	X		
	EBS Areas on AHATS	X	X	X	
	Ramsey County Property[b]	X	X		
	Watchable Wildlife Area	X	X		
OU 3	Deep Groundwater	X	X		

a. All or part of area is on Ramsey County-owned property.
b. Ramsey County property includes 427 acres transferred to Ramsey County in 2013 and 108 acres in the western portion of OU2 to be used as part of the Rice Creek Regional Trail Corridor, which was transferred to Ramsey County in 2018.

5 MONITORING AND REPORTING

5.1 Annual Monitoring and Reporting

Monitoring of LUCs in the form of site inspections will be conducted by the U.S Army, or its designated representative(s), to confirm whether the LUCs remain effective and meet LUC objectives for continued remedy protectiveness. Monitoring will be conducted annually and results will be reported in the TCAAP Annual Performance Report with changes in frequency to be approved by USEPA and MPCA. If the Annual Performance Report ceases to be required, the LUC monitoring results will be included in a separate LUC monitoring report or as a section of another environmental report. The U.S. Army (or its representative) will provide each report to the USEPA and MPCA.

The LUC monitoring results report will evaluate the status and effectiveness of LUCs with a description of how any LUC deficiencies or inconsistent uses were addressed and note whether or not LUCs were properly incorporated into an environmental covenant (or deeds) and leases. The annual monitoring reports will be used in the preparation of the CERCLA 121(c) Five-Year Review. As part of the LUC monitoring and reporting, a written certification will be submitted stating that the LUCs remain in place and are effective. The certification will be in the following form:

> *Based on annual site inspections, the undersigned hereby certifies that the above named property owner and that the above described land use controls have been complied with for the period noted. Alternatively, any known deficiencies and completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).*

Upon transfer or lease of the site or a portion thereof, the U.S. Army may require, via environmental covenant, deed, lease and/or transfer agreement, that transferees, lessees and their subsequent assignees perform similar or identical annual monitoring and reports to help ensure that all land use control objectives are met by all future property users. Such information will be provided to the U.S. Army to be used in its annual report to the USEPA and MPCA.

5.2 CERCLA 121(c) Five-Year Reviews

As part of the CERCLA Section 121(c) 5-year remedy review process, the U.S. Army shall prepare a report certifying the continued effectiveness of the remedy, including effectiveness of the LUCs and an assessment of the need to modify the LUCs or their objectives. The U.S. Army will verify that the LUCs continue to be properly recorded and/or maintained by the responsible agency or entity. Each remedy review will evaluate whether conditions have changed due to contaminant attenuation, migration, or other factors, such as land use. If risk levels have changed since initial LUC implementation, LUC modification will be considered, which may include a reduction in monitoring frequency.

6 MODIFICATION AND TERMINATION OF LUCS

6.1 Modification of LUCs and Land Use Changes

With respect to modification of the various LUCs:

- LUCs concerning disturbance of soil covers at Sites C, D, E, G, H, 129-15, and the Outdoor Firing Range are expected to remain in place indefinitely. The LUCs can be modified if further actions are taken to reduce the concentrations of hazardous substances in the underlying soil to levels that are below the current, site-specific cleanup levels. Alternatively, to conducting further remediation work, it is also possible that the LUC could be modified for a less-restrictive land use, if supported by re-evaluation of the site-specific cleanup levels and inherent exposure assumptions for the intended use.
- LUCs concerning soil use restrictions at the individual OU2 areas of concern addressed in this LUCRD Report are expected to remain in place indefinitely. The LUCs can be modified if further action is taken to reduce the concentrations of hazardous substances in soil to levels that allow for less restrictive use. Alternatively to conducting further remediation work, it is also possible that the LUC could be modified for a less-restrictive land use, if supported by re-evaluation of the site-specific cleanup levels and inherent exposure assumptions for the intended use.
- LUCs concerning soil use restrictions for areas outside the individual OU2 areas of concern are expected to remain in place indefinitely. The LUCs can be modified if the U.S. Army demonstrates, and the USEPA and MPCA agree, that less restrictive use would be safe.
- LUCs related to groundwater at Sites A, C, I , K, Building 102, and the Units 3 and 4 Deep Groundwater will remain in effect until the cleanup levels have been achieved at each respective area. The LUCs can be modified if supported by a determination that the intended groundwater use is safe.

The U.S. Army shall not modify LUCs without concurrence from the USEPA and MPCA, and shall give notice at least 45 days in advance of any proposed LUC modification. The U.S. Army shall obtain prior USEPA and MPCA concurrence before any anticipated action that may disrupt the effectiveness of the LUCs, impact remedy performance, or alter or negate the need for LUCs. USEPA and MPCA concurrence shall be obtained with the terms outlined in the installation's FFA. In the case of an emergency action, the U.S. Army shall obtain prior USEPA and MPCA concurrence as appropriate to the exigencies of the situation.

6.2 Modifications Related to Leases and Property Transfers

At the earliest possible time, but no later than 60 days prior to leasing or transferring any portion of the U.S. Army-owned property to another agency, person, or entity (including federal to federal transfers), the U.S. Army shall provide notice to USEPA and MPCA of such intended lease or transfer. The notice shall describe any additional mechanism(s) and parties to be used for future LUC responsibilities after lease or

transfer[1]. As a condition of transfer or lease, the U.S. Army will require that equivalent LUCs will be put into terms and conditions of an environmental covenant (or deed) or lease, which are no less restrictive than the LUC objectives described above. The lease or environmental covenant (or deed) will prohibit the lessee, transferee, or subsequent owner or users from modification or termination of any restrictions / LUCs without prior U.S. Army concurrence. Furthermore, the transferee or lessee will be responsible for ensuring that any users comply with the LUCs. The U.S. Army will consult with both MPCA and USEPA for input and concurrence on the environmental covenant (or deed) or lease language. The U.S. Army will include language that provides U.S. Army, USEPA, and MPCA enforcement authority.

In addition, concurrent with the lease or transfer of property from the U.S. Army, information regarding the environmental use restrictions and controls will be communicated in writing to the recipients, to adjacent property owners, and to appropriate state and local agencies to ensure such agencies can factor such conditions into their oversight and decision-making activities regarding the property. Should a problem with LUC implementation, maintenance, monitoring, reporting, or enforcement arise at a transferred or leased property, the U.S. Army will work together with the transferee or lessee, subsequent property owner(s) and user(s), as well as USEPA, MPCA, and appropriate local government representatives, to resolve any LUC problems and to ensure expedient solutions.

Because the U.S. Army intends to convey ownership of additional portions of the site property to a non-federal entity, the U.S. Army will require the transferee to, upon transfer of fee title, grant the State an Environmental Covenant pursuant to Minn. Stat. Ch. 114E and an Affidavit Concerning Real Property Contaminated with Hazardous Substances pursuant to Minn. Stat. Ch. 115B or easement to allow the State to enforce LUC terms and conditions against the transferee(s), as well as subsequent property owner(s) or user(s) or their contractors, tenants, lessees, or other parties. Such an instrument may be incorporated by reference in the transfer deed or associated environmental covenant, and will run with the land in accordance with State real property law and parallel to the U.S. Army's own deed restrictions.

If the U.S. Army becomes aware of an action that interferes with or violates an LUC objective or State Covenant Use Restriction, it will take action to resolve the matter in accordance with the Environmental Covenant (or deed). The U.S. Army will notify the MPCA and USEPA regarding the matter within three (3) business days of becoming aware of the violation. If the matter is not resolved, the U.S. Army will notify the MPCA and USEPA regarding the results of its resolution efforts (e.g., any corrective action) or proposal to resolve within ten (10) business days of discovery of the violation.

6.3 Responsibilities of Subsequent Owners/Lessees

In the event of property transfer or lease, the U.S. Army may require the transferee or lessee and subsequent property owner(s) and user(s) to assume certain responsibilities for LUC implementation actions described above, including maintenance, inspection, reporting and administration, with the

[1] In accordance with current Department of Defense and Department of the Army policy, a Finding of Suitability to Transfer (FOST) which describes the institutional controls and includes the land use restriction language for subsequent use in the deed or lease, will be provided to USEPA, the state, and the public for their review and comment on the specific wording for property transfer, sale, or lease documents. The FOST also serves as the basis for deed inclusion of the CERCLA 120(h)(3) notice, covenant, and reservation of access.

involvement of the appropriate regulators and/or local government representatives. The terms of responsibilities assumed by transferee(s) and subsequent owner(s) and user(s) shall be clearly documented in the appropriate transfer/lease documentation. The U.S. Army will continue to: (1) conduct all CERCLA 121(c) reviews; (2) notify the appropriate regulators and/or local government representatives of any known LUC deficiencies or violations; (3) reserve the right to access the property to conduct any necessary response; (4) reserve the authority to change, modify or terminate LUCs and any related deed (environmental covenant) or lease provisions, with USEPA and MPCA approval; and, (5) remain responsible for remedy integrity and the enforcement of LUCs. To the extent permitted by law, a transfer environmental covenant (or deed) shall require the institutional controls imposed as part of a CERCLA remedy to run with the land and bind all property owners and users to enforcement by U.S. Army.

The transferee or lessee, as well as subsequent property owner(s) and user(s), will be responsible for promptly notifying the U.S. Army, the appropriate regulators (USEPA and MPCA), and local government representatives, of any deficiencies or violations of LUCs with information regarding what efforts or measures have or will be taken to address the deficiency within a reasonable time. (Note that the U.S. Army will also be monitoring for deficiencies or violations through annual inspections and reporting as discussed in Section 8.1.) Any violations that breach federal, state, or local criminal or civil law will be reported to the appropriate civil authorities. If the transferee or lessee wants to (1) conduct additional remediation, (2) change land use inconsistent with an environmental covenant (or deed) or lease restriction, or (3) modify or terminate an LUC, the transferee or lessee must first obtain written approval and concurrence from the U.S. Army, USEPA and MPCA, and the property owner, if different than the U.S. Army.

6.4 Termination of LUCs

With respect to termination of the various LUCs:

- LUCs addressing disturbance of soil covers at Sites C, D, E, G, H, 129-15, and the Outdoor Firing Range are expected to remain in place indefinitely. The LUCs can be terminated if further actions are taken to reduce the concentrations of hazardous substances in the underlying soil to levels that allow for unlimited use and unrestricted exposure.
- LUCs concerning soil use restrictions at the individual OU2 areas of concern addressed in this LUCRD Report are expected to remain in place indefinitely. The LUCs can be terminated if further action is taken to reduce the concentrations of hazardous substances in soil to levels that allow for unlimited use and unrestricted exposure.
- LUCs concerning soil use restrictions for areas outside the OU2 areas of concern are expected to remain in place indefinitely. The LUCs can be terminated if the U.S. Army demonstrates, and the USEPA and MPCA agree, that concentrations of hazardous substances in soil are at levels that allow for unlimited use and unrestricted exposure.
- LUCs related to groundwater at Sites A, C, I, K, Building 102, and the Units 3 and 4 Deep Groundwater will remain in effect until the cleanup levels have been achieved at each respective site. The LUCs can be terminated at such time.

When the U.S. Army, USEPA, and MPCA agree that any of these conditions have been met at an individual site, the respective LUCs will be terminated. The decision to terminate LUCs will be documented consistent with the National Oil and Hazardous Substances Pollution Contingency Plan process for post-ROD changes. At least 45 days in advance of any proposed LUC termination, the U.S. Army shall provide notice to USEPA and MPCA of such intended change. The U.S. Army shall not modify LUC implementation actions, or modify land use without concurrence from the USEPA and MPCA. The U.S. Army shall obtain prior USEPA and MPCA concurrence before any anticipated action that may disrupt the effectiveness of the LUCs, impact remedy performance, or alter or negate the need for LUCs. USEPA and MPCA concurrence shall be obtained with the terms outlined in the installation's FFA. If the property has been transferred and a determination by the U.S. Army, USEPA, and MPCA has been made to terminate one or more of the LUCs, the U.S. Army shall provide to the owner of the property an appropriate release for recordation with the deed pertaining to the affected soil and/or groundwater and will also advise other local stakeholders in a timely manner of the action.

7 LUC ENFORCEMENT

If the U.S. Army, USEPA or MPCA discovers any land use inconsistent with LUC objectives or that impairs the effectiveness of the remedial actions at any of the OU2 sites addressed in this LUCRD Report, that party will notify the others as soon as practicable, but no later than 3 business days after discovery with a written description of the deficient land use. Within 10 business days after such notification, the U.S. Army will provide USEPA and MPCA with information regarding what efforts or measures have or will be taken to address the deficient land use.

The U.S. Army will work with USEPA, MPCA and if applicable, transferees/lessees of the property, to take appropriate action to enforce the LUCs or maintain remedy integrity. The U.S. Army is not precluded from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health or the environment. Any violations that breach federal, state, or local criminal or civil law will be reported to the appropriate civil authorities. These measures may range from informal resolutions with the owner or violator, to the institution of judicial action under the auspices of State property law or CERCLA.

Alternatively, should the circumstances warrant such, the U.S. Army could choose to exercise its response authorities under CERCLA then seek cost recovery after the fact from the person(s) or entity(ies) who violated a LUC. It should be noted that the U.S. Department of Justice has the ultimate authority for bringing legal actions on behalf of federal agencies to enforce LUCs. Under this LUCRD Report, the U.S. Army is responsible for requesting that the U.S. Department of Justice seek judicial enforcement of the LUCs. Nothing in this provision shall be construed to limit the ability of the USEPA and MPCA to take appropriate enforcement measures against the party or parties responsible for LUC violations.

Should the U.S. Army become aware that any future owner or user of the property has not complied with any LUC requirement over which a local agency or the state may have independent jurisdiction, the U.S. Army will notify these agencies as soon as practicable but no later than three business days after discovery of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUCs.

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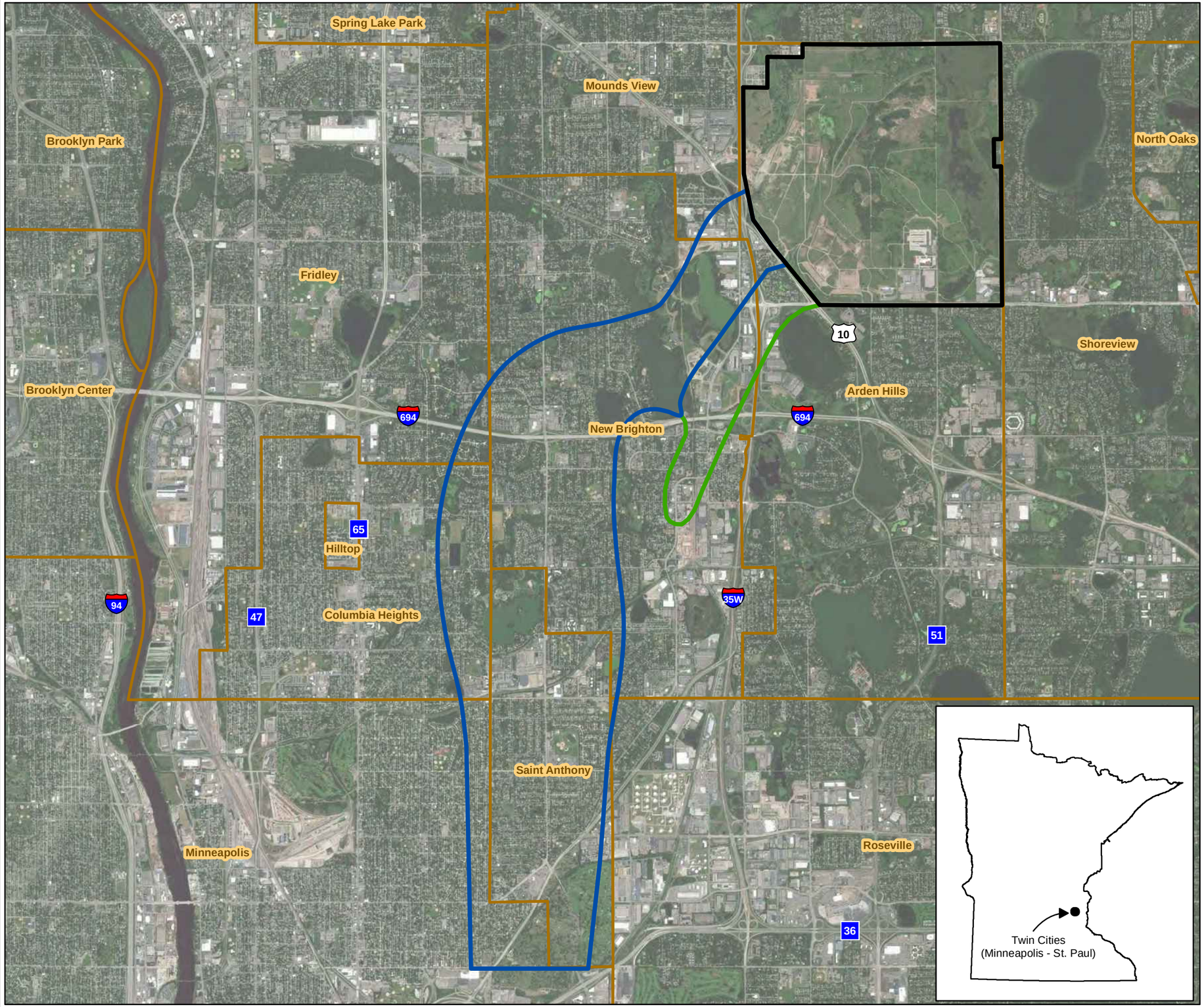
FIGURES



LEGEND:

- Operable Unit 1 (North Plume)
- Operable Unit 2 of the New Brighton/ Arden Hills Superfund Site (the same area occupied by the Twin Cities Army Ammunition Plant in 1983, when the Site was placed on the NPL.)
- Operable Unit 3 (South Plume)
- Municipal Boundary

0 4,000 8,000 Feet

GRAPHIC SCALE

NOTES:

1. Operable Unit Areas adapted from Figure 2 of the OU2 ROD.
2. 2016 Aerial Photograph (Source: DigitalGlobe, Vivid - USA)

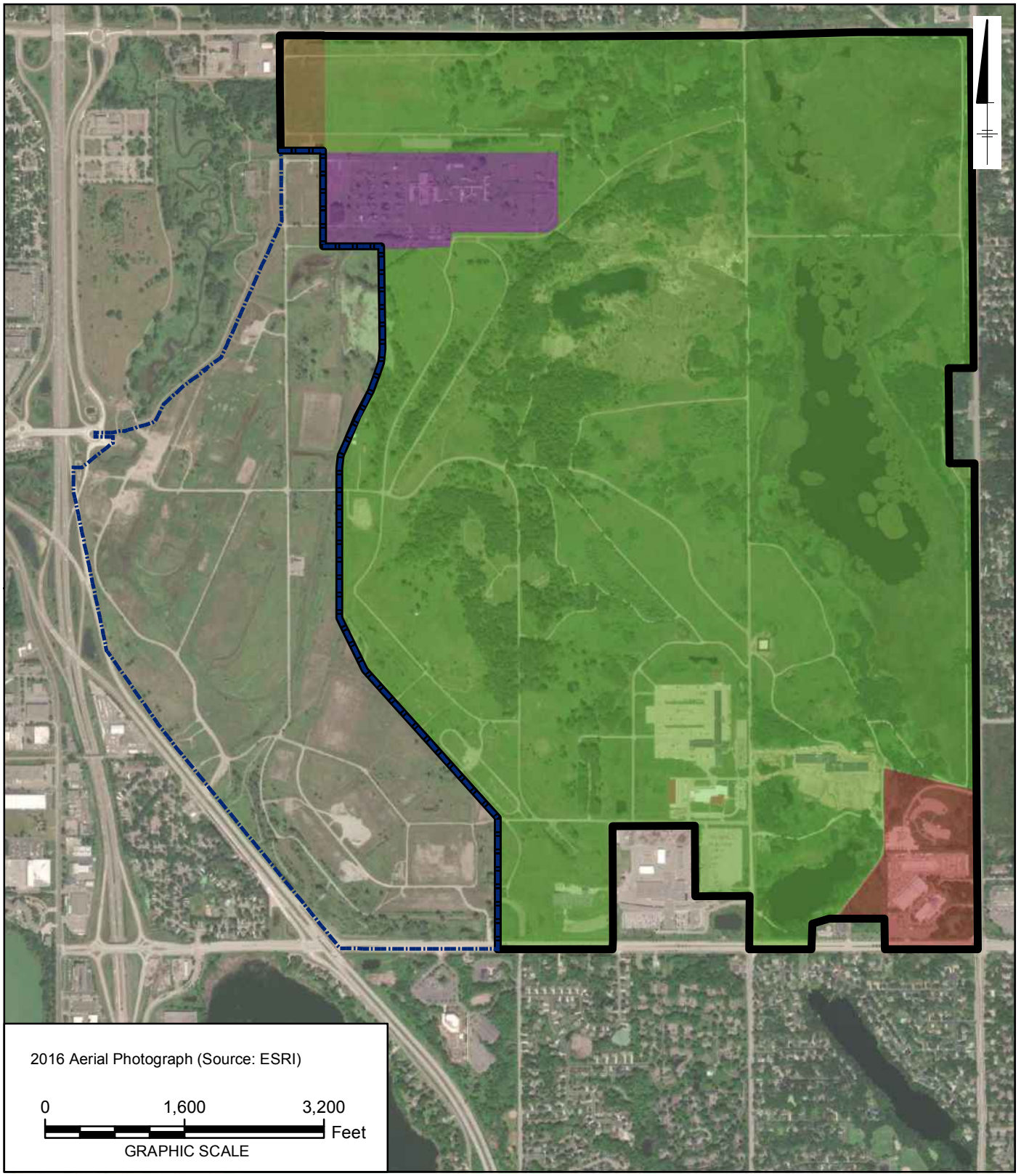
TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA
LAND USE CONTROL REMEDIAL DESIGN REPORT

New Brighton/Arden Hills Superfund Site Operable Units

PIKA ARCADIS a joint venture

FIGURE 1

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: mgress
TCAAP
Z:\GISProjects_ENV\TCAAP_Arden_Hills_MN\MXD\2018-01\APR_2017\OU1_OU2_SiteMap_20180131.mxd 2/1/2018 8:24:59 AM



LEGEND:

- Ramsey County-Owned Property
- Federally - owned property controlled by the U.S. Army
- Control Delegated to the Base Realignment and Closure Division (what remains of TCAAP)
- Control Delegated to the U.S. Army Reserve
- Control Delegated to the National Guard Bureau, who in turn has licensed use of the property to the Minnesota Army National Guard
- Easement to Ramsey County

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Federally - Owned Property Within Operable Unit 2

PIKA
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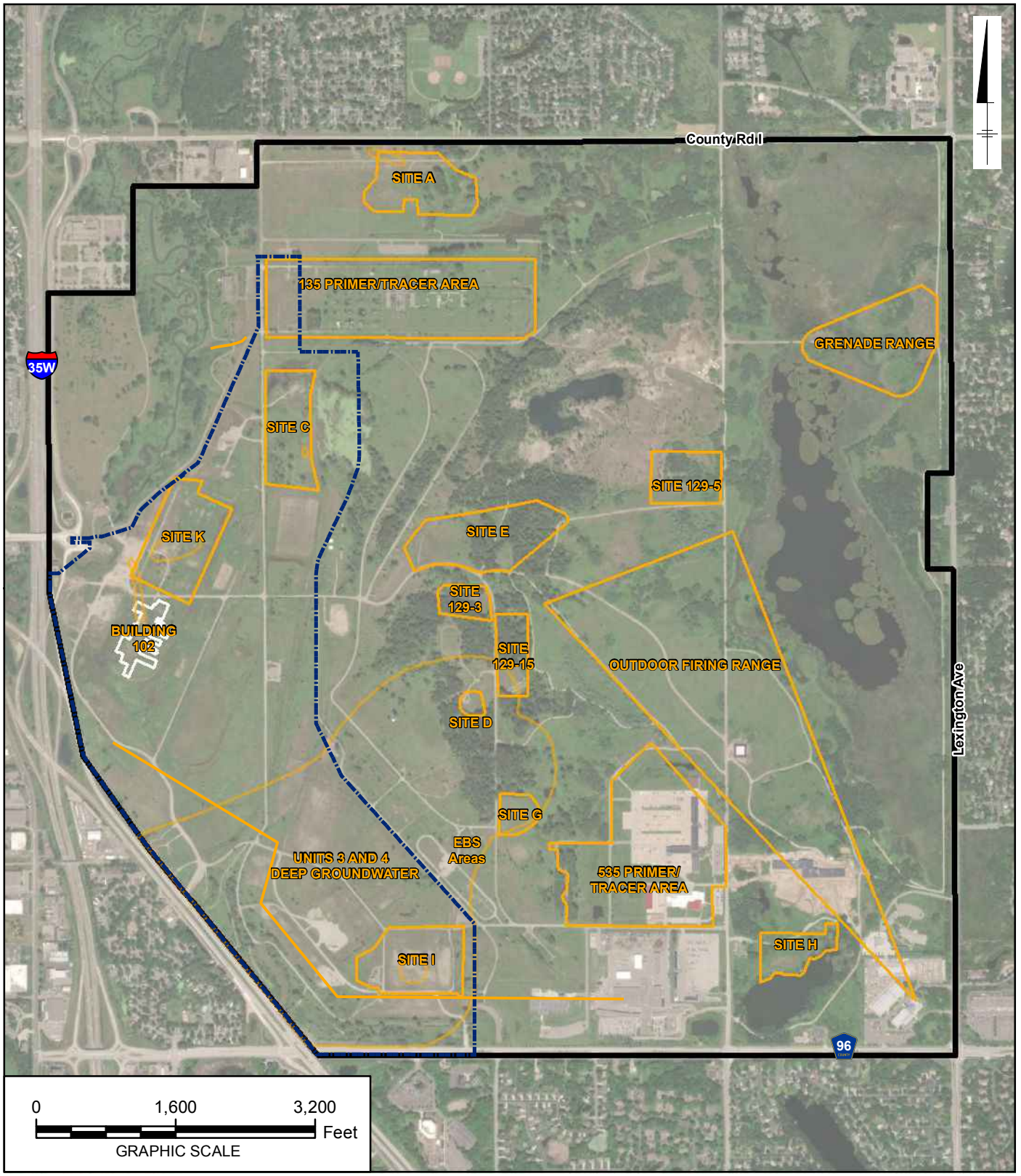
FIGURE 2

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
F:\TCAAP\RegEdits\2020-09\Fig_2_Federally_Owned_Property_within_OU2_LUCRDR.mxd 8/17/2020 3:11:53 PM



LEGEND:

- Operable Unit 2
- Ramsey County-Owned Property
- General NPL Site Boundary (See Note 1)

NOTES:

1. General NPL site boundaries determined during the initial site investigations. Please refer to the latest site reports for the current boundary definitions.
2. 2016 Aerial Photograph (Source: DigitalGlobe, Vivid - USA)

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Operable Unit 2 Areas of Concern with LUCs

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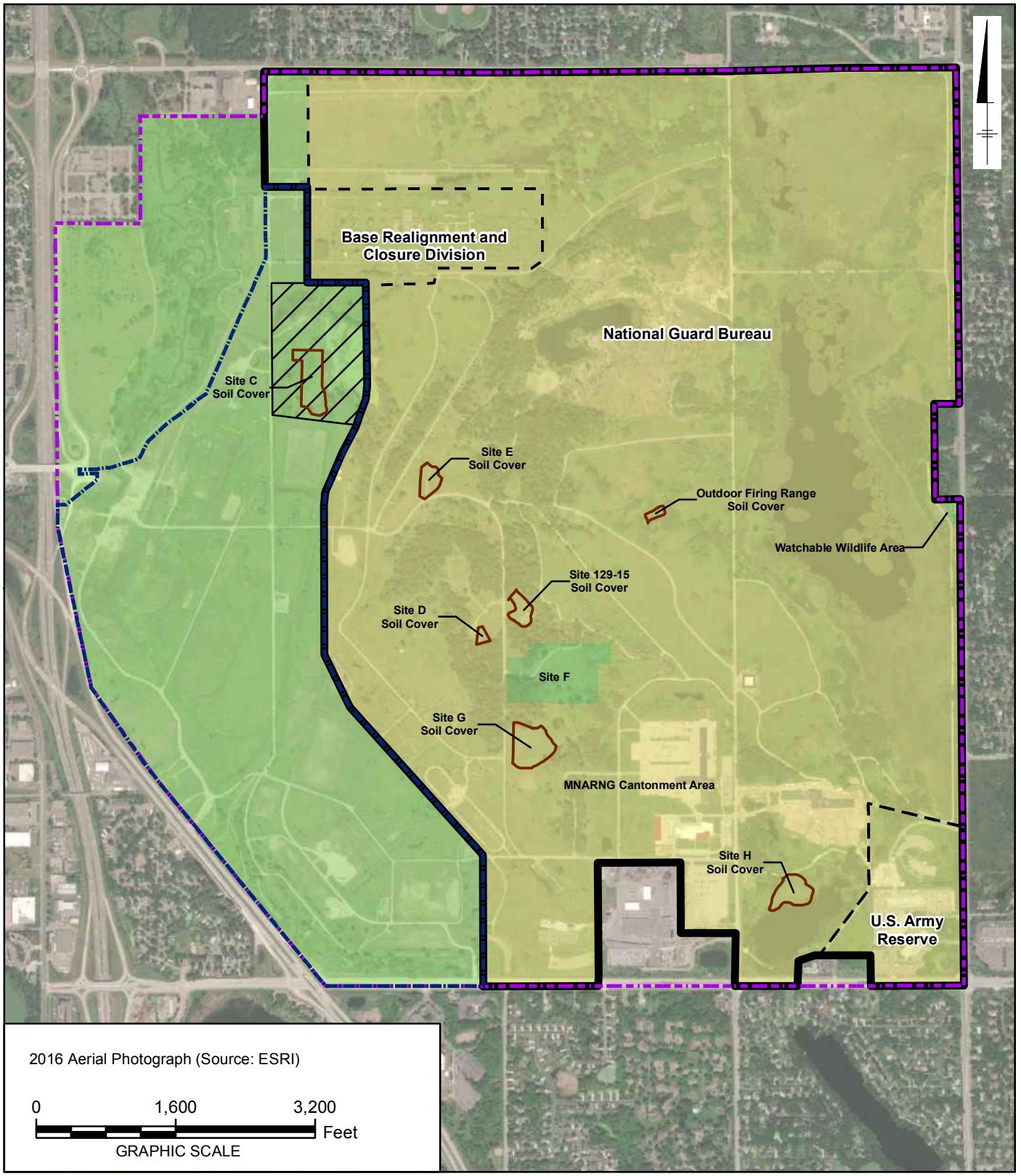
FIGURE
3

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
F:\TCAAP\RegEdits\2020-09\Fig_3_General_Locations_OU2_Sites_FY2017_LUCRDR.mxd 8/17/2020 3:46:57 PM



LEGEND:

- Operable Unit 2
- Ramsey County-Owned Property
- Federally - owned property controlled by the U.S. Army
- Separation of Control Under the U.S. Army
- Location of Soil Cover
- No soil LUC Required
- Industrial LUC
- 4-Foot Soil Disturbance Restriction

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Areas with Soil LUCs

PIKA ARCADIS a joint venture

FIGURE 4

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
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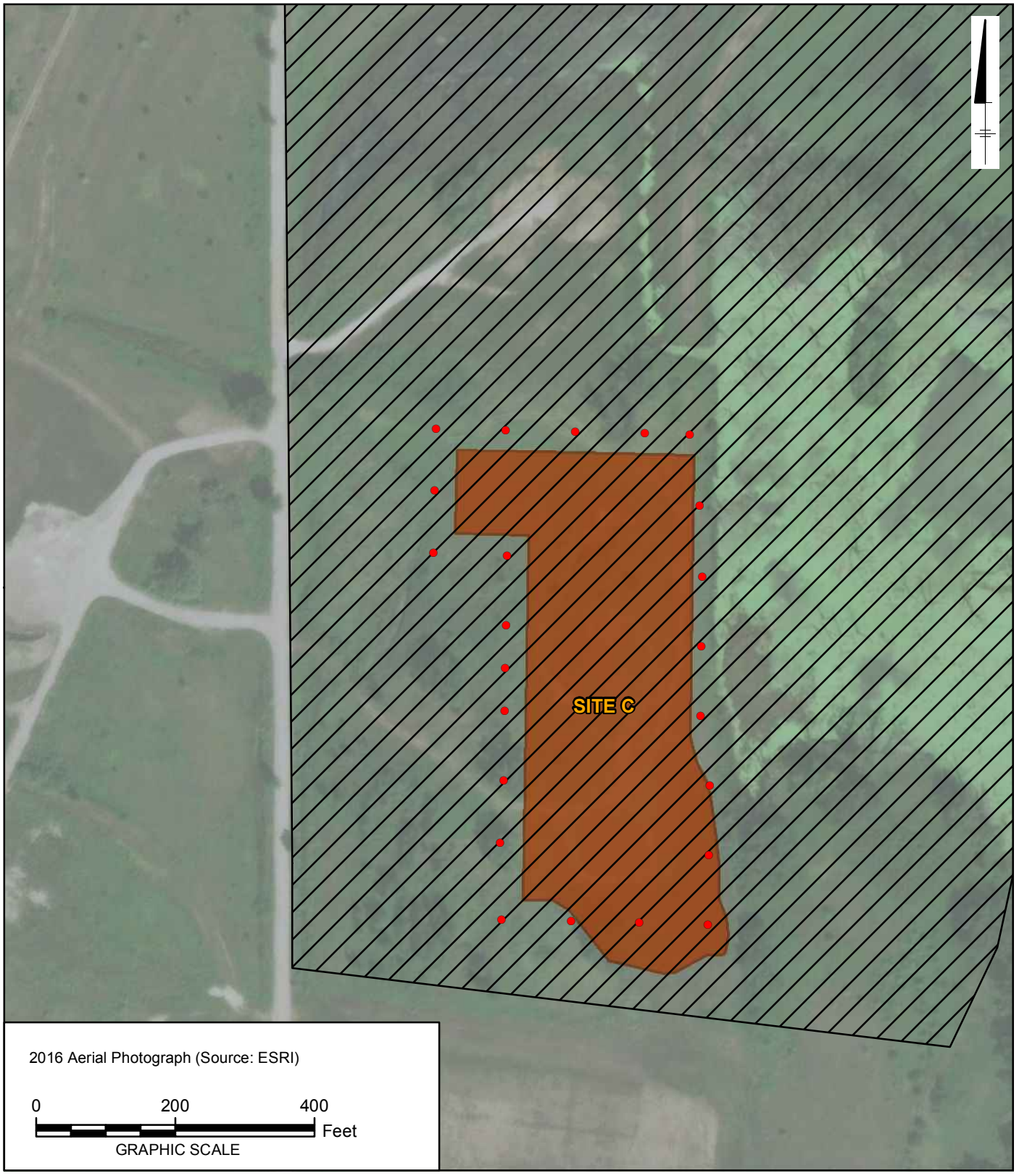

LEGEND:

- Location of Soil Cover
- 4-Foot Soil Disturbance Restriction
- Caution Sign Locations

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Site C Soil Cover Location

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FIGURE 5

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
F:\TCAAP\RegEdits\2020-09\Fig_5_Site_C_Soil_Cover_Locations_LUCRDR.mxd 8/17/2020 4:13:34 PM

LEGEND:

- Location of Soil Cover
- Caution Sign Locations
- General Location of a Soil Area with LUCs (see note below)

(Note: The area boundaries are only intended to illustrate the general locations and should not be interpreted as representing areas of contamination or areas needing LUCs.)

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Site D Soil Cover Location

PIKA
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FIGURE 6

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
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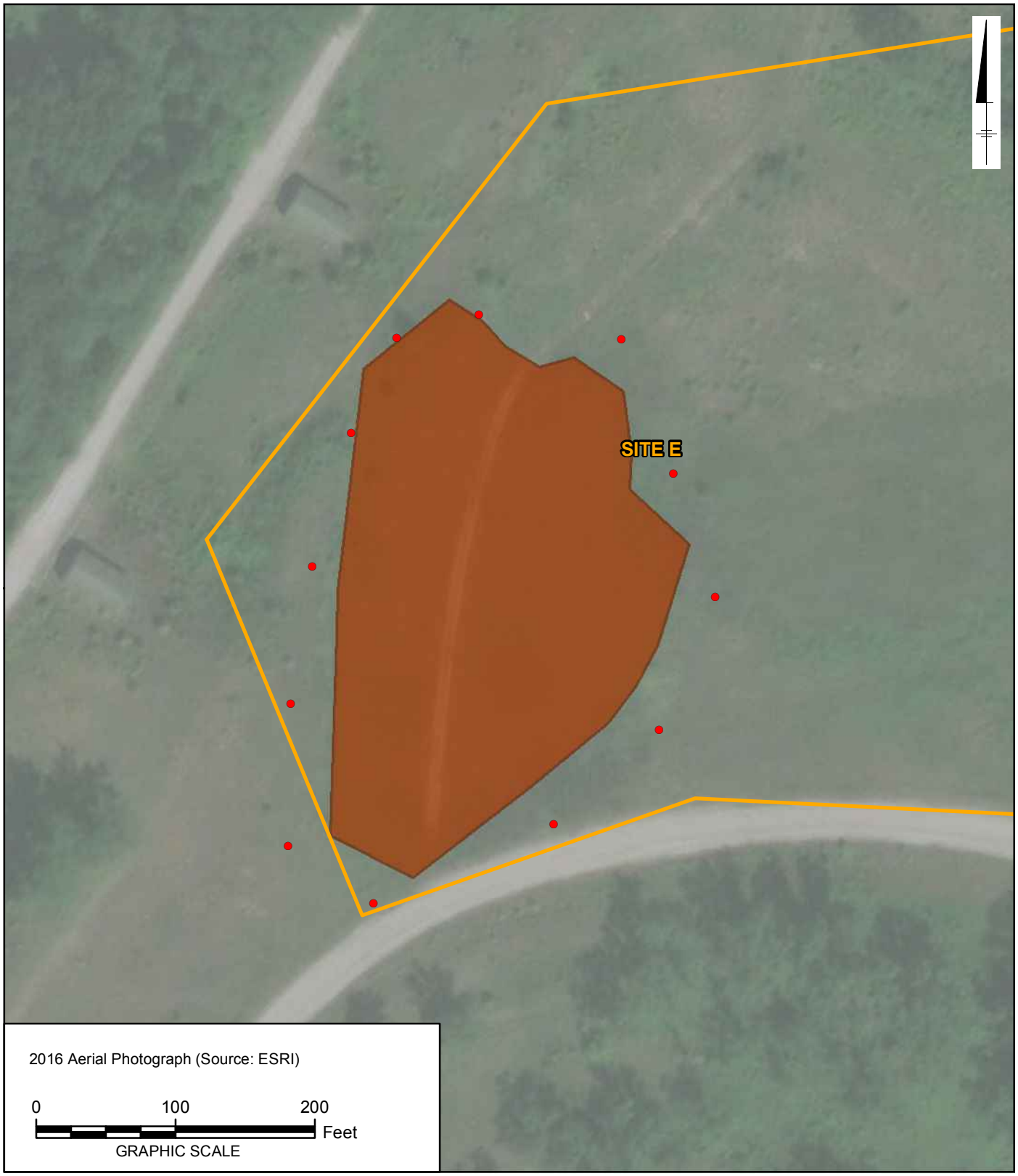

LEGEND:

- Location of Soil Cover
- Caution Sign Locations
- General Location of a Soil Area with LUCs (see note below)

(Note: The area boundaries are only intended to illustrate the general locations and should not be interpreted as representing areas of contamination or areas needing LUCs.)

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Site E Soil Cover Location

PIKA
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FIGURE
7

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
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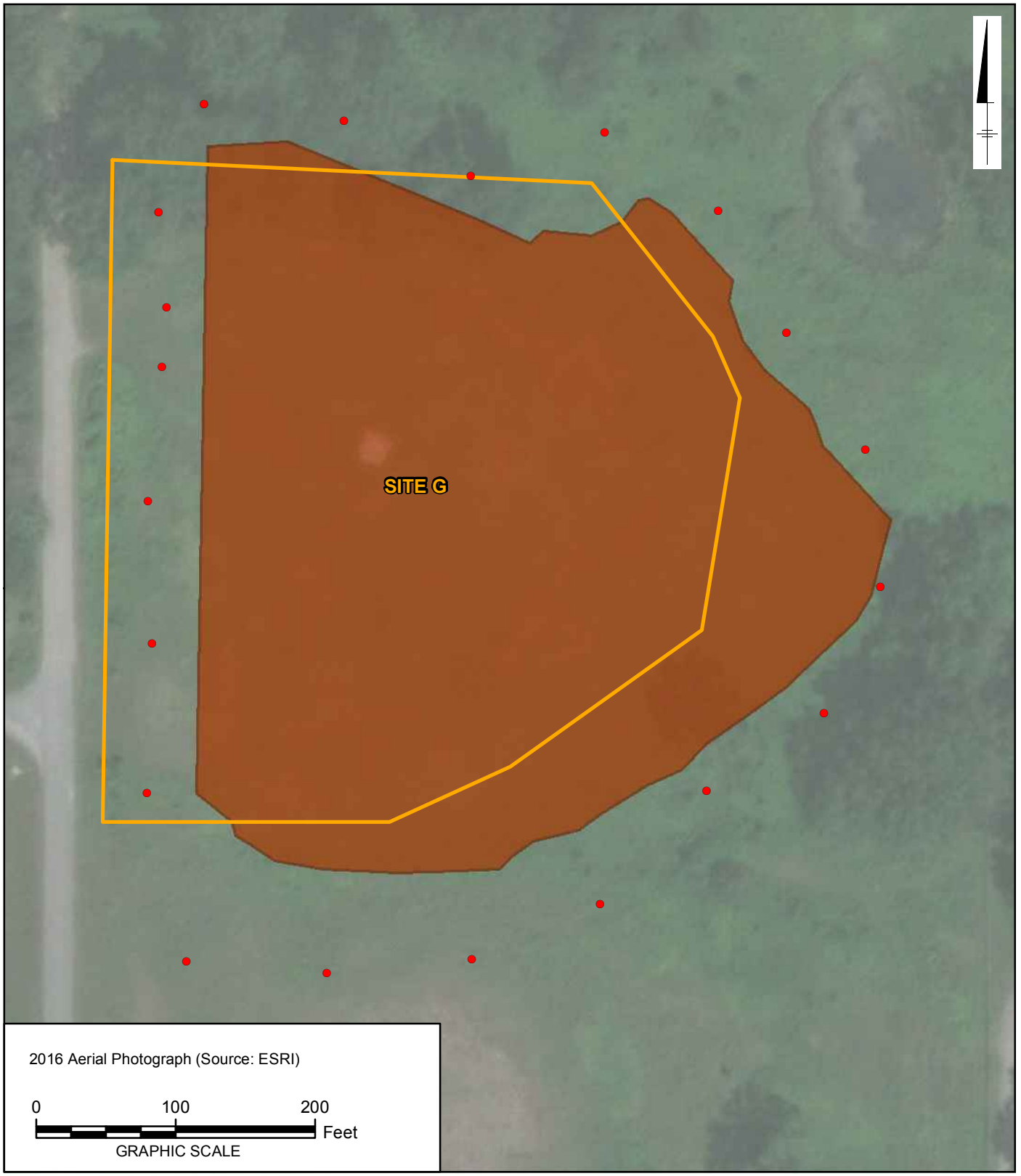

LEGEND:

- Location of Soil Cover
- Caution Sign Locations
- General Location of a Soil Area with LUCs (see note below)

(Note: The area boundaries are only intended to illustrate the general locations and should not be interpreted as representing areas of contamination or areas needing LUCs.)

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Site G Soil Cover Location

PIKA
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FIGURE 8

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
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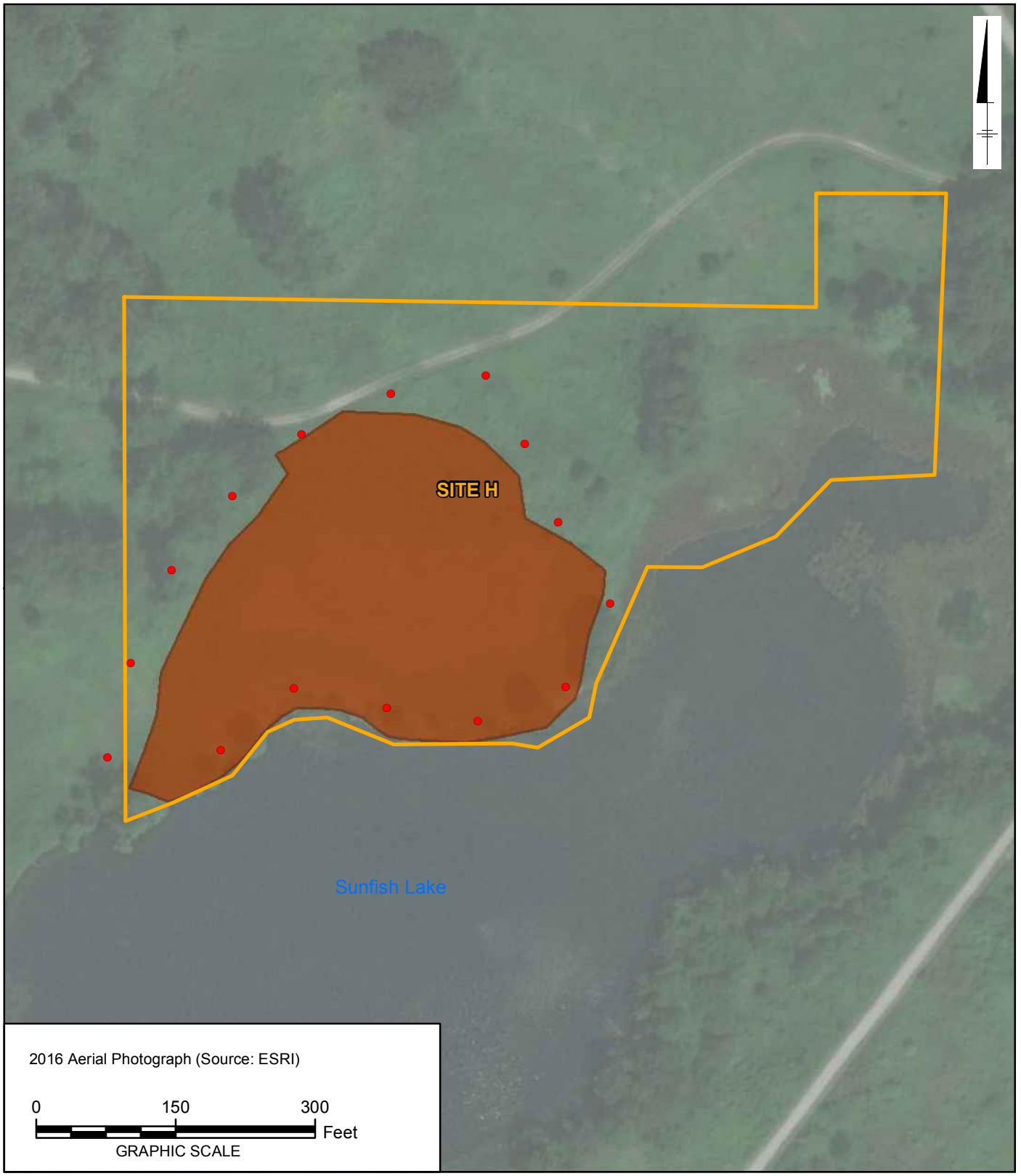

LEGEND:

- Location of Soil Cover
- Caution Sign Locations
- General location of a soil area with LUCs (see note below)

(Note: The area boundaries are only intended to illustrate the general locations and should not be interpreted as representing areas of contamination or areas needing LUCs.)

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Site H Soil Cover Location

PIKA
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FIGURE 9

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
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LEGEND:

- Location of Soil Cover
- Caution Sign Locations
- General Location of a Soil Area with LUCs (see note below)

(Note: The area boundaries are only intended to illustrate the general locations and should not be interpreted as representing areas of contamination or areas needing LUCs.)

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Site 129-15 Soil Cover Location

PIKA
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FIGURE 10

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
F:\TCAAP\RegEdits\2020-09\Fig_10_Site_129-15_Soil_Cover_Locations_LUCRDR.mxd 8/17/2020 4:29:31 PM

LEGEND:

- Location of Soil Cover
- Caution Sign Locations
- General Location of a Soil Area with LUCs (see note below)

(Note: The area boundaries are only intended to illustrate the general locations and should not be interpreted as representing areas of contamination or areas needing LUCs.)

TWIN CITIES ARMY AMMUNITION PLANT
ARDEN HILLS, MINNESOTA

LAND USE CONTROL REMEDIAL DESIGN REPORT

Outdoor Firing Range Soil Cover Location

PIKA
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FIGURE 11

City: Minneapolis Div/Group: IMDV Created By: MG Last Saved By: KGPeters
TCAAP
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APPENDIX A

OU2 Areas of Concern Descriptions

United States Department of the Army

LAND USE CONTROL REMEDIAL DESIGN REPORT

Appendix A – Operable Unit 2 Areas of Concern

New Brighton/Arden Hills Superfund Site

October 2020

CONTENTS

TABLE

ACRONYMS AND ABBREVIATIONS

ACM	asbestos-containing material
COC	contaminant of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CRA	Conestoga-Rovers & Associates
EBS	Environmental Baseline Survey
ESD	Explanation of Significant Differences
LUC	land use control
MPCA	Minnesota Pollution Control Agency
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
POTW	publicly owned treatment works
Proofhouse	Proofhouse Building No. 145
PTA	Primer/Tracer Area
RCRTC	Rice Creek Regional Trail Corridor
ROD	Record of Decision
SLV	Soil Leaching Value
SRV	Soil Reference Value
SVE	soil vapor extraction
TCAAP	Twin Cities Army Ammunition Plant
TCE	trichloroethene
TGRS	Twin Cities Army Ammunition Plant Groundwater Recovery System
U.S. Army	United States Department of the Army
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
Wenck	Wenck Associates, Inc.

1 INTRODUCTION

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and the National Oil and Hazardous Substances Pollution Contingency Plan, the studies and investigations performed for Operable Unit (OU) 2 were focused on locations most likely to have had a release of hazardous substances to the environment. Preliminary assessment type work consisted of reviewing files and available information to evaluate past waste management practices. This work led to identifying a number of areas where waste disposal and/or a release to the environment was known or suspected to have occurred. These areas became the focus of remedial investigation type work and were given their own designations. Cleanup levels were then developed and remedial actions were selected for each individual area, including determining the need for land use controls (LUCs). The following sections describe the areas of concern within OU2, including site setting, history, and remedial actions.

2 SITE A

The area designated as Site A is located near the northern boundary of OU2. Site A is on property owned by the federal government and controlled by the United States Department of the Army (U.S. Army). The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

2.1 Background

The area designated as Site A was reportedly used from the early 1940s to 1966 for burial and/or burning of various wastes, such as sewage sludge, solvents, explosive-containing wastes, and mercury crack cases, which resulted in contamination of soil and groundwater. The contaminants of concern (COCs) and cleanup levels for soil, sediment, surface water, and groundwater are summarized in Table A-1.

2.2 Remedial Actions

Site A Soils. The 1997 OU2 Record of Decision (ROD; United States Environmental Protection Agency [USEPA] 1997) selected excavation, stabilization, and offsite disposal of metals-contaminated soil at Site A. As required by the OU2 ROD, additional site characterization was performed in 1997, which identified a disposal trench (the “1945 Trench”) as the source of volatile organic compound (VOC) contamination in groundwater. In 1998 and 1999, approximately 16,300 cubic yards of contaminated soil and debris were removed to achieve the cleanup levels (LUCs needed). Refer to the Final Remedial Action Completion and Shallow Soils Close Out Report, Site A Activities (Stone & Webster 2001) for additional details. In 1998, an Engineering Evaluation/Cost Analysis (Stone & Webster 1998) recommended soil vapor extraction (SVE)/air sparging as the removal action, which was initiated in January 2001. Based on additional soil sampling results collected from the source area in 2002, the U.S. Army determined that the SVE system would not be able to remediate soils to meet the cleanup levels. With Minnesota Pollution Control Agency (MPCA) and USEPA’s approval, the SVE/air sparging system was dismantled and VOC-contaminated soils (approximately 688 cubic yards) were excavated and disposed of offsite in November 2002. The 1945 Trench soils were remediated to unrestricted use levels (no LUCs needed). Refer to the

Final Remedial Action Completion and Shallow Soils Close Out Report, Site A Former 1945 Trench Activities (Shaw Environmental 2004a) for additional details.

In 2009, Explanation of Significant Differences (ESD) #2 for OU2 (USEPA 2009b) amended the soil remedy at Site A to include the use of long-term LUCs for metals-contaminated soil.

During a 2013 removal action, approximately 60 cubic yards of contaminated soil was excavated, stabilized, and disposed of at an offsite landfill. Refer to the Remedial Action Completion Report for Soil Areas of Concern, Site A, 135 Primer/Tracer Area, Environmental Baseline Survey (EBS) Areas (Wenck Associates, Inc. [Wenck] 2013). A remedy for these particular Site A soil areas of concern was not included in the 1997 ROD. ROD Amendment #5 for OU2 (USEPA 2014) added soil areas of concern at Site A to the final remedy for OU2. The ROD Amendment declared that the removal constitutes the final remedy for the soil areas of concern and, as with the other parts of Site A, documents long-term LUCs as part of the remedy.

Site A Groundwater. Groundwater containment was initiated in 1988 through pumping from a single extraction well located near the suspected source area. The water was treated and discharged onsite. In 1994, the system was modified to consist of eight extraction wells, with extracted water discharged to the sanitary sewer for treatment at the local publicly owned treatment works (POTW).

The 1997 OU2 ROD designated the extraction system as part of the remedy for Site A groundwater. In 2002, four of the extraction wells were turned off. In 2008, the remaining four extraction wells were turned off to evaluate the effectiveness of monitored natural attenuation for remediating the residual groundwater contamination. In December 2015, the USEPA and MPCA approved changing the groundwater remedy from groundwater extraction and treatment to monitored natural attenuation. This change was approved in OU2 ROD Amendment #6 in 2018, officially changing the remedy to monitored natural attenuation for Site A shallow groundwater. Refer to the most recent Annual Performance Report for current groundwater conditions.

3 SITE C

The area designated as Site C is located immediately east of Mounds View Road within the central portion of OU2. Site C is located on the remaining excess, unoccupied portion of Twin Cities Army Ammunition Plant (TCAAP) that was transferred to Ramsey County as part of the 108-acre portion of the Rice Creek Regional Trail Corridor (RCRTC). The LUCs for groundwater and a soil cover for Site C remain in place.

3.1 Background

Site C was reportedly used to burn wastes from 1947 through 1957, which resulted in contamination of soil, along with sediment in runoff ditches. In the late 1990s, the Army Environmental Center sponsored a phytoremediation demonstration (research) project at Site C that had the unintended consequence of causing migration of metals contamination from soil to groundwater and surface water. The COCs and cleanup levels for soil, sediment, surface water, and groundwater are summarized in Table A-1.

3.2 Remedial Actions

Site C Soils and Sediment. The 1997 OU2 ROD selected excavation, stabilization, and offsite disposal of soil with contaminant levels in excess of the cleanup levels. The remedy was later modified to also account for contaminated sediment in runoff ditches, and to allow for some contamination to remain in place at concentrations exceeding cleanup levels if covered with a minimum 4-foot-thick soil cover (OU2 ROD Amendment #1; USEPA 2007). Between 2000 and 2007, approximately 21,450 cubic yards of contaminated soil was excavated, stabilized, and disposed at an offsite landfill, thereby achieving the cleanup levels across most of the site. However, in some scattered areas (grids), contamination was left in place beneath a minimum 4-foot-thick soil cover. Refer to the Final Remedial Action Completion and Shallow Soils Close Out Report, Site C Activities (Shaw Environmental 2009) for additional details.

In 2007, OU2 ROD Amendment #1 (USEPA 2007) amended the soil remedy at Site C-2 (the southern portion of Site C) to include the use of long-term LUCs for contaminated soil and sediment. In 2009, ESD #2 for OU2 (USEPA 2009b) amended the remedy at Site C-1 (the northern portion of Site C) to also include the use of long-term LUCs for soil.

In 2016, the 4-foot-thick soil cover at Site C was extended to the south and southeast to address residual contamination around the perimeter of the original cap as part of additional remedial actions conducted by Ramsey County.

In 2017, additional soil testing by Ramsey County on Parcel A revealed petroleum-related VOCs and lead at concentrations exceeding the MPCA industrial Soil Reference Value (SRV); these impacts were similar to other areas associated with Site C. Approximately 12,180 cubic yards of impacted soil was excavated from Parcel A. Impacted soil remains on Parcel A east of Mounds View Road below a depth of 4 feet. Additional information on Ramsey County-owned property is discussed in Section 20.

Site C Groundwater. Groundwater containment was initiated in 2001 through pumping from three extraction wells located at the downgradient edge of the groundwater contamination. The water was treated onsite and then discharged to the POTW. The OU2 ROD Amendment #1 (USEPA 2007) designated the containment system as part of the remedy for Site C groundwater, along with LUCs. The containment system was turned off in 2008 when lead concentrations at the extraction wells were below the cleanup levels.

Overall, lead concentrations at source area wells have decreased significantly in the last 10 years, indicating substantial progress towards reaching groundwater cleanup levels. Refer to the most recent Annual Performance Report for current groundwater conditions.

4 SITE D

The area designated as Site D is located in the central portion of OU2. Site D is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

4.1 Background

Pits at Site D were used for burning of sump wastes, scrap propellants, solvents, paint thinners, oils, rags, and chemicals, in addition to the dumping of neutralized cyanide wastes from approximately 1949/1950 to 1968. These activities resulted in contamination of soil and groundwater. The COCs and cleanup levels for soil are summarized in Table A-1.

4.2 Remedial Actions

Remedial and removal activities were conducted at Site D from 1985 through 2002. During a 1985 interim remedial action, 1,470 cubic yards of soil contaminated with polychlorinated biphenyls (PCBs) was excavated and secured onsite, and later incinerated onsite in 1989. The excavated area was backfilled with untreated overburden. PCB concentrations exceed unrestricted use levels in some backfilled soil, but it is covered by a 4- to 6-foot layer of clean soil, considered a “soil cover.” Refer to the Post Action Report on PCB Removal – Site D (Wenck 1986) and the Site D Final Remediation Report (Wenck 1990) for additional information.

An SVE system operated from 1986 through 1998 to extract VOCs. The SVE system was initially started as an interim remedial action, and then was selected as part of the final remedy in the 1997 OU2 ROD. An investigation conducted in 2000 confirmed the SVE system could be discontinued and the system was dismantled. Refer to the Final Site D Shallow and Deep Soil Volatile Organic Compound Investigation and Close Out Report (Stone & Webster 2002c) for additional information.

A subsequent investigation in 2001 indicated that concentrations of lead, antimony, and nitroglycerine in shallow soils exceeded the cleanup levels. In 2002, 1,300 cubic yards of contaminated soil was excavated, stabilized, and disposed of at an offsite landfill. Refer to the Final Remedial Action Completion and Shallow Soils Close Out Report, Site D Activities (Shaw Environmental 2004b) for additional information.

In 2009, ROD Amendment #3 for OU2 (USEPA 2009d) amended the remedy for Site D to declare that the past removal actions and PCB soil cover are part of the final remedy for the site, and to include the use of long-term LUCs as part of the remedy.

The groundwater at Site D is addressed as part of the Units 3 and 4 Deep Groundwater remedy. Refer to the most recent Annual Performance Report for current groundwater conditions.

5 SITE E

The area designated as Site E is located in the central portion of OU2. Site E is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

5.1 Background

In the early 1940s, Site E was reportedly used both as a construction debris and trash dump and as a burning ground for ammunition boxes and other materials, including large quantities of unknown

chemicals. Both the dump and the burning area were closed in 1949. These activities resulted in contamination of soil. The COCs and cleanup levels for soil are summarized in Table A-1.

5.2 Remedial Actions

The 1997 OU2 ROD selected excavation, stabilization, and offsite disposal of contaminated soil at Site E. During remedial actions from 1999 through 2001, approximately 20,900 cubic yards of metals-contaminated soil was excavated, stabilized, and disposed of offsite. In addition, a 2-foot-thick soil cover was constructed over an area (the Area E1-2 west dump) containing asbestos-containing material (ACM). Refer to the Final Remedial Action Completion and Shallow Soils Close Out Report, Site E Activities (Stone & Webster 2002b) for additional information.

In 2009, ROD Amendment #3 for OU2 (USEPA 2009d) amended the selected remedy for Site E to declare that the cover is part of the final remedy for the site, and to include the use of long-term soil LUCs as part of the remedy.

6 SITE G

The area designated as Site G is located in the central portion of OU2. Site G is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

6.1 Background

Site G was reportedly used as a general dump area for the disposal of rubble, asphalt pavement, barrels, oil filters, rocket-propellant research materials, floor-absorbent sweepings, metal dusts and grindings, burning operation ashes, and scrap roofing debris. Operations appear to have begun during World War II and continued through 1976. These activities resulted in contamination of soil and groundwater. (Note that the groundwater is addressed as part of the Units 3 and 4 Deep Groundwater.) The COCs and cleanup levels for soil are summarized in Table A-1.

6.2 Remedial Actions

An SVE system operated from 1986 through 1998 to extract VOCs. At the time of SVE system construction, a clay layer was also constructed over the top portion of the dump to minimize infiltration and short-circuiting of air for the SVE system. The SVE system was initially started as an interim remedial action, and then was selected as part of the final remedy in the 1997 OU2 ROD. An investigation conducted in 2000 confirmed that the SVE system could be discontinued and the system was dismantled. As part of this evaluation, the trichloroethene (TCE) cleanup level was revised to reflect existing conditions (i.e., the clay cap).

Based on review and evaluation of information collected during investigations conducted from 1983 through 2000, the Site G dump has been adequately characterized as industrial solid waste and delineated as required. The Site G soil cover was also designed and constructed to minimize infiltration, because the cleanup level for TCE was based on the potential for leaching to groundwater. Refer to the

Final Site G Volatile Organic Compound Investigation and Dump Close Out Report (Shaw Environmental 2004c) for additional information.

In 2009, ROD Amendment #3 for OU2 (USEPA 2009d) amended the selected remedy for Site G to document the revision to the cleanup level for TCE in soil, declare that the dump cover is part of the final remedy for the site, and include the use of long-term LUCs as part of the remedy. ESD #3 dated July 31, 2019 identified installation of additional extraction wells at Site G and design and construction of an advanced oxidation treatment system to treat 1,4-dioxane from the Site G extraction well. Refer to the most recent Annual Performance Report for current groundwater conditions.

7 SITE H

The area designated as Site H is located near the southeastern corner of OU2. Site H is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

7.1 Background

Site H was a burning site with a burning cage located in the center. Burning, primarily of wood, paper, cardboard, and combustible trash, reportedly took place from the early 1940s until the late 1960s. In addition to waste burning, portions of the site may have been used for burial and dumping of industrial sludge, paint residue, incineration ash, and solvents. Dumping activities began at the end of World War II and continued until 1967. These activities resulted in contamination of soil. The COCs and cleanup levels for soil are summarized in Table A-1.

7.2 Remedial Actions

The 1997 OU2 ROD selected excavation, stabilization, and offsite disposal of contaminated soil at Site H. During remedial actions from 1999 through 2001, approximately 8,620 cubic yards of contaminated soil was excavated, stabilized, and disposed of offsite. In addition, a 30-inch-thick soil cover was constructed over an area containing debris and ACM (the Area H1-3 dump). Refer to the Final Remedial Action Completion and Shallow Soils Close Out Report, Site H Activities (Stone & Webster 2002a) for additional information.

In 2009, ROD Amendment #3 for OU2 (USEPA 2009d) amended the selected remedy for Site H to declare that the cover is part of the final remedy for the site and to include the use of long-term LUCs as part of the remedy.

8 SITE I

The area designated as Site I is located near the south-central portion of OU2. Site I is located on property owned by Ramsey County.

8.1 Background

Site I consisted of Building 502 and its associated structures, facilities, and surrounding property. Building 502 was constructed in 1942 and was used until 2004 for the manufacture of various ammunition, projectiles, and artillery components. Following the 2013 property transfer, the building and associated structures were demolished by Ramsey County in 2014 and 2015 (with regulatory oversight). Soluble and quench oils, which were used in Building 502 during the 1940s and 1950s, were distributed throughout the building by a piping system routed in floor trenches. In the 1960s, part of the floor trench was converted to a TCE distribution system, which included a 28,000-gallon TCE storage tank.

The production operations in former Building 502 resulted in contamination of soil and groundwater. Because the building was still in production use until 2004, the primary focus of earlier investigations was soil outside the building and groundwater. Groundwater contamination has been found in both the shallow aquifer (designated Unit 1) and in the deeper aquifer (designated Units 3 and 4).

TCE is the primary contaminant identified in Unit 1 (shallow) groundwater at Site I. Some breakdown products of TCE also have been detected, often at concentrations higher than TCE concentrations. The source of TCE in shallow groundwater has been attributed to leakage from the distribution system that served former Building 502.

The COCs and cleanup levels for Unit 1 groundwater are summarized in Table A-1. Following additional soil investigation and remediation completed by Ramsey County in 2014/2015, as approved by the MPCA and USEPA, the site is suitable for unrestricted use/unlimited exposure and soil LUCs at Site I are no longer necessary.

8.2 Remedial Actions

From 1985 to 1986, as an interim remedial action, PCB-contaminated soil was excavated from the exterior of the east side of Building 502. The soil was stored onsite and in 1998 was hauled to an offsite landfill for disposal. Refer to Final Engineering Report, PCB Remediation, Building 502 (Conestoga-Rovers & Associates [CRA] 1987) for additional information.

The 1997 OU2 ROD selected remedy for Site I shallow groundwater included the following components (USEPA 1997):

- Additional characterization of Unit 1 and 2 soil and groundwater
- Use of an existing well to remove impacted Unit 1 groundwater
- Discharge of extracted groundwater to a POTW
- Groundwater monitoring to track remedy performance.

Further investigations to characterize Unit 1 and 2 soils and groundwater were conducted in 1997 (CRA 1997). Pilot studies of Site I shallow groundwater were completed in March 2001 (CRA 2001). Based on the results of these investigations and pilot studies, the extraction component of the 1997 OU2 ROD remedy for Site I groundwater proved technologically infeasible due to site geologic conditions (low-permeability soils). These conditions limited groundwater extraction rates, making groundwater recovery infeasible.

In 2009, ROD Amendment #2 for OU2: Site I Groundwater (USEPA 2009c) amended the remedy for Site I shallow groundwater to include the following:

- Removal of the "shallow groundwater extraction and discharge to a POTW" component of the 1997 OU2 ROD remedy
- Implementation of LUCs for groundwater
- Implementation of LUCs to prevent human exposure to contaminated soils remaining beneath Building 502 until a regulatory-approved remedy is implemented (which has been completed as noted below).

As part of the approved remedy, additional extraction wells were installed at Site I in accordance with the Final ESD #3 document dated July 31, 2019.

Monitoring has shown that contaminant concentrations in Site I shallow groundwater are decreasing and any minimal downward migration is contained by the TCAAP Groundwater Recovery System (discussed in Section 18.2).

As noted previously, Ramsey County completed additional investigation and remediation of contaminated soils beneath and near former Building 502 in 2014/2015, achieving cleanup levels that allow for unlimited use and unrestricted exposure for soils at Site I.

9 SITE K

The area designated as Site K is located near the western portion of OU2. Site K is located on property owned by Ramsey County.

9.1 Background

Site K consisted of former Building 103 and its surrounding property. Building 103 was constructed in 1942 and was used until 1998 for the manufacture of various ammunition and other munitions components. The building was demolished in 2006. The concrete floor slab was demolished by Ramsey County in 2014 and 2015 (with regulatory oversight).

Various solvents were used in former Building 103, which resulted in contamination of soil and groundwater. Groundwater contamination has been found only in the shallow aquifer (designated Unit 1). The COCs and cleanup levels for Unit 1 groundwater are summarized in Table A-1. Following additional soil investigation and remediation completed by Ramsey County in 2014/2015, as approved by the MPCA and USEPA, Site K is suitable for unrestricted use/unlimited exposure.

9.2 Remedial Actions

Site K Groundwater. Groundwater containment was initiated in 1986 through pumping from an interceptor trench installed near the downgradient edge of groundwater contamination. The water is treated onsite and then discharged to Rice Creek. The 1997 OU2 ROD designated the containment system as part of the remedy for Site K groundwater. The system continues to operate today. Refer to the most recent Annual Performance Report for current groundwater conditions.

In 2009, ESD #1 for OU2, Changes for Groundwater Sites (USEPA 2009a) modified the Site K groundwater remedy selected in the 1997 OU2 ROD to add the use of LUCs for groundwater and to prevent human exposure to contaminated soils remaining beneath the floor slab at former Building 103 until a regulatory-approved remedy is implemented (which has since been completed as noted below).

In 2014, the Building 103 slab was removed as part of site redevelopment activities and 15 Unit 1 monitoring wells were permanently abandoned.

In March 2015, the USEPA and MPCA requested sampling and analysis for 1,4-dioxane to be included in the annual sampling event for Site K. Refer to the most recent Annual Performance Report for current groundwater conditions.

Site K Soils. When the LUC mentioned above for soil was first considered, Building 103 was still in place and it was uncertain when it would be removed in order to address underlying soil contamination. In 2006, the building was demolished. In 2007, a decision was made to proceed with addressing the soil contamination that is the source for the groundwater contamination. In 2008, the U.S. Army signed an Action Memorandum (U.S. Army 2008a) selecting excavation and offsite landfill disposal as the remedy for the contaminated soil. The soil cleanup levels were based on industrial use of the property (i.e., MPCA Tier 2 industrial SRVs), so the Action Memorandum also prescribed LUCs. The soil removal work was completed in 2009 (refer to the Removal Action Completion Report, Site K [CRA 2009] for additional information). Then, as noted previously, following property transfer/lease to Ramsey County in 2013, Ramsey County completed additional investigation and remediation of contaminated soil beneath and near former Building 103 in 2014/2015, achieving cleanup levels that allow for unlimited use and unrestricted exposure for soils at Site K.

10 SITE 129-3

The area designated as Site 129-3 is located in the central portion of OU2. Site 129-3 is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

10.1 Background

The area designated as Site 129-3 had three leaching pits that were used for disposal and flashing of contaminated wastewater. Wastewaters came primarily from a lead styphnate primer mix facility, which reportedly operated from approximately 1971 to 1972. Disposal at Site 129-3 also may have included the burning of scrap powder and lead styphnate wastes. These activities resulted in contamination of soil. The COCs and cleanup levels for soil are summarized in Table A-1.

10.2 Remedial Actions

The 1997 OU2 ROD selected excavation, stabilization, and offsite disposal of contaminated soil at Site 129-3. During remedial actions from 2000 to 2001, approximately 3,460 cubic yards of contaminated soil was excavated, stabilized, and disposed of offsite. In addition, a small amount of debris (approximately 10 cubic yards) with suspect ACM was identified and removed from Site 129-3. Refer to the Final

Remedial Action Completion and Shallow Soil Sites Close Out Report, Site 129-3 Activities (Stone & Webster 2002d) for additional information. In 2009, ESD #2 for OU2 (USEPA 2009b) amended the remedy at Site 129-3 to include the use of long-term LUCs.

11 SITE 129-5

The area designated as Site 129-5 is located in the central portion of OU2. Site 129-5 is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

11.1 Background

The area designated as Site 129-5 was reportedly used for open burning in pits of scrap explosives, bullets, and spent solvents, and for the disposal of primer/tracer sludge from approximately 1945/46 through the late 1950s. A nearby area was mined by Arsenal Sand and Gravel Company in the early 1970s. A silt-settling pond for the former gravel operations overlies much of the suspected burn areas north of and within the northeastern corner of Site 129-5. The activities at Site 129-5 resulted in contamination of soil. The COCs and cleanup levels are summarized in Table A-1.

11.2 Remedial Actions

The 1997 OU2 ROD selected excavation, stabilization, and offsite disposal of contaminated soil at Site 129-5. Approximately 100 cubic yards of contaminated soil was excavated, stabilized, and disposed of offsite in 1999. Refer to the Final Remedial Action Completion and Shallow Soils Close Out Report, Site 129-5 Activities (Stone & Webster 2001) for additional information.

In 2009, ESD #2 for OU2 (USEPA 2009b) amended the remedy at Site 129-5 to include the use of long-term LUCs.

12 SITE 129-15

The area designated as Site 129-15 is located in the central portion of OU2. Site 129-15 is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

12.1 Background

Site 129-15 appears to have been used as a general dump for building materials. Although the site may have been used prior to 1970, the first documented evidence of use as a dump dates from approximately 1970.

In 1998, an investigation was conducted to fulfill the 1997 OU2 ROD requirement to characterize the dump at Site 129-15 to determine its contents. The 1998 investigation consisted of excavating six test trenches to characterize the dump and eight test trenches to locate the dump perimeter. Construction

debris was observed during excavation of the characterization trenches, indicating that the area was used as a general dump for building materials. Contaminated soil was found. The COC and cleanup levels are summarized in Table A-1.

12.2 Remedial Actions

In 2001, a 2-foot-thick soil cover was constructed to contain the dump contents. Refer to the Final Site 129-15 Dump Investigation, Characterization, and Remedial Action Completion and Close Out Report (Stone & Webster 2002e) for additional information.

In 2009, ROD Amendment #3 for OU2 (USEPA 2009d) amended the selected remedy for Site 129-15 to declare that the cover is part of the final remedy for the site and to include the use of long-term LUCs as part of the remedy.

13 GRENADE RANGE

The area designated as the Grenade Range is located in the northeastern portion of OU2. The Grenade Range is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

13.1 Background

The Grenade Range consisted of two proofhouses (A and B) and three targets (Small Range, Large Range, and the Sand Pad), three catchers (two on the Large Range and one on the Small Range), a drainfield, a site of a former underground storage tank near Proofhouse A, and several other concrete bunkers and wood structures. The ranges were constructed by placing fill along the edge of Marsden Lake. The range was operated by the Honeywell Defense Systems Division, now Orbital ATK, from March 1967 until July 1975 for testing rifle grenade fuzes. The grenades were loaded using inert materials, not explosives.

Field investigations conducted in 1993 and 1994 identified areas of metals-contaminated soil at the Small Range and Large Range. The COCs and cleanup levels are summarized in Table A-1.

13.2 Remedial Actions

During a 1999 removal action, approximately 2,180 cubic yards of contaminated soil was excavated, stabilized, and disposed of at an offsite landfill. Refer to the Final Closeout Report, Grenade Range Soil Removal Action (Alliant Techsystems 2001a) for additional information.

A remedy for the Grenade Range was not included in the 1997 ROD. ROD Amendment #3 for OU2 (USEPA 2009d) added the Grenade Range to the final remedy for OU2. The ROD Amendment declared that the previous removal action constituted the final remedy for the site, and added long-term LUCs as part of the remedy.

14 OUTDOOR FIRING RANGE

The area designated as the Outdoor Firing Range is located in the southeastern portion of OU2. The Outdoor Firing Range is on property owned by the federal government and controlled by the U.S. Army. Most of the firing range is on property where the control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard. A small portion of the firing range (the southeasternmost corner where the firing structure was located) is on property where the control has been delegated to the U.S. Army Reserve.

14.1 Background

The Outdoor Firing Range was built in 1943 during the original construction of TCAAP and served as an area to test the outdoor accuracy and performance of small arms ammunition. The original range was composed of Proofhouse Building No. 145 (Proofhouse), from which .30- and .50-caliber ammunition were test-fired, and the Earthen Barricade located approximately 1,200 yards from the Proofhouse. In 1955, three new bullet-catching structures were constructed along the firing line at distances of 600, 840, and 1,900 yards from the Proofhouse. Each bullet catcher was built into the steep slope of a manmade hill that acted as an earthen backstop. At least four observation houses, used to view the performance of test ammunition, were located within the boundary of the Outdoor Firing Range.

From 1961 to 1967, the Proofhouse was leased and operated by the Honeywell Defense Systems Division, now Orbital ATK. Honeywell used the Outdoor Firing Range to test 40-millimeter grenades until the summer of 1966. Honeywell's grenade testing area also included a grenade catcher located 200 yards down range (Building 170/173 and Grenade Catcher). The Outdoor Firing Range was last utilized for ammunition testing in 1974. The original barricade and the three bullet catchers were demolished and removed. Proofhouse Building 145 was demolished in 1987 to clear land for construction of the Arden Hills U.S. Army Reserve Center.

Field investigations conducted in 1993 and 1994 identified sources of metals-contaminated soil at the 200-Yard Range, 600-Yard Range, and 840-Yard Range areas and polycyclic aromatic hydrocarbon (PAH)-contaminated soil at the 1,900-Yard Range area. An additional investigation at the 1,900-Yard Range was conducted in 1999 to further evaluate PAHs in soils. Benzo(a)anthracene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene were identified at concentrations greater than the cleanup levels established for other OU2 sites. The COCs and cleanup levels for soil are summarized in Table A-1.

14.2 Remedial Actions

During a 1999 removal action, approximately 990 cubic yards of contaminated soil was excavated, stabilized, and disposed of at an offsite landfill. Refer to the Final Closeout Report, Outdoor Firing Range and #150 Reservoir Site Removal Action (Alliant Techsystems 2001b). At the 1,900-Yard Range, a 2-foot-thick soil cover was constructed during 2003 and 2004 to eliminate the potential for human exposure to PAH-contaminated soil. Refer to the Outdoor Firing Range 1900 Yard Range Cover Construction (Alliant Techsystems 2006). The excavation and soil cover construction took place on property now controlled by the Minnesota Army National Guard.

A remedy for the Outdoor Firing Range was not included in the 1997 ROD. ROD Amendment #3 for OU2 (USEPA 2009d) added the Outdoor Firing Range to the final remedy for OU2. The ROD Amendment declared that the removal actions and soil cover constitute the final remedy for the site, and added long-term LUCs as part of the remedy.

15 135 PRIMER/TRACER AREA

The 135 Primer/Tracer Area (PTA) is located immediately east of Mounds View Road in the north-central portion of OU2. The 135-PTA is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the Base Realignment and Closure Division. The 135-PTA is located on the remaining excess, unoccupied portion of TCAAP that is proposed for transfer out of federal ownership. The 108-acre portion of the RCRTC includes Parcel B comprising the westernmost portion of the 135-PTA, which has been transferred to Ramsey County for recreational use.

15.1 Background

The 135-PTA includes Building 135 and associated structures used for the production of component primers and tracing compounds associated with TCAAP small-caliber ammunition production from World War II through the Korean Conflict. The majority of the area buildings and structures remain, including Building 135, which was used for manufacturing primers. A few buildings have been removed, including all buildings on the westernmost portion of the 135-PTA (Parcel B), which has been transferred to Ramsey County as part of the RCRTC.

COCs for the 135-PTA soil (eastern portion) were identified as those exceeding their respective MPCA Industrial SRVs or Soil Leaching Value (SLV). Carcinogenic PAHs (cPAHs) were identified as COCs; hence, the SRVs and SLVs are based on the MPCA's benzo(a)pyrene equivalent calculation (compound-specific SRVs and SLVs for cPAHs are not established). One noncarcinogenic PAH was also identified as a COC (naphthalene). Two separate soil areas of concern were identified in the eastern portion of the 135-PTA. The COCs and cleanup levels are summarized in Table A-1.

15.2 Remedial Actions

In 2012, the U.S. Army signed an Action Memorandum (U.S. Army 2012) selecting excavation and offsite landfill disposal as the remedy for the contaminated soil in the eastern portion of the 135-PTA. The soil cleanup levels were based on industrial use SRVs (and SLVs); therefore, the Action Memorandum also prescribed LUCs. The soil removal work (approximately 50 cubic yards) was completed in 2013. Refer to the Remedial Action Completion Report for Soil Areas of Concern, Site A, 135-PTA, EBS Areas (Wenck 2013) for additional information. A remedy for the 135-PTA soil areas of concern was not included in the 1997 ROD. ROD Amendment #5 for OU2 (USEPA 2014) added soil areas of concern at the 135-PTA to the final remedy for OU2. The ROD Amendment declared that the removal constitutes the final remedy for the soil areas of concern in the eastern portion of the 135-PTA and that long-term LUCs are part of the remedy.

16 535 PRIMER/TRACER AREA

The area designated as the 535-PTA is located in the south-central portion of OU2. The 535-PTA is on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

16.1 Background

The 535-PTA was constructed in 1942 and included a group of manufacturing buildings used for the production of component primers and tracing compounds associated with TCAAP small-caliber ammunition production from World War II through the Korean Conflict. The majority of the area buildings have since been removed, including Building 535. Building 535 was used for manufacturing primers.

COCs for the 535-PTA soil were identified as those exceeding their respective MPCA Industrial SRVs or SLVs. cPAHs were identified as COCs; hence, the SRVs and SLVs are based on the MPCA's benzo(a)pyrene equivalent calculation (compound-specific SRVs and SLVs for cPAHs are not established). Two noncarcinogenic PAHs were also identified as COCs (fluoranthene and pyrene). The area of concern where cPAHs were detected is located adjacent to former Building 535. Lead was also identified as a COC in a separate area of the 535-PTA, in a ditch for a storm sewer outfall near former Building 535. The COCs and cleanup levels are summarized in Table A-1.

16.2 Remedial Actions

In 2009, the U.S. Army signed an Action Memorandum (U.S. Army 2009) selecting excavation and offsite landfill disposal as the remedy for the contaminated soil. The soil cleanup levels were based on industrial use SRVs; therefore, the Action Memorandum also prescribed LUCs. The soil removal work was completed in 2009. Refer to the Closeout Report for Soil Removal Action at the 535 Primer/Tracer Area (Wenck 2010) for additional information.

In 2012, ROD Amendment #4 for OU2 (USEPA 2012) documented that soil LUCs were not required in the vicinity of the soil excavation areas; however, as a practical matter, the entire 535-PTA is designated for U.S. Army industrial use.

17 BUILDING 102

Former Building 102 was located near the west-central portion of OU2. The contaminated groundwater plume originating from the northwest corner of former Building 102 is located on property owned by Ramsey County.

17.1 Background

Building 102 was constructed in 1942 and was used for production of .30-caliber ammunition for World War II and the Korean War. In 1968, the building was reactivated for production of 7.62-millimeter ammunition. In 1981, Building 102 was prepared for production of anti-armor cluster munitions by

Honeywell. Building 102 was also used for the manufacture of fuzes by Alliant Techsystems (now Orbital ATK). The building was demolished by Ramsey County in 2014 (with regulatory oversight).

Contamination associated with former Building 102 was first discovered in 2003 during an environmental site assessment conducted for the proposed property transfer. The shallow, Unit 1 aquifer was found to have concentrations of VOCs exceeding the Minnesota Department of Health Risk Limits. Some of these same VOCs were observed in soil samples, but at concentrations below the MPCA residential SRVs. The exact source of the VOCs is not known, but presumably they are associated with equipment degreasing operations that reportedly took place in Building 102 circa 1950. The COCs and cleanup levels for Unit 1 groundwater are summarized in Table A-1. Following additional soil investigation and remediation by Ramsey County in 2014/2015, as approved by the MPCA and USEPA, the Former Building 102 site is suitable for unrestricted use/unlimited exposure.

17.2 Remedial Actions

In 2008, the U.S. Army signed an Action Memorandum (U.S. Army 2008b) selecting monitored natural attenuation as the remedy for the contaminated groundwater, which was also documented in ROD Amendment #4 for OU2 (USEPA 2012). Refer to the most recent Annual Performance Report for current groundwater conditions.

As noted previously, following property transfer/lease to Ramsey County in 2013, Ramsey County completed additional investigation and remediation of contaminated soil beneath and near former Building 102 in 2014/1015, achieving cleanup levels that allow for unlimited use and unrestricted exposure for soils at the Former Building 102 site.

Groundwater monitoring continues on the Ramsey County-owned land. Refer to the most recent Annual Performance Report for current groundwater conditions. Ramsey County plans further development in this area that may result in loss of monitoring wells (subject to U.S. Army and regulatory approval) due to installation of a stormwater control basin.

18 UNITS 3 AND 4 DEEP GROUNDWATER

Activities at Sites D, G, and I resulted in contamination of the Hillside Sand/Prairie du Chien/Jordan aquifer beneath the southwestern portion of OU2. The Hillside Sand is known as Unit 3, while the combined Prairie du Chien/Jordan are regarded as Unit 4. Because the groundwater contamination from the three sites co-mingles, it has been addressed collectively, together known as the Units 3 and 4 Deep Groundwater. The groundwater contamination in Units 3 and 4 Deep Groundwater affects not only OU2, but also has migrated beyond the original TCAAP boundary to OU1 and OU3. The groundwater contamination is beneath portions of the U.S. Army, Minnesota Army National Guard, and Ramsey County properties.

18.1 Background

Onsite groundwater contamination within Units 3 and 4 has been attributed to past waste disposal activities at Sites D, G, and I. The deep groundwater flows to the southwest. The COCs and cleanup levels are summarized in Table A-1.

18.2 Remedial Actions

Groundwater containment was initiated in 1987 through pumping from six Unit 3 extraction wells that were connected by force main to an air stripping treatment facility, known as the Boundary Groundwater Recovery System. Subsequently, extraction wells were added, including near the source areas (Sites D, G, and I). The expanded system was called the TCAAP Groundwater Recovery System (TGRS). These modifications were completed and operation of the expanded system began in 1989. The treated water from the TGRS is discharged to a former gravel pit where the water is allowed to reinfiltrate.

The 1997 OU2 ROD designated the TGRS as part of the remedy for the Units 3 and 4 Deep Groundwater. The TGRS remains in operation and continues to contain and reduce VOC contamination in groundwater. Refer to the most recent Annual Performance Report for current groundwater conditions.

In 2009, ESD #1 for OU2, Changes for Groundwater Sites (USEPA 2009a) modified the deep groundwater remedy selected in the 1997 OU2 remedy to include the use of LUCs.

19 EBS AREAS

Two soil areas of concern referred to as the Minnesota Army National Guard EBS Areas are located west of Snelling Avenue in the south-central portion of OU2. The EBS Areas are on property owned by the federal government and controlled by the U.S. Army. The control has been delegated to the National Guard Bureau, which in turn has licensed use of the property to the Minnesota Army National Guard.

19.1 Background

EBS work performed by the Minnesota Army National Guard between 1996 and 2005 identified the two soil areas of concern. One area of concern was noted as being within an open storage area evident in historical aerial photographs; however, field observations suggest that the soil contamination had resulted from an area of shallow fill that was placed along the railroad tracks. The other area of concern was located at the south end of the concrete pad that served as a loading dock, and which had also been noted as a location for “Burning Kettles.”

COCs for the EBS Areas were identified as those exceeding their respective MPCA Industrial SRVs (SLVs were not applicable to these areas). cPAHs were identified as COCs; hence, the SRVs are based on the MPCA’s benzo(a)pyrene equivalent calculation (compound-specific SRVs and SLVs for cPAHs are not established). Four metals were also identified as COCs (antimony, copper, lead, and mercury). The COCs and cleanup levels are summarized in Table A-1.

19.2 Remedial Actions

In 2012, the U.S. Army signed an Action Memorandum (U.S. Army 2012) selecting excavation and offsite landfill disposal as the remedy for the contaminated soil in the EBS Areas. The soil cleanup levels were based on industrial use SRVs, therefore, the Action Memorandum also prescribed LUCs. The soil removal work (approximately 1,120 cubic yards) was completed in 2013. Refer to the Remedial Action Completion Report for Soil Areas of Concern, Site A, 135 Primer/Tracer Area, EBS Areas (Wenck 2013) for additional information. A remedy for the EBS Areas was not included in the 1997 ROD. ROD

Amendment #5 for OU2 (USEPA 2014) added soil areas of concern at the EBS Areas to the final remedy for OU2. The ROD Amendment declared that the removal constitutes the final remedy for the soil areas of concern in the EBS Areas and that long-term LUCs are part of the remedy.

20 RAMSEY COUNTY PROPERTY

The 108-acre portion of the RCRTC is located in the western portion of OU2. It includes four parcels:

- Parcel A contains Site C and the immediately surrounding area. Parcel A contained the 120-Series Magazine Area, a collection of small buildings formerly used to store containerized explosives and self-contained explosive items. Explosive residue was removed in 1998. Ramsey County demolished all existing structures in 2016.
- Parcel B includes the westernmost end of the former 135-PTA. The larger 135-PTA was used for the manufacture of primers and tracers, which are the ignition components of ballistic rifle ammunition. The portion of 135-PTA that comprises Parcel B was not intensively used for production; most of the former buildings on Parcel B were used for storage of raw and finished materials.
- Parcel C, located north of the 135-PTA, was once occupied by the western end of a long, narrow building, which served as an indoor firing range.
- Parcel D is an approximately 150-foot-wide strip that borders the north and east sides of the 380-acre California-shaped area transferred to Ramsey County in 2013.

Ramsey County has acquired Parcels A, B, and D from the federal government. Parcel C will remain with the federal government, although Ramsey County will be granted a perpetual easement to allow use of the parcel for the trail corridor.

20.1 Remedial Actions

Ramsey County conducted additional soil investigation in selected portions of the site in 2011 to supplement previous data collection and found no additional impacted areas other than one soil sample in Parcel B with an elevated concentration of PAHs. Based on these data and historical data, the COCs in soil include lead and PAHs.

Previous remedial actions were conducted on Parcel A as part of work at Site C. Following the 2011 investigation, Ramsey County completed additional remedial actions that included demolishing all existing structures and soil excavation. The 4-foot-thick soil cover at Site C was extended to the south and southeast to address residual contamination around the perimeter of the soil cover.

Soil testing also indicated petroleum-related VOCs and lead exceeding MPCA's Industrial SRVs, and a high concentration of diesel range organics in Parcel A. The impacts in this area were similar to other previously discovered waste disposal and waste burning areas associated with Site C. Based on the available data, Ramsey County excavated approximately 12,180 cubic yards of contaminated soil from Parcel A. Impacted soil intermixed with debris remains on a portion of Parcel A east of Mounds View Road below a depth of 4 feet and beneath the engineered cover at Site C.

In Parcel B, Ramsey County demolished and removed the existing buildings and associated utility infrastructure and remediated soil at three contaminant hot spots. Soil contaminated with lead and/or PAH concentrations exceeding residential SRVs was removed and transported offsite for landfill disposal.

Ramsey County remediated soil at one contaminant hot spot within Parcel D. Soil at this location with copper exceeding residential SRVs was removed and transported offsite for landfill disposal.

After completion of response actions, data analysis indicated the average concentrations of metals and PAHs in the upper 4 feet of Parcels A, B, and D met their respective residential SRVs.

Revision 4 of the OU2 LUC Remedial Design was approved by the USEPA and MPCA in August 2016. This revision eliminated soil LUCs from the 380-acre area transferred/leased to Ramsey County in 2013 along the western boundary of OU2. The soil LUCs were eliminated following soil cleanup to levels consistent with unlimited use/unrestricted exposure. LUCs for other shallow soil sites were not affected by this revision. Revision 5 of the OU2 LUC Remedial Design was approved by the USEPA and MPCA in March 2018. Revision 5 changed the LUCs for approximately 108 acres in the western portion of OU2 to allow for recreational use.

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TABLE

TABLE A-1
CONTAMINANTS OF CONCERN AND CLEANUP LEVELS,
OU2 AREAS WITH LUCS

Area	Medium	Contaminant of Concern	Cleanup Level
Site A	Soil	Antimony	33.6 mg/kg
		Barium	21,745 mg/kg
		Copper	19,593 mg/kg
		Lead	1,200 mg/kg
		Tetrachloroethene	0.5 mg/kg
		Trichloroethene	1.44 mg/kg
	Shallow Groundwater	1,1-Dichloroethene	6 µg/L
		1,2-Dichloroethane	4 µg/L
		Antimony	6 µg/L
		Benzene	10 µg/L
		Chloroform	60 µg/L
		cis-1,2-Dichloroethene	70 µg/L
		Tetrachloroethene	7 µg/L
		Trichloroethene	30 µg/L
Site C	Soil	Antimony	67.2 mg/kg
		Arsenic	10 mg/kg
		Beryllium	0.7 mg/kg
		Lead	1,200 mg/kg
		Manganese	2,503 mg/kg
		Thallium	11.8 mg/kg
	Sediment	Antimony	25 mg/kg
		Arsenic	10 mg/kg
		Beryllium	0.7 mg/kg
		Lead	91.3 mg/kg
		Manganese	2,503 mg/kg
		Thallium	11.8 mg/kg
	Surface Water	Lead at site ditches	6.9 µg/L
		Lead at Rice Creek	4.0 µg/L
	Groundwater	Lead	15 µg/L
Site D	Soil	Antimony	67.2 mg/kg
		Lead	1,200 mg/kg
		Nitroglycerine	61.2 mg/kg
		PCBs	10 mg/kg
		Trichloroethene	0.416 mg/kg

TABLE A-1
CONTAMINANTS OF CONCERN AND CLEANUP LEVELS,
OU2 AREAS WITH LUCS

Area	Medium	Contaminant of Concern	Cleanup Level
Site E	Soil	Antimony	22.4 mg/kg
		Barium	21,745 mg/kg
		Copper	13,062 mg/kg
		Lead	1,200 mg/kg
		Manganese	834 mg/kg
Site G	Soil	Trichloroethene	36.1 mg/kg
Site H	Soil	Antimony	33.6 mg/kg
		Arsenic	10 mg/kg
		Copper	19,593 mg/kg
		Lead	1,200 mg/kg
		Manganese	2,503 mg/kg
Site I	Shallow Groundwater	1,2-Dichloroethene (cis & trans)	70 µg/L
		Trichloroethene	30 µg/L
		Vinyl Chloride	0.2 µg/L
Site K	Shallow Groundwater	1,2-Dichloroethene (cis & trans)	70 µg/L
		Trichloroethene	30 µg/L
Site 129-3	Soil	Antimony	22.4 mg/kg
		Lead	1,200 mg/kg
		Manganese	834 mg/kg
		Nitroglycerine	61.2 mg/kg
		Trichloroethene	4.43 mg/kg
Site 129-5	Soil	Antimony	67.2 mg/kg
		Barium	21,745 mg/kg
		Lead	1,200 mg/kg
Site 129-15	Soil	Lead	1,200 mg/kg
		Benzo(a)anthracene	0.22 mg/kg
		Benzo(a)pyrene	0.02 mg/kg
Grenade Range	Soil	Antimony	33 mg/kg
		Cadmium (0-1 foot above GW)	1.4 mg/kg
		Cadmium (1-2 feet above GW)	2.3 mg/kg
		Cadmium (2-3 feet above GW)	7 mg/kg
		Cadmium (>3 feet above GW)	50 mg/kg
		Lead (0-1 foot above GW)	270 mg/kg
		Lead (>1 foot above GW)	1,200 mg/kg

TABLE A-1
CONTAMINANTS OF CONCERN AND CLEANUP LEVELS,
OU2 AREAS WITH LUCS

Area	Medium	Contaminant of Concern	Cleanup Level
Outdoor Firing Range	Soil	Antimony	22.4 mg/kg
		Copper	13,067 mg/kg
		Lead	1,200 mg/kg
		Benzo(a)anthracene	0.645 mg/kg
		Benzo(a)pyrene	0.0645 mg/kg
		Indeno(1,2,3-cd)pyrene	0.645 mg/kg
135 Primer/ Tracer Area	Soil	Benzo(a)pyrene Equivalent	3 mg/kg
		Naphthalene	7.5 mg/kg
535 Primer/ Tracer Area	Soil	Lead	525 mg/kg
		Benzo(a)pyrene Equivalent	3 mg/kg
		Fluoranthene	295 mg/kg
		Pyrene	272 mg/kg
Minnesota Army National Guard EBS Areas	Soil	Antimony	100 mg/kg
		Copper	9,000 mg/kg
		Lead	700 mg/kg
		Mercury	1.5 mg/kg
		Benzo(a)pyrene Equivalent	3 mg/kg
Building 102	Shallow Groundwater	1,1-Dichloroethene	6 µg/L
		cis-1,2-Dichloroethene	70 µg/L
		Trichloroethene	5 µg/L
		Vinyl Chloride	0.18 µg/L
Units 3 and 4 Deep Groundwater	Deep Groundwater	1,1,1-Trichloroethane	200 µg/L
		1,1-Dichloroethane	70 µg/L
		1,1-Dichlorethene	6 µg/L
		1,2-Dichloroethane	4 µg/L
		cis-1,2,-Dichloroethene	70 µg/L
		Tetrachloroethene	5 µg/L
		Trichloroethene	5 µg/L

GW - groundwater
mg/kg - milligrams per kilogram
µg/L - micrograms per liter

APPENDIX B

Technical Memorandum, Supporting Documentation for Revision 2

Technical Memorandum

Supporting Documentation for Revision 2,

Operable Unit 2 Land Use Control Remedial Design

Wenck Associates, Inc.

June 27, 2011

Purpose and Summary

The purpose of this Technical Memorandum is to document the information used as the basis for regulatory approval of Revision 2 for the Operable Unit 2 Land Use Control Remedial Design (OU2 LUCRD). Revision 2 affects land use controls (LUCs) for two portions of the Arden Hills Army Training Site (AHATS), i.e., the "subject property" as shown on Attachment 1. The subject property consists of the "watchable wildlife area" on the east side of AHATS and part of the cantonment area on the south side. The subject property is federally-owned and under the control of the National Guard Bureau, who in-turn licenses use to the Minnesota Army National Guard (MNARNG). The watchable wildlife area was previously approved for public access in 1996 and should have been excluded from the blanket LUCs for soil in Revision 1 of the OU2 LUCRD. Therefore, Revision 2 documents that land use controls related to soil are not necessary for this part of the subject property. For the subject part of the cantonment area, a review of soil data compared to risk-based levels indicates that uses compatible with "restricted commercial use" will result in acceptable risk to human health.

Background

Revision 1 of the OU2 LUCRD was approved by the US Environmental Protection Agency (USEPA) and Minnesota Pollution Control Agency (MPCA) in September 2010. (The draft document was considered Revision 0 and the final document was considered Revision 1.) The OU2 LUCRD was developed to satisfy requirements for LUCs set forth in amendments and Explanations of Significant Differences associated with the OU2 Record of Decision. LUCs are a component of the remedies for various areas of concern for protection of human health. While the need for LUCs is clear for the individual areas of concern, it is less clear for surrounding areas. To expedite the approval process, the U.S. Army elected to implement "blanket LUCs" across most of OU2, including AHATS. However, it was anticipated that the U.S. Army would in the future undertake efforts to reduce the footprint of the "blanket LUCs" to allow less restrictive activities on certain portions of OU2.

The LUCs related to soil in Revision 1 of the OU2 LUCRD were based on the following exposure scenario:

> Adult activity, less than 250 days per year, with relatively little contact with bare soil.

The MNARNG mission not only consists of soldier training, but also includes family and community outreach activities. Hence, the MNARNG desires to allow people younger than adult age on portions of the property for specific events. Examples of such events include, but are not limited to: family days, youth bow hunts, supervised nature walks, and Boy or Girl Scout events. These events would occur randomly throughout the year and for a limited duration likely not exceeding 3-7 days. As such, the younger than adult age people would not have significant exposure potential.

Revision 2 of the LUCRD applies to only a portion of the AHATS property (the "subject property"). The U.S. Army has decided to take a phased approach to reducing the footprint of soil LUCs. The portion of AHATS property for the first phase was selected because: 1) the "watchable wildlife area" is already approved for public access, 2) MNARNG is currently constructing a new Readiness Center in the subject part of the cantonment area and would like it to be available to families and friends younger than adult age for special events without concern for LUCs, and 3) additional building construction is anticipated in the next five years.

Description of Subject Property

Attachment 1 is a map showing the location of the subject property, within AHATS, and within OU2. The "watchable wildlife area" is on the east side of AHATS. Attachment 1 also shows the part of the subject property within what is designated by the MNARNG as the "cantonment area." A cantonment area is generally-speaking where primary buildings are located, and is considered a separate feature from "training range" areas.

The watchable wildlife area is outside the AHATS fence and is available to the public. There is a small parking lot and a viewing area with interpretive signs.

Access to the cantonment area is currently controlled by fence and locked gates. Attachment 2 shows the plan for building construction within the cantonment area. As new buildings are constructed, it is anticipated that the fence lines will be modified to allow public access to the buildings, but not beyond into the rest of AHATS.

Former and Current Land Use on Subject Property

The subject property can be loosely divided into four sub-areas based on land use (see Attachment 3):

- Watchable Wildlife Area (1.5 acres)

  The watchable wildlife area was undeveloped until 1996, when the parking lot and interpretive signs were added as part of the installation's natural resource management program.

- Central Sub-Area: 535 Primer/Tracer Area (100 acres)

  The 535 Primer/Tracer Area (PTA) consisted of Building 535 and a number of auxiliary buildings. As the name implies, the complex was used for the manufacture of primer and tracer compounds used in the production of small caliber ammunition. The 535 PTA was operational during World War II and the Korean Conflict. The 535 PTA was decommissioned in the mid-1960s and most of the buildings were burned. Attachment 4 shows the 535 PTA complex prior to decommissioning. Building 535 was leased to the Army Reserve from 1972 through 1993, and was used for office space and storage. The Army Reserve also used area outside the building for vehicle and equipment storage. Building 535 was vacant after 1993, and was demolished in 2010.

- Southwest Sub-Area (44 acres)

  The southwest portion of the subject property has four small above-ground structures that were formerly used as magazines for storage of explosive compounds (see location on Attachment 3). The magazines were cleared for explosives and are presently vacant, with plans for demolition. Building 576 was formerly located east of this portion of the subject property; generally in the area now occupied by the Ramsey County Public Works complex. Building 576 had a parking lot on the south side of the building. The westernmost part of the parking lot extended onto the

subject property in the southeast corner of the Southwest Portion, along with an access road going west (see Attachment 3). This portion of the parking lot is no longer in use. West of the former parking lot, the MNARNG performed grading in 2009 to level out an area currently used for periodic vehicle and equipment storage.

- Southeast Sub-Area (14 acres)

  The southeast portion of the subject property was vacant land until circa 1971, at which time the MNARNG constructed a Facility Maintenance Shop (FMS) that continues to be in use today. The FMS consists of two adjacent buildings housing administrative offices and indoor maintenance bays. The area outside the FMS is used for storage of vehicles and equipment.

Proposed Land Use on Subject Property

The "watchable wildlife area" is anticipated to remain as such into the foreseeable future.

The portion of the cantonment area within the subject property is anticipated to remain part of AHATS into the foreseeable future. The MNARNG has plans to construct several buildings within the cantonment area, including within the subject property. Attachment 2 shows the current building footprint plan. Note that the plans and construction sequencing are subject to change based on MNARNG and/or National Guard Bureau needs, as well as funding. The proposed buildings on the subject property include a Readiness Center (currently under construction), a Facility Maintenance Shop (FMS), a Training and Community Center (TACC), and longer range plans for a Data Center, Post Exchange (PX) facility, dining hall, and temporary billeting. The primary use of the subject property will be for office space, indoor training of soldiers, and indoor vehicle/equipment maintenance. As part of MNARNG's family and community outreach programs, the buildings will be open to the public for periodic visits, such as ceremonies, family days, and potentially community use of the indoor TACC facility. The use of the cantonment portion of the subject property will be analogous to commercial use, where there are daily workers present and transient public visitors.

<u>Previous Environmental Studies and Investigations</u>

Environmental investigations at TCAAP began in the early 1980s with the discovery of groundwater contamination. TCAAP was placed on the National Priorities List as part of the New Brighton/Arden Hills Superfund Site in 1983. Following is a brief summary of studies and investigations relevant to the subject property.

- TCAAP-Wide
  - 1988: *Installation Restoration Program, Preliminary Assessment of the Twin Cities Army Ammunition Plant* (Argonne National Laboratory, February 1988)

    As stated in the Executive Summary, "The document presents the results of a comprehensive review and consolidation of records related to the history of ammunition production and waste disposal activities prior to December 31, 1981…The assessment was based on a critical review and synthesis of published and unpublished information available at USATHAMA [U.S. Army Toxic and Hazardous Materials Command; now Army Environmental Command], TCAAP, Minnesota Pollution Control Agency (MPCA), Donovan Construction, and U.S. National Personnel Records Center in St. Louis, Missouri." The Preliminary Assessment work was probably the most comprehensive study into the records of production, including chemical usage and disposal. The intent of the Preliminary Assessment was to identify areas within Operable

Unit 2 most likely to have had a release of hazardous substances into the environment based on historical property use. The Preliminary Assessment formed the foundation for later investigations as far as where to look and what to look for. The Preliminary Assessment did not identify any areas of concern within the subject property of this OU2 LUCRD Revision 2. Consequently, the TCAAP-wide remedial investigation did not address the subject property.

- Watchable Wildlife Area

    - 1995-1996: A report was not generated. In 1995, the U.S. Army approached the USEPA and MPCA with the plan to create the watchable wildlife area for public use. The MPCA requested that the Army perform soil testing, which was conducted in May 1995. Two composite samples and one grab sample were collected and analyzed. The laboratory results were transmitted to the USEPA and MPCA in September 1995. In 1996, it was agreed that the area was suitable for public use and the watchable wildlife area was constructed.

- 535 PTA

    - 1996: *Relative Risk Site Evaluation, Twin Cities Army Ammunition Plant* (U.S. Army Center for Health Promotion and Preventative Medicine, November 1996) [Appended to the 2001 Preliminary Assessment Report listed below]

      Three sites were identified by the U.S. Army as having potential explosive compound concerns, with no previous investigation work: the Trap Range, 135 Primer/Tracer Area, and 535 Primer/Tracer Area. Limited soil sampling was performed at each site with analyses for metals and explosives. Based on the metal results, the U.S. Army programmed funding to perform a Preliminary Assessment for the 535 PTA.

    - 1997: *Environmental Baseline Survey, Twin Cities Army Ammunition Plant* (Montgomery Watson, June 1997)

      The MNARNG commissioned a study of the portion of TCAAP it sought to take accountability for under license to the National Guard Bureau. This study was a “Phase I” in that it reviewed previous documents, but did not involve any environmental testing. Further work was recommended to evaluate the 535 PTA.

    - 1998: *Final Phase II Environmental Baseline Survey, Twin Cities Army Ammunition Plant* (Montgomery Watson, April 1998)

      The MNARNG commissioned an investigation that included conducting a site inspection and interviews related to the 535 PTA, but no environmental testing.

    - 1998: *Final Primer Tracer Area Addendum, Phase II Environmental Baseline Survey* (Montgomery Watson, 1998)

      The MNARNG commissioned a geophysical survey to look for any buried tanks or disposal sites near the 535 PTA. The geophysical survey found numerous small anomalies, but none judged large enough to represent a tank or buried disposal pit. No intrusive investigation work was performed for the anomalies. Also, a surface soil sample was collected from a drainage ditch exiting the former foundations of the 535 PTA and

analyzed for metals, VOCs, and explosives. The report concluded that "there are no environmental concerns for shallow soils within the area."

- 2001: *Final Preliminary Assessment, 535 Primer/Tracer Area, Twin Cities Army Ammunition Plant* (Alliant Techsystems, December 2001)

  TCAAP commissioned the study based on the 1996 work. From the introduction section of the report, "The purpose of this investigation was to collect information concerning conditions at the 535 PTA sufficient to assess the threat posed to human health and the environment and to determine the need for additional CERCLA/SARA or other appropriate action." The report presents information on the historical buildings and use, including chemical usage. The report also summarizes previous work related to investigation and cleaning activities inside sewers and sumps. The Preliminary Assessment recommended that a Site Inspection be conducted, including the following:

  1. "An investigation of the soil surrounding any sewer discontinuities identified in the Sewer System Evaluation Survey and the sumps
  2. An investigation of the soil where the buildings were burned to determine the presence of PAHs
  3. An investigation of the drainage courses
  4. An investigation of the soil surrounding the existing and historical production and storage buildings
  5. Locate and evaluate the underground anomalies to determine if further investigation is necessary."

  The Preliminary Assessment was approved by the USEPA and MPCA.

- 2005: *Summary Report for 535 Primer/Tracer Area Site Inspection Investigation* (Wenck Associates, January 2005)

  The report summarizes the findings of investigation work performed in 2003. The work was in accordance with the *Site Inspection Work Plan* approved by the USEPA and MPCA in March 2003, and followed the recommendations of the Preliminary Assessment. Soil sampling targeted building sumps, sewer lines, existing and historical building areas, and stormwater drainage conveyances. Groundwater sampling was also performed. In addition, a backhoe was used to investigate the anomalies identified during the earlier geophysical survey. Scrap metal objects were found with no evidence of soil contamination, so soil samples were not collected. No impacts to groundwater were found. Soil results were compared to site-specific cleanup levels from other TCAAP sites for screening purposes. The report recommended that an Engineering Evaluation/Cost Analysis be performed to further evaluate 1) lead observed in a surface soil sample collected in a drainage ditch, 2) PAHs observed in a surface sample adjacent to Building 535, and 3) beryllium in a subsurface soil sample adjacent to a former sump. The Summary Report was approved by the USEPA and MPCA.

- 2009: *535 Primer/Tracer Area, Engineering Evaluation/Cost Analysis* (Wenck Associates, January 2009)

  The report summarizes additional soil investigation work to evaluate items 1 and 2 listed above. The work was performed on accordance with *Quality Assurance Project Plan for 535 Primer/Tracer Area* approved by the USEPA and MPCA in November 2007. (Note:

during development of the QAPP, the previous soil data was compared to the MPCA industrial Soil Reference Values and beryllium dropped out as a chemical of concern.) The report delineates the extent of both the lead and PAH contamination for the purpose of evaluating and recommending a remedy. The EE/CA was approved by the USEPA and MPCA.

- 2010: *Closeout Report for Soil Removal Action at the 535 Primer/Tracer Area* (Wenck Associates, January 2010)

  The report documents additional soil sampling performed to verify the cleanup levels were achieved during soil removal activities. The work was performed in accordance with the *Removal Action Work Plan, 535 Primer/Tracer Area* approved by the USEPA and MPCA in May 2009. The soil removal work achieved the MPCA industrial Soil Reference Values for lead and PAHs, which were the prescribed cleanup goals. The Closeout Report was approved by the USEPA and MPCA.

Data Compilation and Analysis

To assist with efforts to reduce the footprint of LUCs on AHATS, previous soil data generated within the AHATS property was compiled into a single database. The database includes work commissioned by both TCAAP and the MNARNG. An electronic version of the database is included at Attachment 5, along with explanatory notes. The data from locations within the subject property is highlighted within the database for ease of viewing.

The soil database was used to generate a map (Attachment 6) showing a comparison of soil results to the MPCA residential Soil Reference Values (SRVs). On the map, green dots represent locations where all soil results were less than the residential SRVs. Red dots represent locations where one or more sample results was above a residential SRV.

Attachment 6 shows that within the subject property for Revision 2 to the OU2 LUCRD, all of the sample locations are represented by green dots, meaning that the soil testing results are below the MPCA residential SRVs. Following is more discussion for each of the sub-areas.

- Watchable Wildlife Area

  The soil testing results from 1995 are not included in the AHATS soil database (Attachment 5) because they were composite samples and do not have unique location coordinates. The soil data was submitted to the USEPA and MPCA in 1995, and it was agreed that the area was suitable for unrestricted public use.

- Central Sub-Area: 535 PTA

  Soil testing results from the various investigations described earlier in this Memorandum are included in the AHATS soil database (Attachment 5) and the results are represented as green dots on Attachment 6. As mentioned under the various investigations, and presented in more detail in the respective reports, each soil sample had a specific purpose related to a suspected release of hazardous substances to the environment. The spatial distribution of sampling (both horizontal and vertical) was biased to features most likely to have resulted in a release to the environment. Likewise, the laboratory analyses were targeted to the most likely chemicals of concern based on previous operations and chemical usage. Thus, the soil sampling and analysis is adequate for purposes of making decisions for soil LUCs.

Attachment 6 shows that the results are all below the MPCA residential SRVs. This is seemingly a contradiction to Revision 1 of the OU2 LUCRD, which states that LUCs are needed for soil at the 535 PTA. The difference is in how the benzo[a]pyrene equivalent (BAP equivalent) was calculated, and specifically how “non-detect” results were handled.

The approach used in Attachment 5 is identical to that previously used by the U.S. Army for analysis of soil results on the portion of TCAAP proposed for public sale and generating red/green dot maps. The following approach was employed:

- The current MPCA calculation worksheet was used, which has a longer list of chemicals than most past analyses. All available chemical results were inserted into the worksheet. If a result was reported as "non-detect," a value of one-half the reporting limit was used in the calculation.
  - If the calculation result was less than the respective SRV for BAP equivalent, the database assigned a mapping value of "0" (= green dot on map).
  - If the calculation result was above the respective SRV, and there were no "non-detect" values involved in the calculation, the database assigned a mapping value of "1" (= red dot on map)
  - If the calculation result was above the respective SRV, and "non-detect" values were involved in the calculation, the database initially assigned a mapping value of "2." The results with a "2" were individually reviewed to assess the impact of using one-half the reporting limit for "non-detect" inputs.
    - If the calculation would result in an SRV exceedance even if the "non-detect" values were ignored, then the "2" was changed to a "1."
    - If the SRV exceedance was caused by the use of one-half the reporting limit for "non-detect" values, then the "2" was changed to a "0."

A more conservative approach was used for the 535 PTA work, whereby all "non-detects" were handled as one-half the reporting limit in calculating the BAP equivalent, even if doing so caused exceedances of the residential SRV. The U.S. Army believes the methodology outlined above is a more reasonable approach for handling "non-detect" values. This alternative method for calculating the BAP equivalent is in keeping with the options described in MPCA guidance.

- Southwest Sub-Area

  Attachment 6 shows that no soil sampling has been conducted in the southwest sub-area. Previous Preliminary Assessments and Environmental Baseline Surveys did not identify any features or activities likely to have resulted in a release of hazardous substances to the environment. Hence, no environmental testing was deemed necessary.

- Southeast Sub-Area
  Attachment 6 shows that no soil sampling has been conducted in the southeast sub-area. Previous Preliminary Assessments and Environmental Baseline Surveys did not identify any features or activities likely to have resulted in a release of hazardous substances to the environment. Hence, no environmental testing was deemed necessary.

As stated earlier, the use of the cantonment portion of the subject property will be analogous to restricted commercial use. The MPCA defines restricted commercial property use as:

> "Use of property for commercial purposes where access or occupancy by non-employees is less frequent or is restricted. This property use can range from no public access for both outdoor and indoor activities (e.g., large-scale warehouse operations), to limited public access and indoor office worker activities (e.g., banks, dentist office). In general, restricted commercial property use excludes the kinds of facilities specifically listed under unrestricted commercial use (e.g., it excludes day care centers, schools, churches, social centers, hospitals, nursing homes, and other facilities used to house, educate, or provide care for children, the elderly, the infirm, or other sensitive subpopulations)." (MPCA webpage for Risk-Based Site Evaluation Process Guidance Documents, Risk-Based Site Evaluation Manual (September 1998), Glossary of RBSE Terms and Concepts.)

The available soil data results for the cantonment portion of the subject property are all below the residential SRVs; however, the MPCA has determined that the level of site characterization is not sufficient to support an unrestricted property use designation. Through the review of a draft version of this Technical Memorandum, the MPCA has stated that the level of characterization is adequate for restricted commercial use. Since the intended AHATS use does not include day care centers, schools, or other frequent uses by children or sensitive subpopulations, restricted commercial property satisfies the MNARNG's needs for its intended future use.

Conclusions and Recommendations

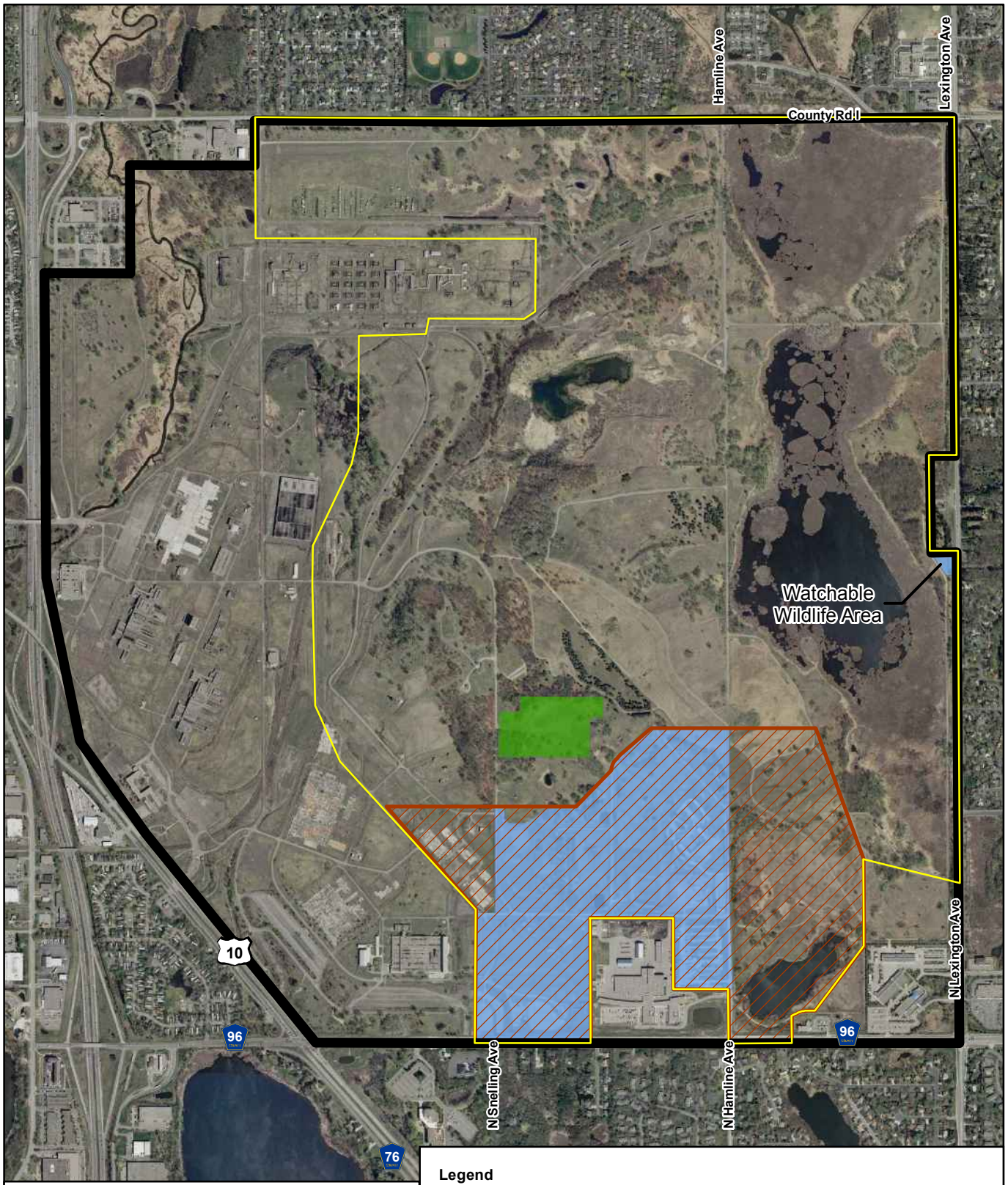
The U.S. Army believes that the level of soil testing previously performed within the subject property is appropriate based on past land uses. Testing has been performed in the specific locations considered most likely to have had a release of hazardous substances to the environment. Where soil testing was conducted, the results are below the MPCA residential SRVs.

For the "watchable wildlife area" portion of the subject property, the level of characterization and results are compatible with unrestricted use.

For the cantonment portion of the subject property, the level of characterization and results are compatible with restricted commercial use.

Therefore, it is recommended that the Revision 2 of the OU2 LUCRD be approved documenting these changes."

If soil contamination is encountered during building construction, the U.S. Army will notify the USEPA and MPCA and develop actions in accordance with the Federal Facility Agreement.



2010 Aerial Photograph (Source: Mn GEO)

1,500 750 0 1,500 Feet

N

Path: L:\1561\09\2011 LUCRD Revision 2\Subject Property Location.mxd
Date: 6/29/2011 Time: 9:58:04 AM User: shujc0243

Legend

- **Operable Unit 2 of the New Brighton/ Arden Hills Superfund Site (the same area occupied by the Twin Cities Army Ammunition Plant in 1983, when the Site was placed on the NPL.)**
- **National Guard Boundary**
- **Cantonment Area**
- **Unrestricted Use Areas**
- **Subject Property**

OPERABLE UNIT 2 LUCRD
Location of Subject Property for Revision 2 of OU2 LUCRD

Engineers - Scientists
Business Professionals
www.wenck.com

Wenck
1800 Pioneer Creek Center
Maple Plain, MN 55359-0429
1-800-472-2232

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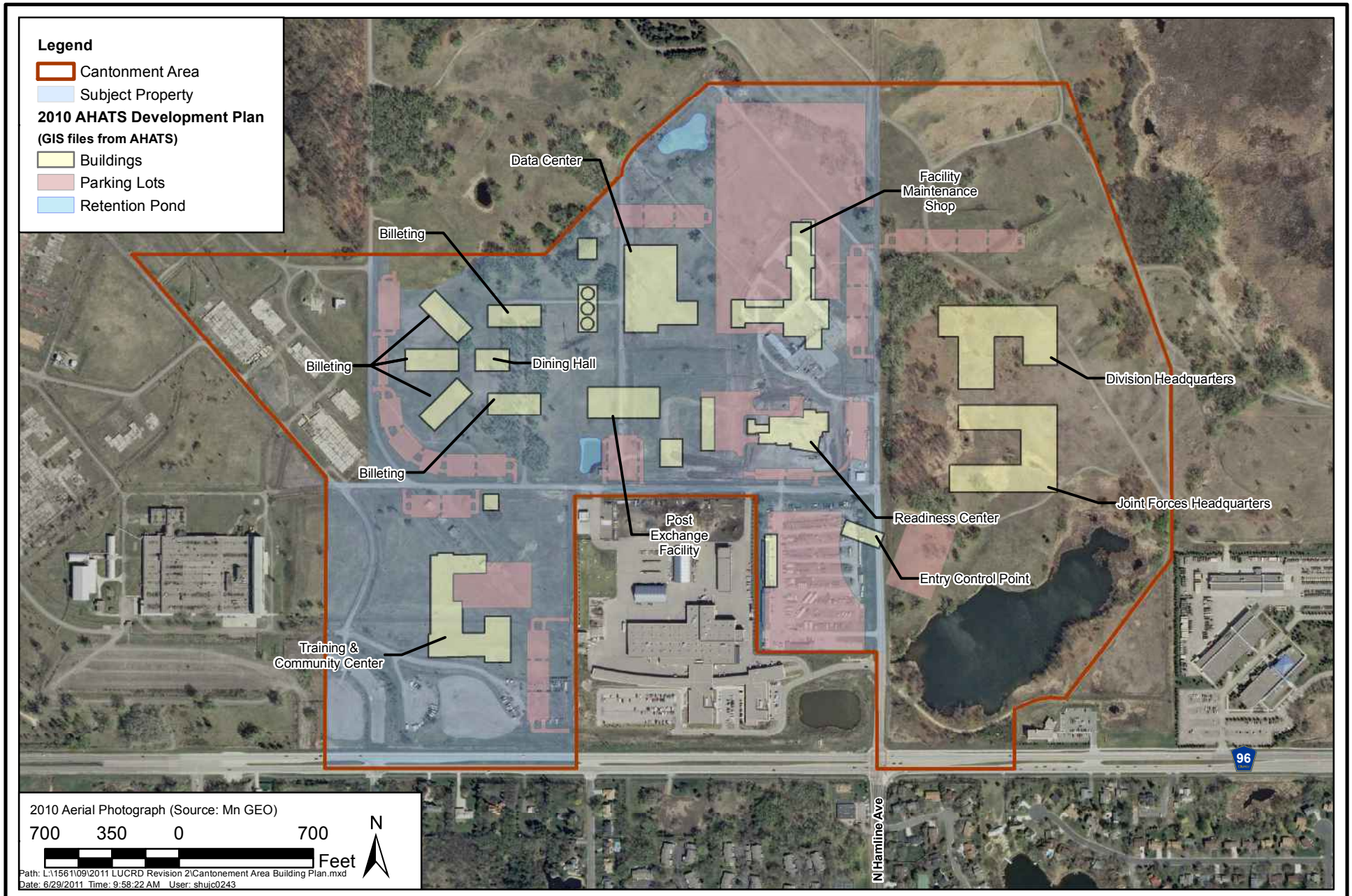
Attachment 1



OPERABLE UNIT 2 LUCRD

AHATS Cantonment Area Proposed Development Plan

Engineers - Scientists
Business Professionals
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1800 Pioneer Creek Center
Maple Plain, MN 55359-0429
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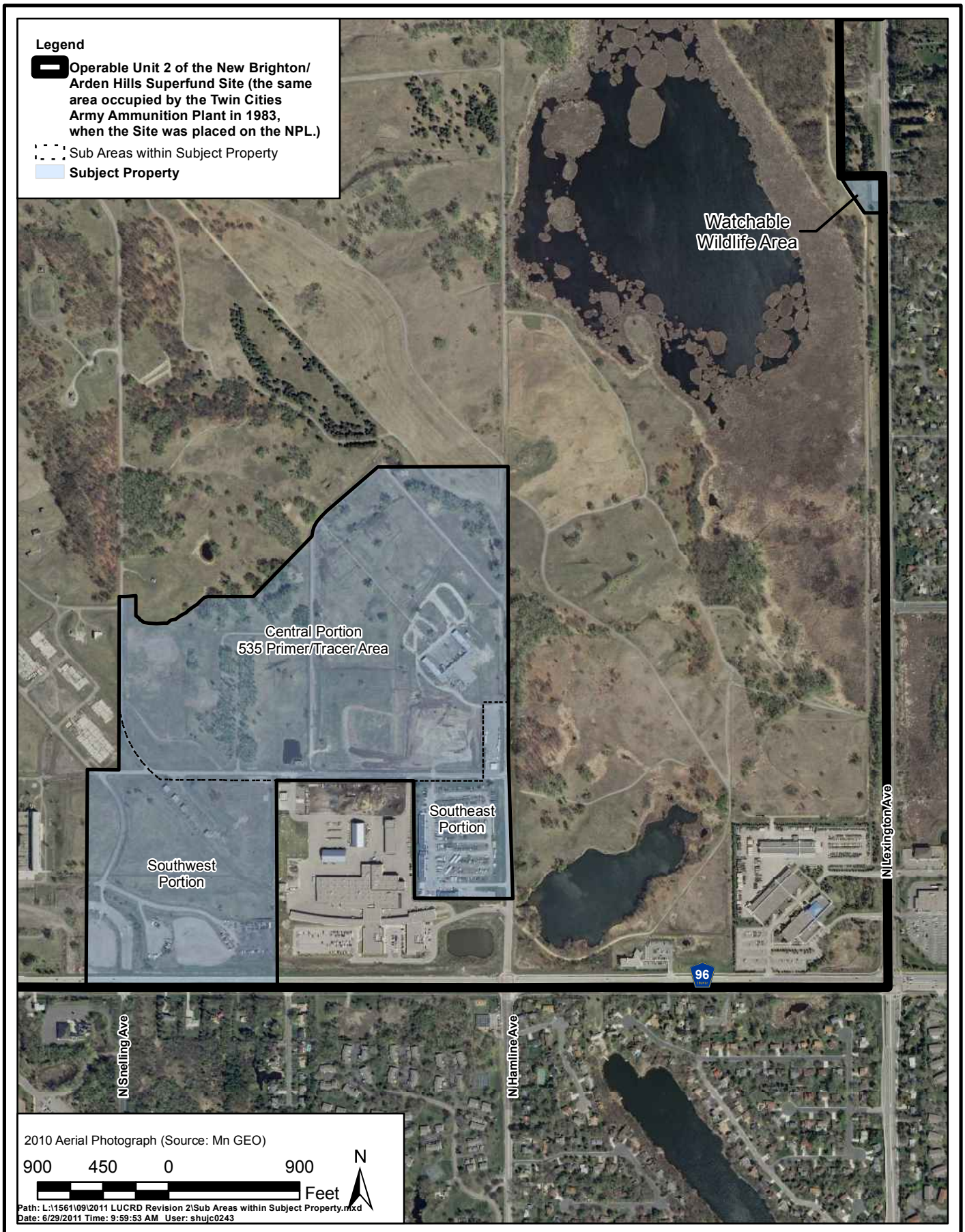
Attachment 2



OPERABLE UNIT 2 LUCRD

Sub Areas within Subject Property

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Attachment 3

Attachment 4
(Source: Summary Report for 535 Primer/Tracer Area Site Inspection Investigation. Wenck Associates, January 2005.)

LEGEND

SITE FEATURES

- EXISTING FENCE
- HISTORICAL FENCE
- CULVERT
- 6" D11–1 SANITARY SEWER
- 133B HISTORICAL BUILDING LOCATION
- 196 EXISTING BUILDING LOCATION
- 195 SUMP LOCATION

0 300
APPROXIMATE SCALE IN FEET

Alliant Techsystems
Twin Cities Army Ammunition Plant
Arden Hills, Minnesota

FIGURE 3
535 PRIMER/TRACER AREA
SITE LAYOUT INCLUDING SANITARY SEWER LINES, SUMPS AND HISTORICAL BUILDINGS

POINTMAP FILE: Fig3–AREA–535.DWG (05/20/04)

Attachment 5

AHATS Soil Database

ATTACHMENT 5

EXPLANATORY NOTES ACCOMPANYING SOIL DATABASE FOR AHATS

Notes Regarding the Database Excel File

1. The database includes data generated by both TCAAP and the Minnesota Army National Guard for all of AHATS. The data relevant to the subject area for Revision 2 to the OU2 LUCRD is highlighted in yellow.
2. The soil data was too large for a single Excel sheet so it is in two sheets: one for data generated by Shaw (formerly Stone & Webster) and another for all other sources. (Note: there is no Shaw data relevant to the subject property for Revision 2 to the OU2 LUCRD.) These are the first two tabs in the Excel file. Each row in these tabs represents a unique soil data result, along with the location coordinates and depth. As an example, if a single soil sample was analyzed for 15 different chemicals, then there are 15 rows in the database, one for each chemical result at the same location and depth.
3. The third tab, labeled "Column Metadata," has a brief explanation for what type of information is presented in each column for the two data tabs. Some columns are more "working" in nature, such as converting units when necessary.
4. The fourth tab, labeled "Sources," describes where the data, locations, and depths were obtained. This tab assigns a number to the various reports used, and attempts to inventory whether various information was available electronically versus hard-copy. The data tabs have a column listing the source number, so a user should be able to back-track and find the original source for every piece of data.
5. The fifth tab, labeled "Cleanup Values," presents the available Soil Reference Values (SRVs) developed by the MPCA. There are SRVs for three different default land use scenarios: industrial, recreational, and residential. These SRVs were used for comparison to the soil data, with one exception: the TCAAP site-specific value of 1,200 mg/kg was used for the industrial cleanup value for lead in place of the MPCA industrial SRV of 700 mg/kg (not relevant for Revision 2 to the OU2 LUCRD).
6. The remaining tabs are for calculations of the benzo(a)pyrene (BAP) equivalent following the worksheet on the MPCA's webpage. The user is cautioned that the number of chemicals incorporated into the BAP equivalent calculation has changed over time, so there is variability in the reporting. For this database, a consistent methodology was employed. The current MPCA calculation worksheet was used, which has a longer list of chemicals than most past analyses. All available chemical results were inserted into the worksheet. If a result was reported as "non-detect," a value of one-half the reporting limit was used in the calculation.

a. If the calculation result was less than the respective SRV for BAP equivalent, the database assigned a mapping value of "0" (see notes regarding figures for more information on mapping values).
b. If the calculation result was above the respective SRV, and there were no "non-detect" values involved in the calculation, the database assigned a mapping value of "1."
c. If the calculation result was above the respective SRV, and "non-detect" values were involved in the calculation, the database initially assigned a mapping value of "2." The results with a "2" were individually reviewed to assess the impact of using one-half the reporting limit for "non-detect" inputs.
    i. If the calculation would result in an SRV exceedance even if the "non-detect" values were ignored, then the "2" was changed to a "1."
    ii. If the SRV exceedance was caused by the use of one-half the reporting limit for "non-detect" values, then the "2" was changed to a "0."

7. Field screening type data was not entered into the database, such as that generated by a portable X-Ray Florescence (XRF) instrument.
8. Data was entered for grab samples with a unique location and depth, but not for composite samples representing a bigger area.
9. Data was entered for standard chemical analyses, as opposed to say data generated by the Toxicity Characteristic Leaching Procedure (TCLP), or data from testing of physical properties.
10. The database is intended to represent current soil conditions. Hence, results for samples representing soil that was later excavated or treated in-place are not in the database. Various reports differed in the level of detail with respect to areas and depths of excavated soil, so at times, professional judgment had to be exercised.
11. Most excavated areas were backfilled with "clean" soil. Backfill was tested and demonstrated to be acceptable prior to use, but testing was not performed of the soil after placement. Since borrow testing results do not have unique locations and depths corresponding to the current placement of the soil, this data was not incorporated into the database.
12. The database does not take into account any earthwork that may have occurred since the time of remediation at the various areas of concern.
13. A substantial portion of the data had to be manually entered from hard copy sources. While a reasonable amount of quality control checks were employed, not every test result was checked. Wenck does not guarantee the accuracy of all data.
14. An attempt was made to compile Reporting Limits and Method Detection Limits, and thus, there are columns in the database for this information. The information was to assist in handling "non-detect" values. Unfortunately, there was not great standardization in what information labs have shown over the years on their reports. Sometimes labs showed both the Reporting Limit and the Method Detection Limit. Sometimes one or the

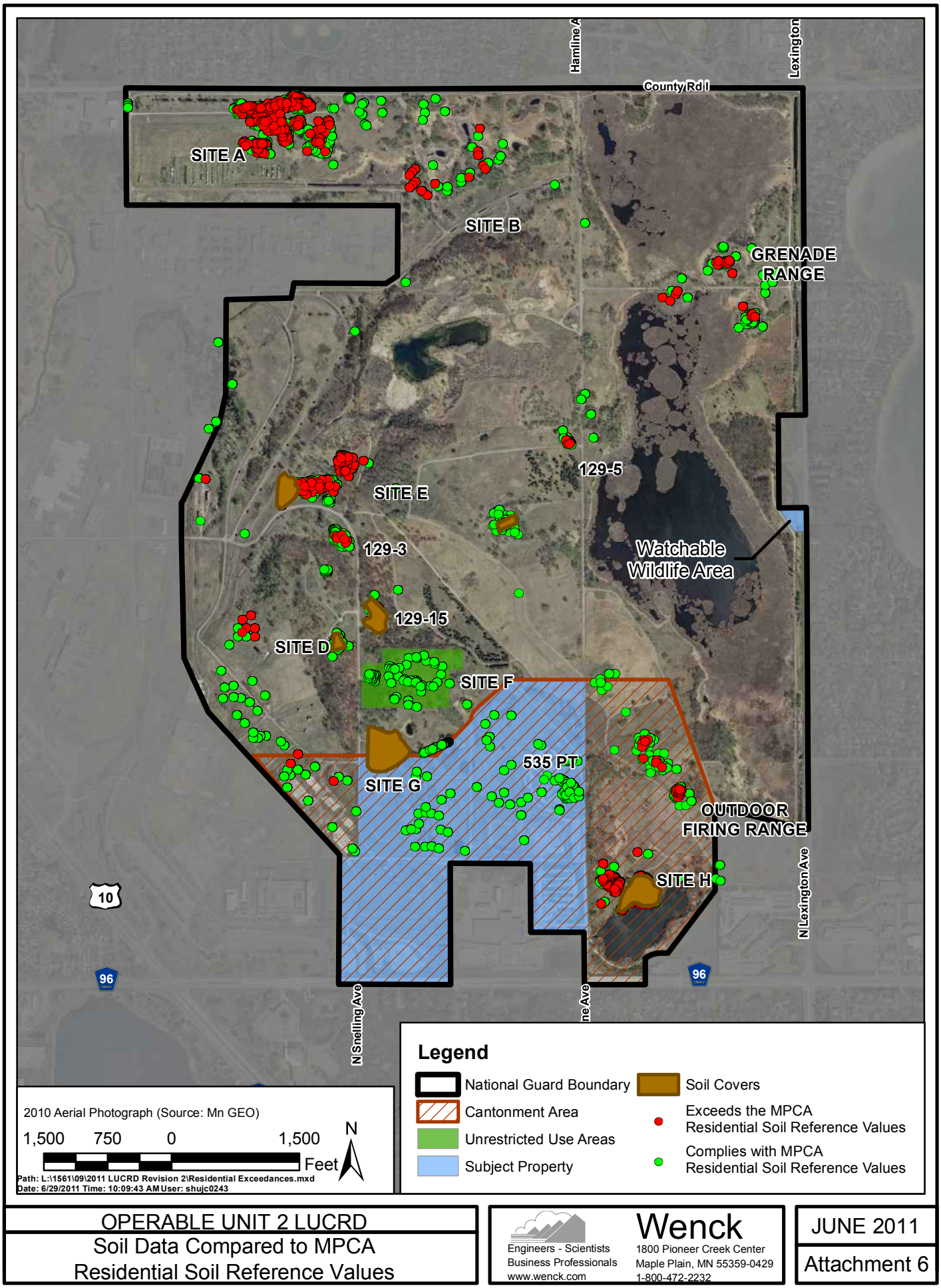
other. Sometimes none. Older lab reports were even more inconsistent in this aspect. Further complicating the matter is variability in how "non-detects" were reported. Sometimes labs simply reported an "ND." Sometimes it was reported like "<1," where 1 represents the Reporting Limit. Sometimes it was reported as "1U," where 1 represents the Reporting Limit and U means undetected. Further complicating the matter is that consulting engineers often created summary tables of data, and often didn't carry through a result like "<1," but instead replaced it with ND. To have a single, common system for the database, we elected to go with the "<1" approach, where the digit represents whatever the Reporting Limit was. Sometimes we would have a result reported like <1, but it was unclear if the 1 represented the Reporting Limit or Method Detection Limit. In these cases, we assumed it was a Reporting Limit as the more common practice of reporting. For data reported in a source simply as "ND," if we could find a Reporting Limit elsewhere in the source or in an original lab report, then we manually entered the value like <1. If the data was reported as 1U, we changed it to <1.

Notes Regarding the Figure (Attachment 6)

1. The database is set up to have each sample result compared to the three SRVs (industrial, recreational, and residential). The only exception is for lead in the industrial scenario where the TCAAP site-specific value of 1,200 mg/kg is used in place of the SRV (not relevant for Revision 2 to the LUCRD). The comparison generates a mapping value of "0" if the value is less than the respective SRV or a "1" if the value is greater.
2. For mapping purposes, a green dot was assigned to the "0's" and a red dot to the "1"s". Attachment 6 is a red/green dot map for comparison to the residential SRVs.
3. To elaborate, each dot on a map is really a "stack" of dots; one for every chemical test result at that location, including multiple depths. Try to visualize each dot as a stack of dots. If the map could be plotted in 3-D, the stack heights would be different between locations because the number of chemicals tested varied. Some dots represent a stack one dot high based on a single chemical test (e.g., lead), while other dots could represent up to hundreds of individual dots stacked together based on testing for a full suite of 20 or so metals, 100 or so VOCs, 100 or so semi-volatile organic compounds (SVOCs), etc. And there can be samples at multiple depths at the same location.
4. A green dot on the maps means that every dot within the stack for that location is green, or a "0", which means the results were less than the respective SRVs.
5. A red dot means there is at least one red dot within the stack of dots, or a chemical test result that is greater than its respective SRV. Again, there could be many green dots in the stack for that location representing other chemicals or different depths, but in essence, the red dot moves to the top of the stack and is shown on the map.

6. As previously discussed, the maps show that soil testing has been biased to portions of the property with the greatest likelihood of a past release of a hazardous substance to the environment.

Note: The AHATS Soil Database included with OU2 LUCRD Revision 2 is superseded by the AHATS Soil Database version that is included with OU2 LUCRD Revision 3 (Appendix C, Attachment 4)



OPERABLE UNIT 2 LUCRD
Soil Data Compared to MPCA Residential Soil Reference Values

Engineers - Scientists
Business Professionals
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JUNE 2011

Attachment 6

APPENDIX C

Technical Memorandum, Supporting Documentation for Revision 3

Technical Memorandum

Supporting Documentation for Revision 3,
Operable Unit 2 Land Use Control Remedial Design

New Brighton/Arden Hills Superfund Site

Wenck Associates, Inc.

March 23, 2015

Purpose and Summary

The purpose of this Technical Memorandum is to document the information used as the basis for regulatory approval of Revision 3 for the Operable Unit 2 Land Use Control Remedial Design (OU2 LUCRD). Revision 3 affects land use controls (LUCs) for a portion of the Arden Hills Army Training Site (AHATS) and for the entire Arden Hills U.S. Army Reserve Center (USARC), subsequently referred to together as the "subject property", as shown on Attachment 1. Within AHATS, the subject property consists of the western and eastern portions of the cantonment area located on either side of the restricted commercial use area. The subject property is federally-owned, with the AHATS property under the control of the National Guard Bureau, who in-turn licenses use to the Minnesota Army National Guard (MNARNG), and with the USARC under the control of the U.S. Army Reserve. Revision 3 documents that, for the subject property, uses compatible with "restricted commercial use" will result in acceptable risk to human health (based on comparison of soil data to risk-based levels). This revision only affects LUCs for soils/property use. LUCs for groundwater, groundwater infrastructure, and soil covers are not affected by this revision.

Background

Revision 1 of the OU2 LUCRD was approved by the US Environmental Protection Agency (USEPA) and Minnesota Pollution Control Agency (MPCA) in September 2010. (The draft document was considered Revision 0 and the final document was considered Revision 1.) The OU2 LUCRD was developed to satisfy requirements for LUCs set forth in amendments and Explanations of Significant Differences associated with the OU2 Record of Decision (ROD). LUCs are a component of the remedies for various areas of concern for protection of human health. While the need for LUCs is clear for the individual areas of concern, it is less clear for surrounding areas. To expedite the approval process, the U.S. Army elected to implement "blanket LUCs" across most of OU2, including AHATS and the USARC. However, it was anticipated that the U.S. Army would, in the future, undertake efforts to reduce the footprint of the "blanket LUCs" to allow less restrictive activities on certain portions of OU2. The first such effort, Revision 2 of the OU2 LUCRD, was approved by the USEPA and MPCA in June 2011, and it changed the central portion of the AHATS cantonment area from the "blanket LUC" for soils to uses compatible with "restricted commercial use".

The "blanket LUC" for soils, as specified in the OU2 LUCRD, is based on the following exposure scenario:

> *Adult activity, less than 250 days per year, with relatively little contact with bare soil.*

The MPCA defines restricted commercial property use as:

> "Use of property for commercial purposes where access or occupancy by non-employees is less frequent or is restricted. This property use can range from no public access for both outdoor and indoor activities (e.g., large-scale warehouse operations), to limited public access and indoor office worker activities (e.g., banks, dentist office). In general, restricted commercial property use excludes the kinds of facilities specifically listed under unrestricted commercial use (e.g., it excludes day care centers, schools, churches, social centers, hospitals, nursing homes, and other facilities used to house, educate, or provide care for children, the elderly, the infirm, or other sensitive subpopulations)." (MPCA webpage for Risk-Based Site Evaluation Process Guidance Documents, Risk-Based Site Evaluation Manual (September 1998), Glossary of RBSE Terms and Concepts.)

The MNARNG mission consists not only of soldier training, but also includes family and community outreach activities. Hence, the MNARNG desires to allow people younger than adult age on portions of the property for occasional specific events, such as family days. The restricted commercial property definition allows for this type of occasional MNARNG event, which can then include younger than adult age people, whereas the "blanket LUC" restricts access to adult age only. This also applies to the USARC.

Revision 3 of the LUCRD applies only to the USARC and to the portion of the AHATS property identified as the "subject property" on Attachment 1. The southern portion of Site G that is located within the AHATS cantonment area is included as part of the subject property.

Description of Subject Property

Attachment 1 shows the location of the subject property within OU2, and also shows the "cantonment area" of AHATS. Generally-speaking, a cantonment area is where primary buildings are located, and is considered a separate feature from "training range" areas. Access to the cantonment area is currently controlled by fence and locked gates. Attachment 2 shows the plan for building construction within the cantonment area. As new buildings are constructed, it is anticipated that the fence lines will be modified to allow public access to the buildings, but not beyond into the rest of AHATS.

The subject property also contains (or partially contains) two isolated disposal/dump areas having soil covers (Site G and Site H as shown in Attachment 3). Note that the soil cover areas are areas where a soil cover has been established as a barrier that prevents exposure to underlying contaminated soils and/or debris. The long-term integrity of soil covers is protected by an LUC (i.e., restricting activities that would disrupt the effectiveness of the cover) and also by signs that are posted around the perimeters of the soil covers cautioning against any digging or disturbance.

The USARC has several buildings and associated parking lots, and a lesser area of open space. The front parking lot is accessible, but the interior property is controlled by fence and locked gates.

Former and Current Land Use on Subject Property

The Twin Cities Army Ammunition Plant (TCAAP) was constructed in 1941 to produce small-caliber ammunition for the United States military. Production activities included manufacturing small arms ammunition and related materials, proof-testing small arms ammunition and related items as required, and handling and storing strategic and critical materials for other government agencies. Ammunition production and related activities have occurred periodically, commensurate with operations in wars, conflicts, and other national emergencies, and ceased in 2005. Since the establishment of AHATS, the property use within the AHATS portion of the subject property has been military training, and has also included beginning to construct buildings within the cantonment area, as described above. Since the establishment of the USARC, the property use within the USARC has been indoor office and training activities, along with vehicle storage and maintenance.

Proposed Land Use on Subject Property

The cantonment area, including the subject property, is anticipated to remain part of AHATS into the foreseeable future. The MNARNG has begun implementing their plans to construct a number of buildings within the cantonment area, including the portions of the cantonment area that fall within the subject property. Attachment 2 shows the current building footprint plan, along with parking lots and roads/sidewalks. Note that the plans and construction sequencing are subject to change based on MNARNG and/or National Guard Bureau needs, as well as funding. Currently, the proposed buildings on the western piece of the subject property only include billeting, and the proposed buildings on the eastern piece of the subject property include Division Headquarters and Joint Forces Headquarters. The primary use of the two headquarters buildings will be for office space. Members of the public may periodically visit these buildings for meetings or for other special ceremonies or events. The use of the cantonment portion of the subject property will be analogous to commercial use, where there are daily workers present and transient public visitors.

While Attachment 2 indicates that the amount of open space will be significantly reduced as development progresses, some open spaces will remain. The definition of restricted commercial property does not preclude the existence of scattered open space areas, which are common in many site developments. The focus of this land use category is on the type of facilities and type of people that regularly use the property. Hence, it specifically excludes the kinds of facilities that involve regular use by children, the elderly, and the infirm (e.g., it excludes day care centers, schools, churches, social centers, hospitals, nursing homes, and other such facilities involving sensitive subpopulations), and also cites limits on access or occupancy of the property by non-employees such that it is “less frequent or is restricted”. The rare event of a “family day” in which families could visit the MNARNG facilities would fall under this definition. In particular, the MNARNG is not proposing any type of formal recreation or public access areas that might result in higher frequency/degree of exposures to soils (and if any areas of this type were to be considered by the MNARNG, they would be discussed beforehand with the MPCA/USEPA). At times when the MNARNG conducts a “family day” type event, the MNARNG will take

measures to prevent visitors from accessing the larger, undeveloped open space areas, either by phased relocation of the perimeter fence that occurs coincident with new development activity, or by providing temporary signage. Also, note that institutional controls (security, gates, locks, fence, anti-climb, guards, etc.) are maintained by the MNARNG due to Anti-Terrorism Force Protection requirements and the normal operations of the MNARNG.

The other portions of AHATS outside (and generally north of) the cantonment area will continue to be used as "training range" areas for conducting military training and will continue to be subject to the "blanket LUC" for soils.

The USARC will continue to be used for indoor office and training activities, vehicle storage and maintenance. As with the AHATS cantonment area, members of the public may periodically visit USARC buildings for meetings or for other special ceremonies or events. The use of the USARC portion of the subject property will be analogous to commercial use, where there are daily workers present and transient public visitors.

Previous Environmental Studies and Investigations

Environmental investigations at TCAAP began in the early 1980s with the discovery of groundwater contamination. TCAAP was placed on the National Priorities List as part of the New Brighton/Arden Hills Superfund Site in 1983. Following is a brief summary of the key studies/investigations and closeout reports relevant to the subject property.

- **TCAAP-Wide Reports**

    - 1988: *Installation Restoration Program: Preliminary Assessment of the Twin Cities Army Ammunition Plant* (Argonne National Laboratory, February 1988)

      As stated in the Executive Summary, "The document presents the results of a comprehensive review and consolidation of records related to the history of ammunition production and waste disposal activities prior to December 31, 1981…The assessment was based on a critical review and synthesis of published and unpublished information available at USATHAMA [U.S. Army Toxic and Hazardous Materials Agency; now U.S. Army Environmental Command], TCAAP, MPCA, Donovan Construction, and U.S. National Personnel Records Center in St. Louis, Missouri." The Preliminary Assessment work was probably the most comprehensive study into the records of production, including chemical usage and disposal. The intent of the Preliminary Assessment was to identify areas within OU2 most likely to have had a release of hazardous substances into the environment based on historical property use. The Preliminary Assessment formed the foundation for later investigations as far as where to look and what to look for. The Preliminary Assessment identified 14 areas of concern that were known or potential waste disposal sites (burial and/or open burning), and two of these sites are located within (or partially within) the subject property of this OU2 LUCRD Revision 3 (Sites G and H). Descriptions of disposal activities at these sites are included under site-specific report discussions below. Solvent disposal at

Site G contributed to the regional groundwater contamination, and hence an Interim Remedial Action (IRA) had previously been implemented at this site to remove volatile organic contaminants (VOCs) from the soil (a soil vapor extraction (SVE) system had been installed and had begun operation in 1986). The report also noted that a number of sewer investigations were conducted in the early to mid-1980s, and that cleaning of TCAAP sewers was completed by the end of 1986.

- 1991: *Installation Restoration Program: Remedial Investigation Report for the Twin Cities Army Ammunition Plant* (Argonne National Laboratory, April 1991)

  The remedial investigation report presented additional characterization of the 14 disposal sites identified at TCAAP as sources of contamination, an initial screening of remedial alternatives, and recommendations for additional investigations. Additional investigation work was recommended at both of the two disposal sites on the subject property.

- 1997: *Operable Unit 2 Feasibility Study, Twin Cities Army Ammunition Plant* (Montgomery Watson, March 1997)

  The OU2 FS (with its supporting 1994 Supplemental Data Report) presented the results of additional data collection in support of the FS, and provided a more complete characterization of the nature and extent of contamination at the two sites on the subject property. Based on the Remedial Action Objectives (RAOs) that were established in this FS, this report presented a screening of potential remedial technologies and then assembled various retained technologies into potential remedial alternatives. The potential remedial alternatives were then evaluated against the nine evaluation criteria established in the National Contingency Plan (NCP) and also against each other, with a recommended remedy presented. The report determined the final Chemicals of Concern (COCs) for each site and developed site-specific, risk-based Recommended Remediation Goals (RRGs) that were based on an "industrial use" scenario (i.e., the "blanket LUC" exposure scenario stated on Page 2 of this memorandum), as documented in Appendix B of the FS. The recommended remedies are discussed below under the site-specific reports.

- 1997: *Operable Unit 2 Record of Decision, New Brighton/Arden Hills Superfund Site* (October 1997)

  The OU2 ROD documented the final selected remedies for the disposal sites, including the two sites on the subject property, and also documented the final COCs and corresponding RRGs for each site. The recommended remedies are discussed below under the site-specific reports. Subsequent to the signing of this ROD, additions, changes or clarifications to the original ROD-specified remedies are documented in two Explanation of Significant Difference (ESD) and five Amendments.

- **Site-Specific Reports for Sites Included in the 1997 OU2 ROD**

    - 1998: *Final Field Sampling Report – **Site**s D and **G**, Twin Cities Army Ammunition Plant* (Stone & Webster Environmental Technology & Services, March 1998)

      Site G is located on the north side of the western piece of the subject property, within AHATS, and the northern boundary of the cantonment area bisects Site G. The SVE system installed as an IRA at Site G was included as a component in the final remedy selected in the OU2 ROD, which specified that a deep SVE system should also be installed (to address presumed VOC contamination in the deeper soils), along with modifications and potential enhancements to the existing shallow SVE system. The field sampling for this report included soil borings and soil sample analyses. The results for Site G indicated that trichloroethene exceeded the RRG in shallow soil, and also identified the presence of a tar-like material that had not been identified in previous investigations at Site G. VOC detections in deeper soils were all below the Site G trichloroethene RRG. Site D is not located within the subject property.

    - 1999: *Final Field Investigation Report – **Site G** Tar-Like Material, Twin Cities Army Ammunition Plant, Revision 2* (Stone & Webster Environmental Technology & Services, August 1999)

      Soil borings and soil sample analyses were conducted to determine the extent of the tar-like material and to characterize this material. The material was found intermittently throughout the Site G dump area. Compounds detected in the material suggested that it may be roofing tar or other asphaltic material. The tar-like material contained SVOCs that may be considered a hazard; however, the depths where the material was found (9 to 24 feet below ground surface) and the presence of the clay cap limit the possibility of contact with the materials. The clay cap also minimizes infiltration of precipitation through these areas. No further action was recommended for the tar-like material.

    - 2004: *Final **Site G** Volatile Organic Compound Investigation and Dump Close Out Report, Twin Cities Army Ammunition Plant, Revision 2* (Shaw Environmental, Inc., December 2004)

      This report documents the results from additional soil borings and soil sample analyses that were conducted in 2000 to confirm the results of the soil borings conducted for the 1998 Field Sampling Report. The prior results were confirmed, with no trichloroethene detections exceeding the RRG in deep soil, and with one soil sample from the shallow soil (15 feet below ground surface) exceeding the trichloroethene RRG. However, USEPA and MPCA agreed to recalculation of the leaching-based RRG accounting for existing site conditions (the clay cap). All trichloroethene detections were below the revised RRG of 36.1 mg/kg. The report

therefore concluded that the Site G VOC-related remedy components specified in the OU2 ROD have been completed, assuming the clay cap remains in place.

Final characterization of the dump, as required by the OU2 ROD, was completed based on review of previous investigations conducted at Site G between 1983 and 2000. Results from these investigations indicated that the dump contained bricks, glass, wire, rubber, nails, concrete, asphalt, metal pieces, ash, and the tar-like material. Lead concentrations above the TCAAP RRG of 1,200 mg/kg were also noted in two composite soil samples from 1984. The dump materials were considered to be industrial solid waste, and the USEPA and MPCA agreed that containment was the most appropriate remedy. A 2-foot thick soil cover was recommended and approved as the final remedy, with the existing 2-foot thick cap (including 18 inches of clay) serving as the cover for the top portion of the dump, and additional cover to be placed on the side slopes of the dump. The Site G SVE system was dismantled prior to cover construction. Cover construction, as documented in this report, was completed in 2003. The soil cover location is shown on Attachment 3.

The report received preliminary approval from the USEPA and MPCA in July 2004, and received final USEPA/MPCA approval on October 25, 2010, following approval of the OU2 LUCRD. OU2 ROD Amendment #3 documented that the requirement to characterize the Site G dump has been completed and that construction of a selected remedy (containment) has been completed. The requirement to maintain this soil cover and its associated LUCs is also documented in Amendment #3.

- 2002: *Final Remedial Action Completion and Shallow Soil Sites Close Out Report, Volume III – **Site H** Activities, Twin Cities Army Ammunition Plant, Revision 2* (Stone & Webster, Inc., February 2002)

  Site H is located in the eastern piece of the subject property, within the AHATS cantonment area, on the north side of Sunfish Lake. Site H was a burning site with a burning cage located in the center. Burning, primarily of wood, paper, cardboard, and combustible trash, reportedly took place from the early 1940s until the late 1960s. In addition to waste burning, portions of the site may have been used for burial and dumping of industrial sludge, paint residue, incineration ash, and solvents. Dumping activities began at the end of World War II and continued until 1967. This report documents 1999-2001 remediation work in which the soils that exceeded RRGs were excavated, stabilized, and transported off-site to a Subtitle D landfill. The COCs for Site H are antimony, arsenic, copper, lead, and manganese. Verification soil sampling and analysis indicated that the COCs were below RRGs for the soils remaining onsite. In addition, a 2½-foot thick soil cover was constructed over an area containing Asbestos Containing Material, or “ACM” (the Area H1-3 dump). The soil cover location is shown on Attachment 3.

The report received preliminary approval from the USEPA and MPCA in February 2002, and received final USEPA/MPCA approval on October 25, 2010, following approval of the OU2 LUCRD. OU2 ROD Amendment #3 amended the selected remedy for Site H to declare that the cover is part of the final remedy for the site, and to include maintaining this soil cover and its associated LUCs. Also, since RRGs were not based on unrestricted use, Amendment #3 documented the need to maintain an LUC for property use relative to soils.

- **Site-Specific Reports for Other Removal Actions**

  - Outdoor Firing Range

    - 1995: *Final Report, Phase I - Investigation of Soils at the **Outdoor Firing Range**, Twin Cities Army Ammunition Plant* (Federal Cartridge Company, March 1995)

      The Outdoor Firing Range was built in 1943 during the original construction of TCAAP and served as an area to test the outdoor accuracy and performance of small arms ammunition. This site was not included in the 1997 OU2 ROD. The original range was composed of Proofhouse Building No. 145 (Proofhouse), from which .30- and .50-caliber ammunition were test-fired, and the Earthen Barricade located approximately 1,200 yards from the Proofhouse. In 1955, three new bullet-catching structures were constructed along the firing line at distances of 600, 840, and 1,900 yards from the Proofhouse. Each bullet catcher was built into the steep slope of a man-made hill that acted as an earthen backstop. At least four observation houses that were used to view the performance of test ammunition were located within the boundary of the Outdoor Firing Range. Most of the Outdoor Firing Range area extends from the southeast corner of AHATS to the central area of AHATS. The very southeastern portion of the Outdoor Firing Range, where the Proofhouse was located, is located on the U.S. Army Reserve property. The 1900-Yard Range is located north of the cantonment area, outside the subject property, and is not discussed further in this memorandum.

      From 1961 to 1967, the Proofhouse was leased and operated by the Honeywell Defense Systems Division (now Orbital ATK). Honeywell used the Outdoor Firing Range to test 40-mm grenades until the summer of 1966. Honeywell's grenade testing area also included a grenade catcher located 200 yards down range (Building 170/173 and Grenade Catcher). The Outdoor Firing Range was last utilized for ammunition testing in 1974.

      As documented in the report, the original barricade and the three bullet catchers were demolished and removed. Proofhouse Building 145 was

demolished in 1987 to clear land for construction of the USARC. The report notes that, during construction of the USARC, one Underground Storage Tank (UST) was located and removed in 1990. The report further states that an "exhaustive search" was conducted in order to locate any additional USTs associated with observation structures at the Outdoor Firing Range, but no additional USTs were discovered.

The Phase I soil investigation work identified metal-contaminated soils at the 200-Yard Range, 600-Yard Range, and 840-Yard Range areas. The report recommended that sources be further delineated in a Phase II investigation.

- 1997: *Final Phase II - Investigation Report, **Outdoor Firing Range**, Twin Cities Army Ammunition Plant* (Alliant Techsystems Inc., March 1997)

  This report documents the results from additional soil borings and soil sample analyses from the Outdoor Firing Range. The results confirmed the Phase I results and provided improved delineation. The report recommended that an Engineering Evaluation / Cost Analysis (EE/CA) report be prepared to establish cleanup goals and evaluate remedial alternatives, and also recommended additional characterization in some areas.

- 1998: ***Outdoor Firing Range** Engineering Evaluation/Cost Analysis (EE/CA), Twin Cities Army Ammunition Plant* (Alliant Techsystems Inc., March 1998)

  The EE/CA report documented additional characterization results; evaluated potential remedial alternatives based on effectiveness, implementability, and cost; and also presented a comparative analysis of the alternatives. The recommended remedy was soil excavation, stabilization, and transportation off-site to a Subtitle D landfill. The report determined the final COCs (antimony, copper, and lead) and the respective RRGs, which were based on an "industrial use" scenario.

- 1999: *Action Memorandum: Non-Time Critical Removal Action at the **Outdoor Firing Range**, Twin Cities Army Ammunition Plant* (February 1999)

  The Action memorandum documented the final selected remedy for the Outdoor Firing Range (as noted in the previous item) and also documented the final COCs.

- 2001: *Final Closeout Report, **Outdoor Firing Range** and #150 Reservoir Site Soil Removal Action, Completion of Soil Removal, Twin Cities Army Ammunition Plant, Revision 1* (Alliant Techsystems Inc., December 2001)

  This report documents 1999 remediation work in which the soils that exceeded RRGs were excavated, stabilized, and transported off-site to a Subtitle D landfill. Verification soil sampling and analysis indicated that the COCs were below RRGs for the soils remaining onsite. Note that the #150 Reservoir Site is not located within the subject property. The report received preliminary approval from the USEPA and MPCA in December 2001, and received final USEPA/MPCA approval on October 25, 2010, following approval of the OU2 LUCRD. OU2 ROD Amendment #3 added the Outdoor Firing Range to the final remedy for OU2 and also, since RRGs were not based on unrestricted use, documented the need to maintain an LUC for property use relative to soils.

- **Other Site-Specific Reports**

  - AHATS Environmental Baseline Survey (EBS) Reports

    - 1997: *Environmental Baseline Survey, Twin Cities Army Ammunition Plant* (Montgomery Watson, June 1997)

      The MNARNG commissioned a study of the portion of TCAAP it sought to take accountability for under license to the National Guard Bureau. This study was a "Phase I" in that it reviewed previous documents, but did not involve any environmental testing. The report identified data gaps where further work was recommended.

    - 1998: *Final Phase II Environmental Baseline Survey, Twin Cities Army Ammunition Plant* (Montgomery Watson, April 1998)

      The MNARNG commissioned an investigation that included conducting property inspections, interviews, and in some cases, analytical testing. Areas within the subject property that were covered by this report include the Outdoor Firing Range and the Sunfish Lake area. Risks were noted to be associated with the Outdoor Firing Range; however, this was prior to the remedy implementation at this site which addressed the site risks. The Sunfish Lake Area was concluded to have "minimal site risk to guardsmen and other occupants", with no further recommendations.

- 1999: *Final Training Area F Addendum, Phase II Environmental Baseline Survey* (Montgomery Watson, December 1999)

  The MNARNG commissioned an investigation that included conducting property inspections, interviews, and in some cases, analytical testing. Training Area F is identified as the area of AHATS south and west of Snelling Avenue, excluding a narrow strip of property along the west edge thereof. Areas within the subject property that were covered by this report included three areas that were identified as the Building 599 Runoff and Site Debris, the Foundation Area West of Building 599, and the Southern Open Storage Area. These three areas were located in the southern portion of Training Area F, and within the western piece of the subject property. Soil sampling and analysis was conducted in these areas, and the report noted that no residential Soil Reference Values (SRVs) were exceeded in the Building 599 Runoff and Site Debris area. However, there were exeedances of MPCA industrial SRVs noted for lead and/or mercury in both the Foundation Area West of Building 599 and the Southern Open Storage Area, and these exceedances were further investigated and remediated as the "EBS Area Soil Areas of Concern," as further discussed below.

- 2001: *Final Phase II Environmental Baseline Survey, Area WK* (Montgomery Watson, November 2001)

  The MNARNG commissioned an investigation that included conducting property inspections, interviews, and in some cases, analytical testing. Area WK included Training Area F (see previous report), plus the narrow strip of property along the west edge of Training Area F, plus additional area between Training Area F and the 135 Primer/Tracer Area and just east of the 135 Primer/Tracer Area. The only area within the subject property that was covered by this report is the area of "Buildings 594, 590, and 588" (of which only Buildings 588 and 590 are located on the subject property, in the western piece thereof). Soil sampling and analysis was conducted in the Building 588 and 590 areas, and the report indicates that "soil sample results do not show evidence of hazardous materials or concentrations of compounds that exceed regulatory criteria."

- 2005: *Final Phase II EBS Investigation* (MWH Americas, Inc., December 2005)

  The MNARNG commissioned an investigation that included concrete cores collected from the slabs for Buildings 588 and 590, which are located in the western piece of the subject property. These cores were collected to provide information regarding potential disposal options for these concrete slabs, should they be removed in the future. No soil sampling was conducted relative to these two buildings.

- MNARNG EBS Area Soil Areas of Concern (AOCs)

  - 2012: *Engineering Evaluation/Cost Analysis (EE/CA), Soil Investigations at Areas of Concern (Site A, 135 Primer/Tracer Area, **EBS Areas**), New Brighton/Arden Hills Superfund Site* (Wenck Associates, Inc., November 2012)

    The EE/CA report documented additional characterization results for the MNARNG EBS Areas; evaluated potential remedial alternatives based on effectiveness, implementability, and cost; and also presented a comparative analysis of the alternatives. The recommended remedy was soil excavation, stabilization, and transportation off-site to a Subtitle D landfill. The report determined the final COCs for EBS AOC #1(lead, mercury, and cPAHs) and EBS AOC #2 (antimony, copper, lead, and mercury) and the respective RRGs, which were based on an "industrial use" scenario. Note that Site A and the 135 Primer/Tracer Area are not located on the subject property.

  - 2012: *Action Memorandum: Non-Time Critical Removal Action for Soil Areas of Concern (Site A, 135 Primer/Tracer Area, **EBS Areas**), New Brighton/Arden Hills Superfund Site* (Wenck Associates, Inc., (December 2012)

    The Action memorandum documented the final selected remedy for the MNARNG EBS Areas (as noted in the previous item) and also documented the final COCs.

  - 2013: *Removal Action Completion Report for Soil Areas of Concern (Site A, 135 Primer/Tracer Area, **EBS Areas**), New Brighton/Arden Hills Superfund Site* (Wenck Associates, Inc., November 2013)

    This report documents 2013 remediation work in which the soils that exceeded RRGs were excavated, stabilized, and transported off-site to a Subtitle D landfill. Verification soil sampling and analysis indicated that the COCs were below RRGs for the soils remaining onsite. OU2 ROD Amendment #5 added the EBS Areas to the final remedy for OU2 and also, since RRGs were not based on unrestricted use, documented the need to maintain an LUC for property use relative to soils.

- Aquatic Sites

  - 2010: *Feasibility Study for Rice Creek, **Sunfish Lake**, Marsden Lake, and Pond G, New Brighton/Arden Hills Superfund Site* (Wenck Associates, Inc., December 2010)

    Aquatic sites within OU2 were excluded from the OU2 FS and 1997 OU2 ROD. This report summarizes prior surface water/sediment sampling work and ecological risk assessment work conducted at these water bodies, one of which is located within AHATS and within the eastern piece of the subject property (Sunfish Lake). No unacceptable ecological risks were identified in Sunfish Lake. The report also cites the 1991 human health risk for TCAAP (*Human Health Risk Assessment, New Brighton/Arden Hills Superfund Site Including Twin Cities Army Ammunition Plant*, PRC Environmental Management, April 1991), which concluded that human exposure to Sunfish Lake surface water and sediment presents negligible risks. The report recommended No Action for Sunfish Lake. OU2 ROD Amendment #4 documented the No Action finding for Sunfish Lake.

Data Compilation and Analysis

To assist with efforts to reduce the footprint of LUCs on AHATS, previous soil data generated within the AHATS property was compiled into a single database. The database includes work commissioned by both TCAAP and the MNARNG. An electronic version of the database is included at Attachment 4, along with explanatory notes. Similarly, previous soil data generated within the USARC property was compiled into a database. The electronic version of the database and accompanying explanatory notes are included in Attachment 5.

The soil databases were used to generate a map (Attachment 6) showing a comparison of soil results to the MPCA industrial Soil Reference Values (SRVs). On the map, green dots represent locations where all soil results were less than the industrial SRVs. Red dots represent locations where one or more sample results was above the industrial SRV. Note that that the MPCA does not have SRVs that are specific to commercial use. The MPCA has indicated that due to the similarity of restricted commercial use and industrial use, the industrial SRVs are generally also applied to restricted commercial use. Also, two clarifications are noted:

1. For lead, note that the MPCA industrial SRV of 700 mg/kg was used in preparing Attachment 6. Lead was a common TCAAP COC, present at many sites, and a TCAAP site-specific cleanup level of 1,200 mg/kg was used for most of these sites. Hence, it should be further noted that many of the red dots that appear around the entirety of AHATS are actually lead results that met the site-specific cleanup value of 1,200 mg/kg (and therefore remediation was deemed complete), but fall between the industrial SRV of 700 mg/kg and the site-specific cleanup level. This fact is illustrated by the next clarification below.

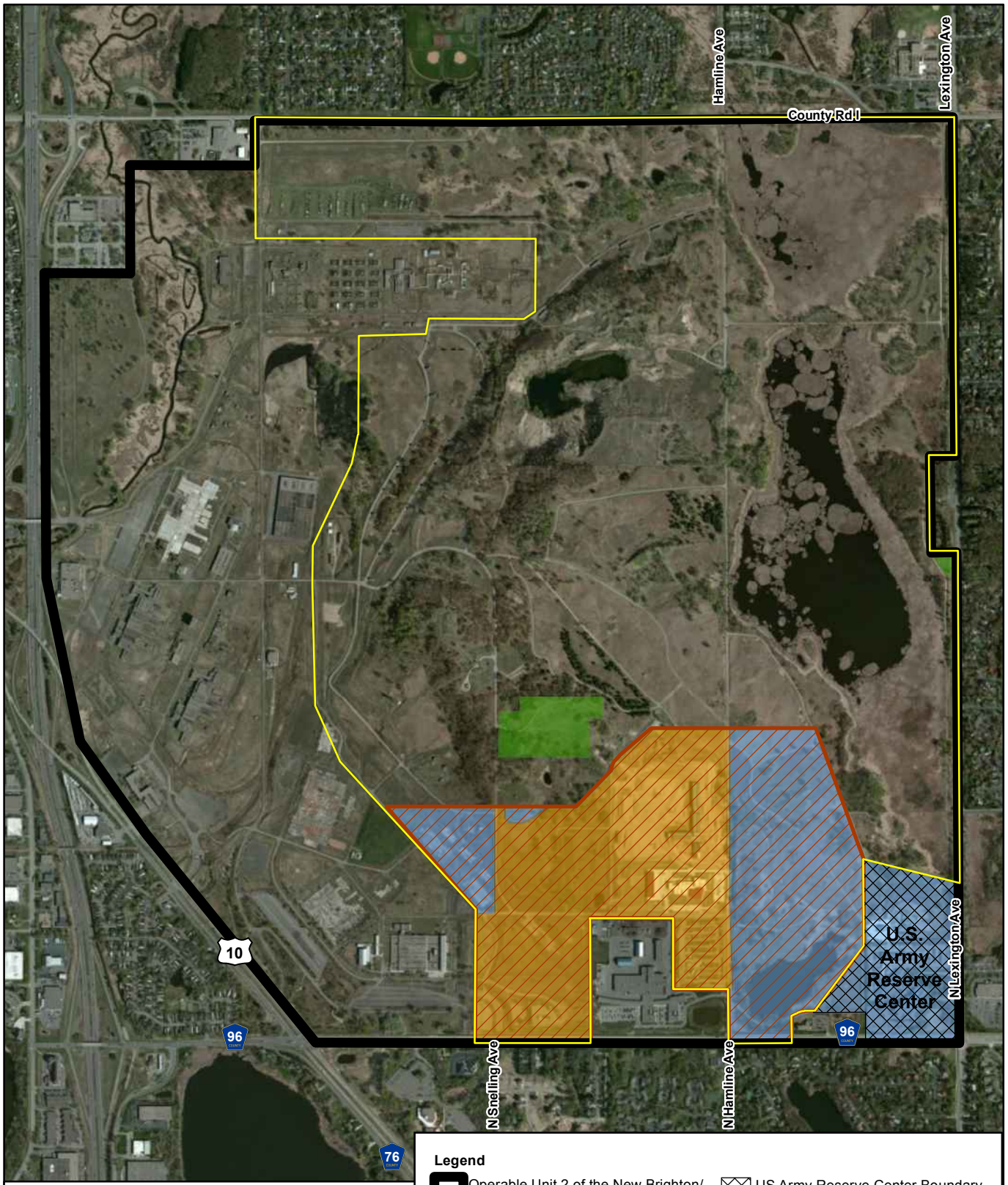
2. On Attachment 6, there are a several red dots related to the Outdoor Firing Range and one red dot related to Site H. All of these red dots are lead results that fall between 700 and 1,200 mg/kg, as discussed in the prior item above. In these cases, the red dot exists within a cluster of green dots that are much more numerous. These few and generally isolated red dots were not deemed to be of concern based on consideration of a nominal "exposure area" that includes the entirety of each cluster of red and green dots. MPCA Guidance (Risk-Based Guidance for the Soil-Human Health Pathway, User's Guide, September 1998) states that "when adequate contaminant characterization has occurred, the exposure concentration should represent the average concentration within the potential exposure area. The guidance also states hot spots should not be lumped into such areas. However, since remediation was already conducted in these areas to a site-specific lead cleanup level, the red dots clearly do not represent "hot spots" (i.e., contamination that is substantially higher than other surrounding locations); rather, they are random locations with slightly higher lead concentrations than other typical results. To further consider the average concentrations of the exposure areas, Attachment 7 was prepared. Five assumed exposure areas were drawn at each of the subject clusters of red and green dots. The available lead soil sampling results samples within each of these five areas were then summarized in the table presented in Attachment 8. Since the sample depths for the various red dots were all noted to be 0, 1 or 2 feet in depth, and since the upper 2 feet of soil represents the most accessible soil, only soil sampling results from this upper 2 feet were included in the table. At the bottom of the soil sample data for each area within this table, the calculated mean lead soil concentration is shown. In all five cases the mean is substantially below the MPCA industrial SRV of 700 mg/kg (by over a factor of three). This indicates that exposures in these areas will not present an unacceptable risk under an industrial or restricted commercial land use. Also shown for each area is the total number of samples and exposure area acreage, along with the calculated number of samples per acre, for reference.

Attachment 6 shows that within the subject property for Revision 3 to the OU2 LUCRD, the vast majority of the sample locations are represented by green dots, meaning that the soil testing results are below the MPCA industrial SRVs (with the isolated exceptions noted above). As detailed in the respective reports, each soil sample had a specific purpose related to a suspected release of hazardous substances to the environment. The spatial distribution of sampling (both horizontal and vertical) was biased to features most likely to have resulted in a release to the environment. Areas with sparse sample locations correlate to areas where there was no available information to suggest that an impact could have occurred. Similarly, the laboratory analyses were targeted to the most likely chemicals of concern based on previous operations and chemical usage. Thus, the soil sampling and analysis is adequate for purposes of making decisions for soil LUCs. Also, specifically, the level of characterization is adequate to support restricted commercial use, and since the intended AHATS and USARC uses do not include day care centers, schools, or other frequent uses by children or sensitive subpopulations, the restricted commercial use designation satisfies the MNARNG's and U.S. Army Reserve's needs for their intended future uses.

Conclusions and Recommendations

The U.S. Army has concluded that the level of soil testing previously performed within the subject property is appropriate for the proposed land uses. Testing has been performed in the specific locations considered most likely to have had a release of hazardous substances to the environment. Where soil testing was conducted, the results are below the MPCA industrial SRVs (with the isolated exceptions noted above), and the level of characterization and results are compatible with restricted commercial use. Therefore, it is recommended that Revision 3 of the OU2 LUCRD be approved documenting these changes.

If soil contamination is encountered during building construction, the U.S. Army will notify the USEPA and MPCA and develop actions in accordance with the Federal Facility Agreement.



2012 Aerial Photograph (Source: ESRI)

1,600 800 0 1,600 Feet

N

Path: L:\1561\17\LUC\mxd\Subject Property Location.mxd
Date: 3/26/2015 Time: 7:55:54 AM User: ShuJC0243

Legend

- Operable Unit 2 of the New Brighton/ Arden Hills Superfund Site (the same area occupied by the Twin Cities Army Ammunition Plant in 1983, when the Site was placed on the NPL.)
- National Guard Boundary
- US Army Reserve Center Boundary
- Cantonment Area
- Unrestricted Use Areas
- Restricted Commercial Areas
- Subject Property

OPERABLE UNIT 2 LUCRD
Location of Subject Property for Revision 3 of OU2 LUCRD

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Wenck
1800 Pioneer Creek Center
Maple Plain, MN 55359-0429
1-800-472-2232

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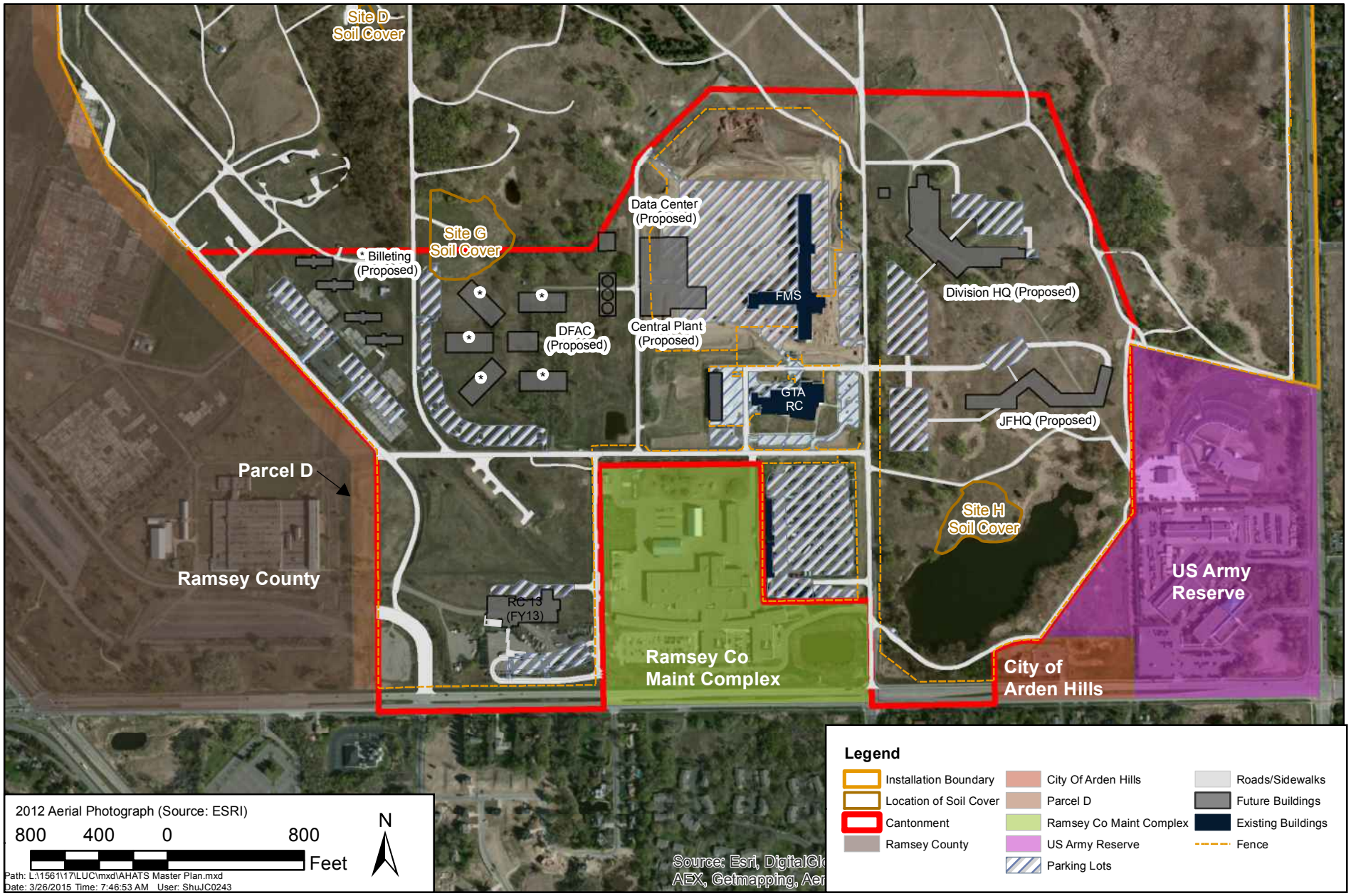
Attachment 1



OPERABLE UNIT 2 LUCRD

AHATS Cantonment Master Plan

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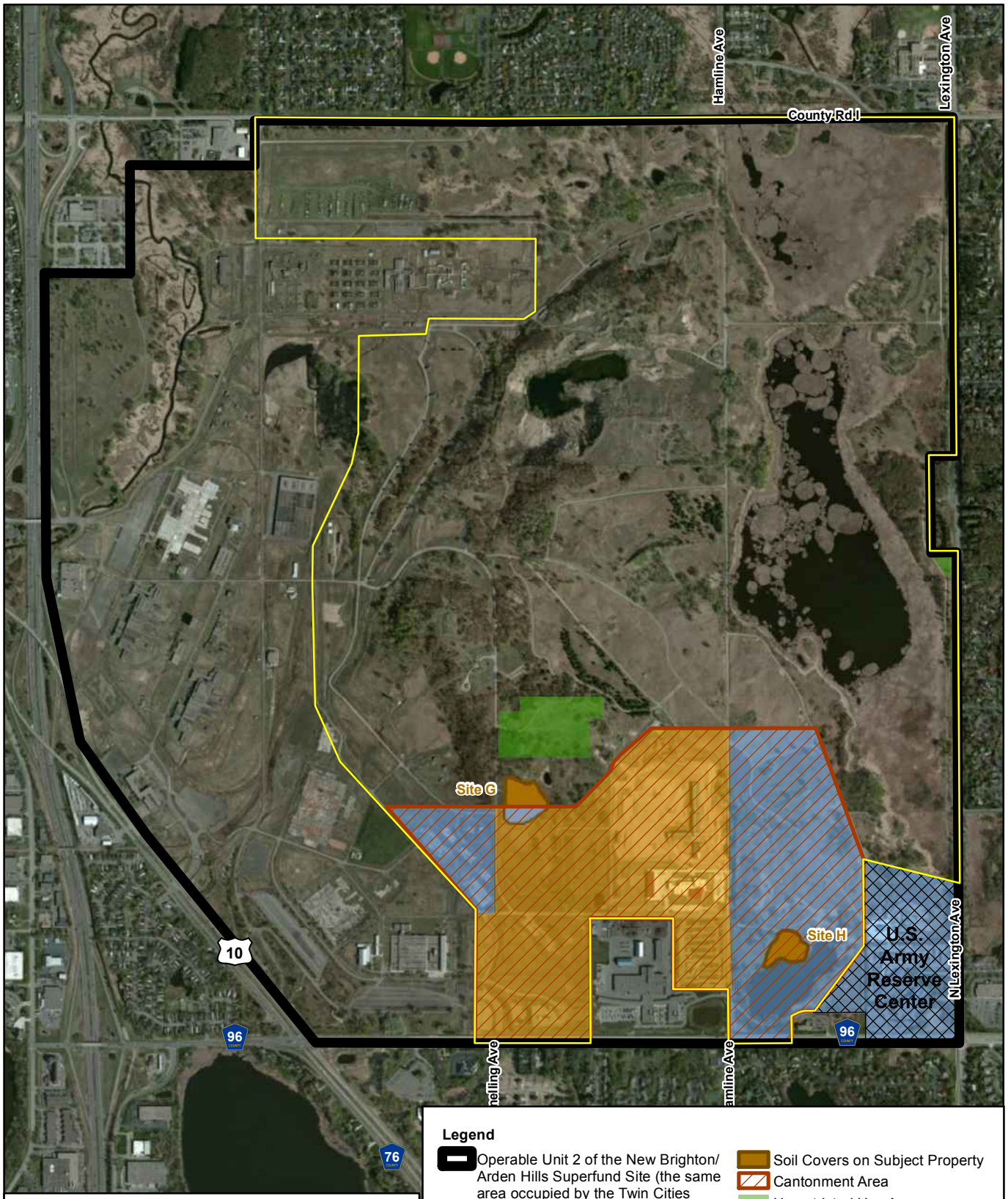
Attachment 2



OPERABLE UNIT 2 LUCRD

Soil Covers within Subject Property for Revision 3 of OU2 LUCRD

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Attachment 3

Attachment 4

AHATS Soil Database

ATTACHMENT 4

EXPLANATORY NOTES ACCOMPANYING SOIL DATABASE FOR AHATS

Notes Regarding the Database Excel File

1. The database includes data generated by both TCAAP and the Minnesota Army National Guard for all of AHATS.
2. The soil data was too large for a single Excel sheet so it is in two sheets: one for data generated by Shaw (formerly Stone & Webster) and another for all other sources. These are the first two tabs in the Excel file. Each row in these tabs represents a unique soil data result, along with the location coordinates and depth. As an example, if a single soil sample was analyzed for 15 different chemicals, then there are 15 rows in the database, one for each chemical result at the same location and depth.
3. The third tab, labeled "Column Metadata," has a brief explanation for what type of information is presented in each column for the two data tabs. Some columns are more "working" in nature, such as converting units when necessary.
4. The fourth tab, labeled "Sources," describes where the data, locations, and depths were obtained. This tab assigns a number to the various reports used, and attempts to inventory whether various information was available electronically versus hard-copy. The data tabs have a column listing the source number, so a user should be able to back-track and find the original source for every piece of data.
5. The fifth tab, labeled "Cleanup Values," presents the available Soil Reference Values (SRVs) developed by the MPCA. There are SRVs for three different default land use scenarios: industrial, recreational, and residential. These SRVs were used for comparison to the soil data, with one exception:
    a. In a few instances, an exceedance was noted in a soil sample that was collected at the groundwater level. Given that the USEPA and MPCA approved stopping excavation at groundwater, these locations are mapped as locations not exceeding the standard. For such locations, a footnote was added to the database in the "Sources" tab, under the "Cleanup Value Comparison Notes" column.
6. The remaining tabs are for calculations of the benzo(a)pyrene (BAP) equivalent following the worksheet on the MPCA's webpage. The user is cautioned that the number of chemicals incorporated into the BAP equivalent calculation has changed over time, so there is variability in the reporting. For this database, a consistent methodology was employed. The current MPCA calculation worksheet was used, which has a longer list of chemicals than most past analyses. All available chemical results were inserted into the worksheet. If a result was reported as "non-detect," a value of one-half the reporting limit was used in the calculation.

a. If the calculation result was less than the respective SRV for BAP equivalent, the database assigned a mapping value of "0" (see notes regarding figures for more information on mapping values).
b. If the calculation result was above the respective SRV, and there were no "non-detect" values involved in the calculation, the database assigned a mapping value of "1."
c. If the calculation result was above the respective SRV, and "non-detect" values were involved in the calculation, the database initially assigned a mapping value of "2." The results with a "2" were individually reviewed to assess the impact of using one-half the reporting limit for "non-detect" inputs.
    i. If the calculation would result in an SRV exceedance even if the "non-detect" values were ignored, then the "2" was changed to a "1."
    ii. If the SRV exceedance was caused by the use of one-half the reporting limit for "non-detect" values, then the "2" was changed to a "0."

The only exception to the above methodology are the samples related to the soil AOCs at Site A and the 135 Primer/Tracer Area, which were remediated in 2013 (Sources 28 and 29). Since these sites were investigated/remediated after new, specific MPCA guidance was published (Remediation Division Policy on Analysis of Carcinogenic of Carcinogenic Polynuclear Aromatic Hydrocarbons (cPAH), June 2011), the cPAH data for these sites was handled in the manner prescribed in this policy, which suggested that the "short list" of seven cPAHs was appropriate for these sites and which recommended the use of zero for non-detect results when calculating BAP Equivalent. Since the original data tables in the reports for sources 28 and 29 used this methodology, the identical BAP Equivalent values from these report data tables were entered directly into the AHATS database.

7. Field screening type data was not entered into the database, such as that generated by a portable X-Ray Florescence (XRF) instrument.
8. Data was entered for grab samples with a unique location and depth, but not for composite samples representing a bigger area.
9. Data was entered for standard chemical analyses, as opposed to say data generated by the Toxicity Characteristic Leaching Procedure (TCLP), or data from testing of physical properties.
10. The database is intended to represent current soil conditions. Hence, results for samples representing soil that was later excavated or treated in-place are not in the database. Various reports differed in the level of detail with respect to areas and depths of excavated soil, so at times, professional judgment had to be exercised.
11. Most excavated areas were backfilled with "clean" soil. In some cases, backfill was tested and demonstrated to be acceptable prior to use, but testing was not performed of the soil after placement. Since borrow testing results do not have unique locations and depths corresponding to the current placement of the soil, this data was not incorporated into the database.
12. The database does not take into account any earthwork that may have occurred since the time of remediation at the various areas of concern.

13. A substantial portion of the data had to be manually entered from hard copy sources. While a reasonable amount of quality control checks were employed, not every test result was checked. Wenck does not guarantee the accuracy of all data.
14. An attempt was made to compile Reporting Limits and Method Detection Limits, and thus, there are columns in the database for this information. The information was to assist in handling "non-detect" values. Unfortunately, there was not great standardization in what information labs have shown over the years on their reports. Sometimes labs showed both the Reporting Limit and the Method Detection Limit. Sometimes one or the other. Sometimes none. Older lab reports were even more inconsistent in this aspect. Further complicating the matter is variability in how "non-detects" were reported. Sometimes labs simply reported an "ND." Sometimes it was reported like "<1," where 1 represents the Reporting Limit. Sometimes it was reported as "1U," where 1 represents the Reporting Limit and U means undetected. Further complicating the matter is that consulting engineers often created summary tables of data, and often didn't carry through a result like "<1," but instead replaced it with ND. To have a single, common system for the database, we elected to go with the "<1" approach, where the digit represents whatever the Reporting Limit was. Sometimes we would have a result reported like <1, but it was unclear if the 1 represented the Reporting Limit or Method Detection Limit. In these cases, we assumed it was a Reporting Limit as the more common practice of reporting. For data reported in a source simply as "ND," if we could find a Reporting Limit elsewhere in the source or in an original lab report, then we manually entered the value like <1. If the data was reported as 1U, we changed it to <1.

<u>Notes Regarding the Figures (Attachments 6 and 7)</u>

1. The database is set up to have each sample result compared to the three SRVs (industrial, recreational, and residential), subject to the exceptions listed in Note 5 of the previous section. The comparison generates a mapping value of "0" if the value is less than the respective SRV or a "1" if the value is greater. However, regarding lead, it should be noted that the MPCA industrial SRV of 700 mg/kg was used in preparing Attachments 6 and 7. Lead was a common TCAAP COC, present at many sites, and a TCAAP site-specific (industrial) cleanup level of 1,200 mg/kg was used for most of these sites. Hence, it should be further noted that many of the red dots that appear around the entirety of AHATS are actually lead results that met the site-specific cleanup value of 1,200 mg/kg (and therefore remediation was deemed complete), but fall between the MPCA industrial SRV of 700 mg/kg and the site-specific cleanup level.
2. For mapping purposes, a green dot was assigned to the "0's" and a red dot to the "1"s". Attachments 6 and 7 are a red/green dot map for comparison to the industrial SRVs.
3. To elaborate, each dot on a map is really a "stack" of dots; one for every chemical test result at that location, including multiple depths. Try to visualize each dot as a stack of dots. If the map could be plotted in 3-D, the stack heights would be different between locations because the number of chemicals tested varied. Some dots represent a stack one dot high based on a single chemical test (e.g., lead), while other dots could represent up to

hundreds of individual dots stacked together based on testing for a full suite of 20 or so metals, 100 or so VOCs, 100 or so semi-volatile organic compounds (SVOCs), etc. And there can be samples at multiple depths at the same location.

4. A green dot on the maps means that every dot within the stack for that location is green, or a “0”, which means the results were less than the respective SRVs.
5. A red dot means there is at least one red dot within the stack of dots, or a chemical test result that is greater than its respective SRV. Again, there could be many green dots in the stack for that location representing other chemicals or different depths, but in essence, the red dot moves to the top of the stack and is shown on the map.
6. As previously discussed, the maps show that soil testing has been biased to portions of the property with the greatest likelihood of a past release of a hazardous substance to the environment.

AHATS Soil Database can be found
as a separate Excel file on the CD-ROM

Attachment 5

USARC Soil Database

ATTACHMENT 5

EXPLANATORY NOTES ACCOMPANYING SOIL DATABASE FOR USARC

Notes Regarding the Database Excel File

1. The database includes data generated by TCAAP for all of the USARC.
2. The first tab in the Excel file, labeled "Soil Samples", contains the soil data. Each row in this tab represents a unique soil data result, along with the location coordinates and depth. As an example, if a single soil sample was analyzed for 15 different chemicals, then there are 15 rows in the database, one for each chemical result at the same location and depth.
3. The second tab, labeled "Column Metadata," has a brief explanation for what type of information is presented in each column of the data tab. Some columns are more "working" in nature, such as converting units when necessary.
4. The third tab, labeled "Sources," describes where the data, locations, and depths were obtained. This tab assigns a number to the various reports used, and attempts to inventory whether various information was available electronically versus hard-copy. The data tabs have a column listing the source number, so a user should be able to back-track and find the original source for every piece of data.
5. The fourth tab, labeled "Cleanup Values," presents the available Soil Reference Values (SRVs) developed by the MPCA. There are SRVs for three different default land use scenarios: industrial, recreational, and residential. These SRVs were used for comparison to the soil data.
6. The remaining tab is for calculations of the benzo(a)pyrene (BAP) equivalent following the worksheet on the MPCA's webpage. The user is cautioned that the number of chemicals incorporated into the BAP equivalent calculation has changed over time, so there is variability in the reporting. For this database, a consistent methodology was employed. The current MPCA calculation worksheet was used, which has a longer list of chemicals than most past analyses. All available chemical results were inserted into the worksheet. If a result was reported as "non-detect," a value of one-half the reporting limit was used in the calculation.
    a. If the calculation result was less than the respective SRV for BAP equivalent, the database assigned a mapping value of "0" (see notes regarding figures for more information on mapping values).
    b. If the calculation result was above the respective SRV, and there were no "non-detect" values involved in the calculation, the database assigned a mapping value of "1."
    c. If the calculation result was above the respective SRV, and "non-detect" values were involved in the calculation, the database initially assigned a mapping value

of "2." The results with a "2" were individually reviewed to assess the impact of using one-half the reporting limit for "non-detect" inputs.

   i. If the calculation would result in an SRV exceedance even if the "non-detect" values were ignored, then the "2" was changed to a "1."
   ii. If the SRV exceedance was caused by the use of one-half the reporting limit for "non-detect" values, then the "2" was changed to a "0."

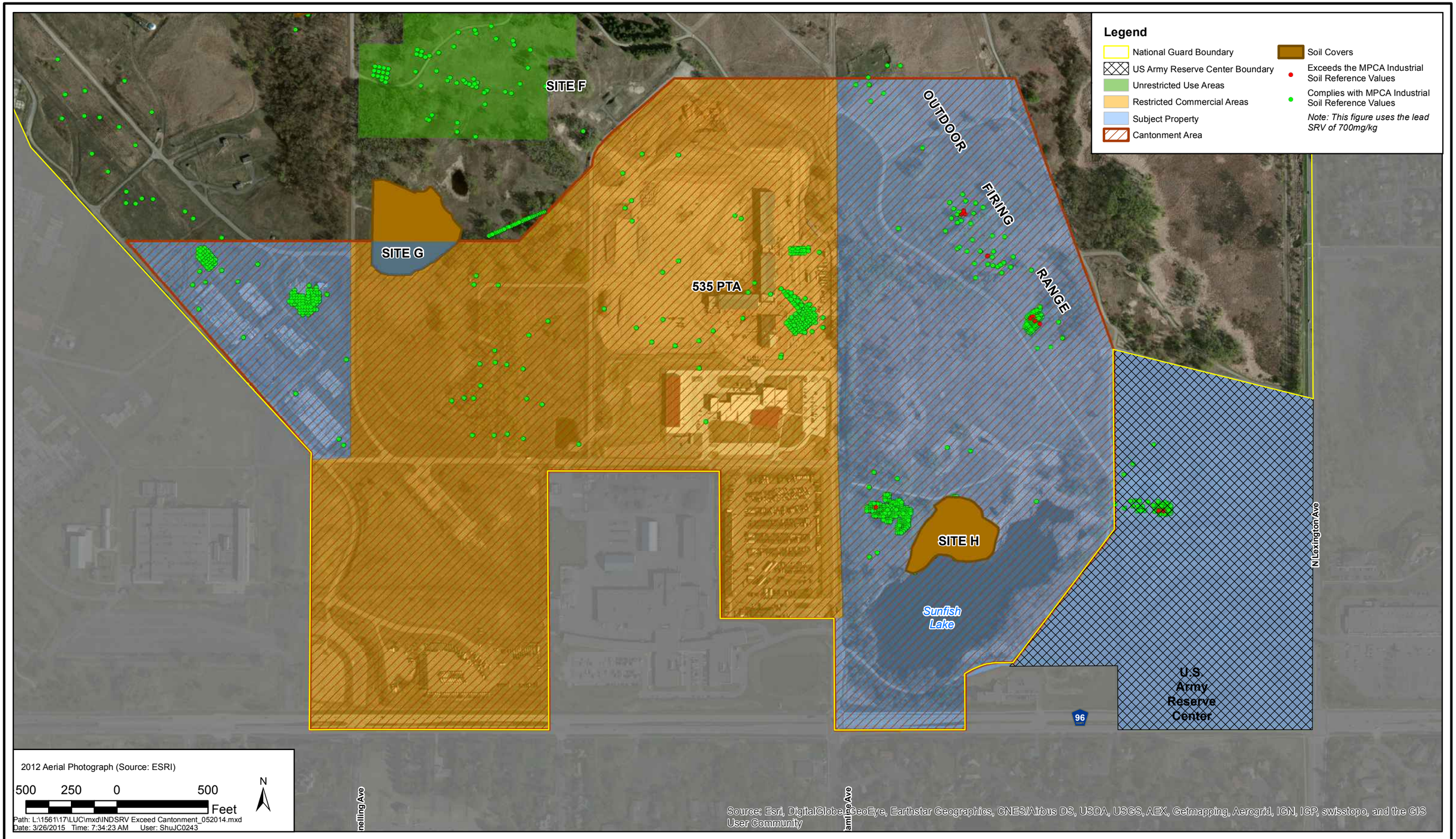
7. Field screening type data was not entered into the database, such as that generated by a portable X-Ray Florescence (XRF) instrument.
8. Data was entered for grab samples with a unique location and depth, but not for composite samples representing a bigger area.
9. Data was entered for standard chemical analyses, as opposed to say data generated by the Toxicity Characteristic Leaching Procedure (TCLP), or data from testing of physical properties.
10. The database is intended to represent current soil conditions. Hence, results for samples representing soil that was later excavated or treated in-place are not in the database. Various reports differed in the level of detail with respect to areas and depths of excavated soil, so at times, professional judgment had to be exercised.
11. Most excavated areas were backfilled with "clean" soil. In some cases, backfill was tested and demonstrated to be acceptable prior to use, but testing was not performed of the soil after placement. Since borrow testing results do not have unique locations and depths corresponding to the current placement of the soil, this data was not incorporated into the database.
12. The database does not take into account any earthwork that may have occurred since the time of remediation at the various areas of concern.
13. A substantial portion of the data had to be manually entered from hard copy sources. While a reasonable amount of quality control checks were employed, not every test result was checked. Wenck does not guarantee the accuracy of all data.
14. An attempt was made to compile Reporting Limits and Method Detection Limits, and thus, there are columns in the database for this information. The information was to assist in handling "non-detect" values. Unfortunately, there was not great standardization in what information labs have shown over the years on their reports. Sometimes labs showed both the Reporting Limit and the Method Detection Limit. Sometimes one or the other. Sometimes none. Older lab reports were even more inconsistent in this aspect. Further complicating the matter is variability in how "non-detects" were reported. Sometimes labs simply reported an "ND." Sometimes it was reported like "<1," where 1 represents the Reporting Limit. Sometimes it was reported as "1U," where 1 represents the Reporting Limit and U means undetected. Further complicating the matter is that consulting engineers often created summary tables of data, and often didn't carry through a result like "<1," but instead replaced it with ND. To have a single, common system for the database, we elected to go with the "<1" approach, where the digit represents whatever the Reporting Limit was. Sometimes we would have a result reported like <1, but it was unclear if the 1 represented the Reporting Limit or Method Detection Limit. In these cases, we assumed it was a Reporting Limit as the more common practice of reporting. For data reported in a source simply as "ND," if we could find a Reporting

Limit elsewhere in the source or in an original lab report, then we manually entered the value like <1. If the data was reported as 1U, we changed it to <1.

Notes Regarding the Figures (Attachments 6 and 7)

1. The database is set up to have each sample result compared to the three SRVs (industrial, recreational, and residential). The comparison generates a mapping value of "0" if the value is less than the respective SRV or a "1" if the value is greater. However, regarding lead, it should be noted that the MPCA industrial SRV of 700 mg/kg was used in preparing Attachments 6 and 7. Lead was a common TCAAP COC, present at many sites, and a TCAAP site-specific (industrial) cleanup level of 1,200 mg/kg was used for most of these sites. Hence, it should be further noted that the two red dots that appear on the USARC are actually lead results that met the site-specific cleanup value of 1,200 mg/kg (and therefore remediation was deemed complete), but fall between the MPCA industrial SRV of 700 mg/kg and the site-specific cleanup level.
2. For mapping purposes, a green dot was assigned to the "0's" and a red dot to the "1"s". Attachments 6 and 7 are a red/green dot map for comparison to the industrial SRVs.
3. To elaborate, each dot on a map is really a "stack" of dots; one for every chemical test result at that location, including multiple depths. Try to visualize each dot as a stack of dots. If the map could be plotted in 3-D, the stack heights would be different between locations because the number of chemicals tested varied. Some dots represent a stack one dot high based on a single chemical test (e.g., lead), while other dots could represent up to hundreds of individual dots stacked together based on testing for a full suite of 20 or so metals, 100 or so VOCs, 100 or so semi-volatile organic compounds (SVOCs), etc. And there can be samples at multiple depths at the same location.
4. A green dot on the maps means that every dot within the stack for that location is green, or a "0", which means the results were less than the respective SRVs.
5. A red dot means there is at least one red dot within the stack of dots, or a chemical test result that is greater than its respective SRV. Again, there could be many green dots in the stack for that location representing other chemicals or different depths, but in essence, the red dot moves to the top of the stack and is shown on the map.
6. As previously discussed, the maps show that soil testing has been biased to portions of the property with the greatest likelihood of a past release of a hazardous substance to the environment.

USARC Soil Database can be found
as a separate Excel file on the CD-ROM
included with Attachment 4



OPERABLE UNIT 2 LUCRD

Soil Data Compared to MPCA Industrial Soil Reference Values

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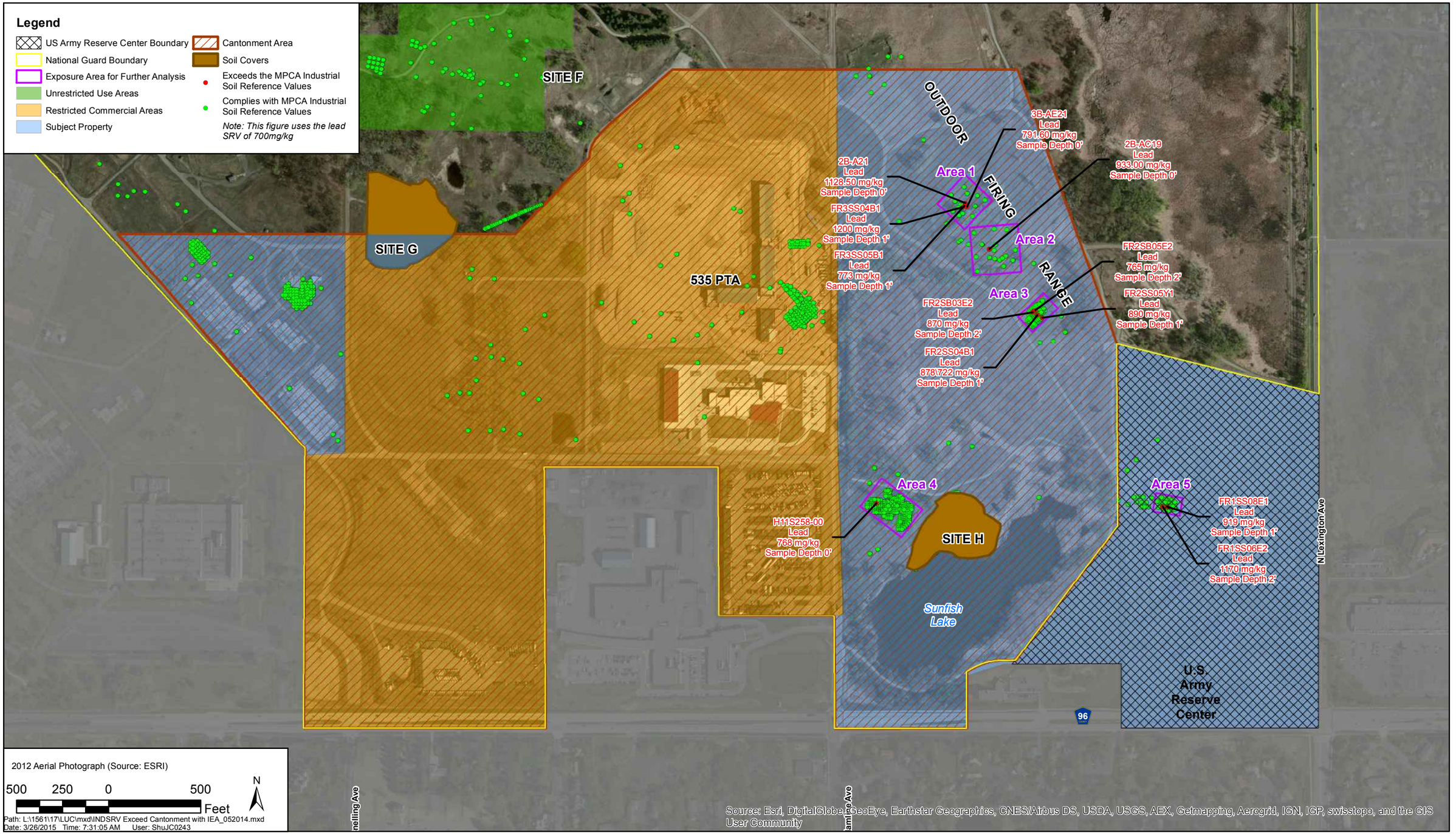
Attachment 6



OPERABLE UNIT 2 LUCRD

Soil Data Compared to MPCA Industrial Soil Reference Values (with Identified Exposure Areas for Further Analysis)

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Attachment 7

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
AREA 1				
FR3SS03B1	1	Outdoor Firing Range	10/13/99	662
FR3SS03C1	1	Outdoor Firing Range	10/13/99	60.3
FR3SS04B1	1	Outdoor Firing Range	10/13/99	**1200**
FR3SB04C2	2	Outdoor Firing Range	11/18/99	6.7
FR3SS04D1	1	Outdoor Firing Range	10/13/99	45.5
FR3SS05B1	1	Outdoor Firing Range	10/13/99	**773**
FR3SS05C1	1	Outdoor Firing Range	10/13/99	40.2
2B-A29	0	Outdoor Firing Range	6/21/95	21.6
2B-A29	1	Outdoor Firing Range	6/21/95	9.9
2B-A29	2	Outdoor Firing Range	6/21/95	3.4
2B-OE17	0	Outdoor Firing Range	6/21/95	25.3
2B-OE17	1	Outdoor Firing Range	6/21/95	4.8
2B-OE17	2	Outdoor Firing Range	6/21/95	2.5
2B-A21	1	Outdoor Firing Range	6/21/95	192.1
2B-A21	2	Outdoor Firing Range	6/21/95	18.3
2B-OE25	0	Outdoor Firing Range	6/21/95	47
2B-OE25	1	Outdoor Firing Range	6/21/95	3.8
2B-OE25	2	Outdoor Firing Range	6/21/95	5.5
2B-A13	0	Outdoor Firing Range	6/21/95	16.2
2B-A13	1	Outdoor Firing Range	6/21/95	<1.2
2B-A13	2	Outdoor Firing Range	6/21/95	2.2
2B-E17	0	Outdoor Firing Range	6/21/95	106.5
2B-E17	1	Outdoor Firing Range	6/21/95	26.3
2B-E17	2	Outdoor Firing Range	6/21/95	85.8
2B-E25	0	Outdoor Firing Range	6/21/95	210.9
2B-E25	1	Outdoor Firing Range	6/21/95	86.8
2B-E25	2	Outdoor Firing Range	6/21/95	232.4
2B-OI17	0	Outdoor Firing Range	6/21/95	22.6
2B-OI25	0	Outdoor Firing Range	6/21/95	24.6
2B-A21	0	Outdoor Firing Range	6/21/95	**1128.5**
B-E31	0	Outdoor Firing Range	8/16/94	21.7
B-I21	0	Outdoor Firing Range	8/16/94	178.8
3B-AE21	0	Outdoor Firing Range	12/5/96	**791.6**
B-A17	0	Outdoor Firing Range	8/3/94	634.1
B-A17 DUP	0	Outdoor Firing Range	8/3/94	610.2
B-E15	0	Outdoor Firing Range	10/13/94	404
		AREA 1 - Mean Lead Result (mg/kg):		**220**
			Total Number of Samples:	35
			Size of Exposure Area (acres):	1.0
			Samling Frequency (samples/acre):	35

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
AREA 2				
B-U27	0	Outdoor Firing Range	8/16/94	134.6
B-AC11	0	Outdoor Firing Range	8/16/94	29.1
B-AK31	0	Outdoor Firing Range	8/16/94	70.8
B-AK31 DUP	0	Outdoor Firing Range	8/16/94	96.1
B-Q17	0	Outdoor Firing Range	8/16/94	151.5
B-Y33	0	Outdoor Firing Range	8/16/94	27.4
OH750-1	0	Outdoor Firing Range	10/13/94	<1.2
2B-AK25	0	Outdoor Firing Range	6/20/95	135.6
2B-AK25	1	Outdoor Firing Range	6/20/95	13.8
2B-AK25	2	Outdoor Firing Range	6/20/95	13.6
2B-AO21	0	Outdoor Firing Range	6/20/95	56.4
2B-AO21	1	Outdoor Firing Range	6/20/95	11.1
2B-AO21	2	Outdoor Firing Range	6/20/95	14.5
2B-BSed3	0	Outdoor Firing Range	6/20/95	86.4
2B-BSed3	1	Outdoor Firing Range	6/20/95	6
2B-BSed3	2	Outdoor Firing Range	6/20/95	6.5
2B-Y17	0	Outdoor Firing Range	6/20/95	19.7
2B-Y17	1	Outdoor Firing Range	6/20/95	3.8
2B-Y17	2	Outdoor Firing Range	6/20/95	2.1
2B-AC19	0	Outdoor Firing Range	6/20/95	**933**
2B-AC19	1	Outdoor Firing Range	6/20/95	6.1
2B-AC19	2	Outdoor Firing Range	6/20/95	3.6
2B-AC23	0	Outdoor Firing Range	6/20/95	82.9
2B-AC23	1	Outdoor Firing Range	6/20/95	13.6
2B-AC23	2	Outdoor Firing Range	6/20/95	9
2B-AG17	0	Outdoor Firing Range	6/20/95	131.5
2B-AG17	1	Outdoor Firing Range	6/20/95	8.4
2B-AG17	2	Outdoor Firing Range	6/20/95	4.5
2B-AK21	0	Outdoor Firing Range	6/20/95	141.5
2B-AK21	1	Outdoor Firing Range	6/20/95	65.3
2B-AK21	2	Outdoor Firing Range	6/20/95	9
3B-AA21	0	Outdoor Firing Range	12/5/96	465.4
B-AC19	0	Outdoor Firing Range	7/28/94	413.2
B-AI19	0	Outdoor Firing Range	10/13/94	171
B-AI19 DUP	0	Outdoor Firing Range	10/13/94	227
B-AK23	0	Outdoor Firing Range	10/13/94	312
		AREA 2 - Mean Lead Result (mg/kg):		**111**
		Total Number of Samples:		35
		Size of Exposure Area (acres):		1.6
		Samling Frequency (samples/acre):		22

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
AREA 3				
FR2SS00C1	1	Outdoor Firing Range	11/15/99	285
FR2SB00C2	2	Outdoor Firing Range	11/15/99	9.7
FR2SS00D1	1	Outdoor Firing Range	11/15/99	165
FR2SB00D2	2	Outdoor Firing Range	11/15/99	11.3
FR2SS00E1	1	Outdoor Firing Range	11/15/99	22.5
FR2SB00E2	2	Outdoor Firing Range	11/15/99	9.1
FR2SS00Y1	1	Outdoor Firing Range	11/24/99	628
FR2SB00Z2	2	Outdoor Firing Range	11/30/99	13.1
FR2SS01D1	1	Outdoor Firing Range	11/12/99	83.8
FR2SB01D2	2	Outdoor Firing Range	11/12/99	12.6
FR2SS01E1	1	Outdoor Firing Range	11/12/99	20.2
FR2SB01E2	2	Outdoor Firing Range	11/12/99	14.2
FR2SS01Y1	1	Outdoor Firing Range	11/24/99	94.3
FR2SB01Z2	2	Outdoor Firing Range	11/30/99	5.2
FR2SB02A2	2	Outdoor Firing Range	11/29/99	7.7
FR2SD02B2	2	Outdoor Firing Range	11/29/99	6.8
FR2SB02B2	2	Outdoor Firing Range	11/15/99	242
FR2SB02B2	2	Outdoor Firing Range	11/29/99	7.9
FR2SS02E1	1	Outdoor Firing Range	11/15/99	317
FR2SS02F1	1	Outdoor Firing Range	11/15/99	28.4
FR2SB02F2	2	Outdoor Firing Range	11/15/99	10.3
FR2SS02G1	1	Outdoor Firing Range	11/15/99	91.8
FR2SD02G1	1	Outdoor Firing Range	11/15/99	64.2
FR2SD02G2	2	Outdoor Firing Range	11/15/99	7.2
FR2SB02G2	2	Outdoor Firing Range	11/15/99	12.7
FR2SS02Y1	1	Outdoor Firing Range	11/24/99	299
FR2SB02Z2	2	Outdoor Firing Range	11/30/00	7
FR2SB03A2	2	Outdoor Firing Range	11/30/99	44.2
FR2SS03B1	1	Outdoor Firing Range	11/15/99	209
FR2SB03B2	2	Outdoor Firing Range	11/15/99	17.8
FR2SB03E2	2	Outdoor Firing Range	11/15/99	**870**
FR2SS03F1	1	Outdoor Firing Range	11/12/99	24.4
FR2SB03F2	2	Outdoor Firing Range	11/12/99	8.9
FR2SS03G1	1	Outdoor Firing Range	11/15/99	54.4
FR2SB03G2	2	Outdoor Firing Range	11/15/99	9.3
FR2SS03Y1	1	Outdoor Firing Range	11/24/99	28.2
FR2SB03Z2	2	Outdoor Firing Range	11/30/99	7.7
FR2SS04A1	1	Outdoor Firing Range	11/24/99	374
FR2SS04B1	1	Outdoor Firing Range	11/22/99	**722**
FR2SS04B1	1	Outdoor Firing Range	11/24/99	**878**
FR2SB04D2	2	Outdoor Firing Range	11/29/99	80.7
FR2SS04F1	1	Outdoor Firing Range	11/12/99	29.3
FR2SB04F2	2	Outdoor Firing Range	11/12/99	7.9
FR2SS04G1	1	Outdoor Firing Range	11/15/99	38.3
FR2SB04G2	2	Outdoor Firing Range	11/15/99	9.4
FR2SS04Y1	1	Outdoor Firing Range	12/8/99	115
FR2SS05B1	1	Outdoor Firing Range	11/24/99	446
FR2SS05C1	1	Outdoor Firing Range	11/15/99	147
FR2SS05D1	1	Outdoor Firing Range	10/14/99	167
FR2SB05E2	2	Outdoor Firing Range	11/15/99	**765**
FR2SS05F1	1	Outdoor Firing Range	11/12/99	31.3
FR2SB05F2	2	Outdoor Firing Range	11/12/99	6.5
FR2SS05G1	1	Outdoor Firing Range	11/15/99	50.8
FR2SS05Y1	1	Outdoor Firing Range	12/8/99	**890**
FR2SS05Z1	1	Outdoor Firing Range	12/8/99	178
FR2SS06A1	1	Outdoor Firing Range	11/15/99	599
FR2SS06B1	1	Outdoor Firing Range	11/12/99	336
FR2SS06C1	1	Outdoor Firing Range	11/15/99	111
FR2SB06E2	2	Outdoor Firing Range	11/15/99	51.9
FR2SS06F1	1	Outdoor Firing Range	11/12/99	446
FR2SB06F2	2	Outdoor Firing Range	11/12/99	38

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ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
FR2SS06G1	1	Outdoor Firing Range	11/15/99	139
FR2SD06G1	1	Outdoor Firing Range	11/15/99	366
FR2SD06G2	2	Outdoor Firing Range	11/15/99	9.3
FR2SB06G2	2	Outdoor Firing Range	11/15/99	10.7
FR2SS07A1	1	Outdoor Firing Range	11/15/99	302
FR2SS07B1	1	Outdoor Firing Range	11/12/99	130
FR2SB07B2	2	Outdoor Firing Range	11/12/99	23.6
FR2SB07C2	2	Outdoor Firing Range	11/15/99	293
FR2SS07F1	1	Outdoor Firing Range	11/12/99	175
FR2SB07F2	2	Outdoor Firing Range	11/12/99	9
FR2SS07G1	1	Outdoor Firing Range	11/15/99	68.5
FR2SS07G2	2	Outdoor Firing Range	11/15/99	8.8
FR2SS08A1	1	Outdoor Firing Range	11/15/99	211
FR2SB08A2	2	Outdoor Firing Range	11/15/99	26.4
FR2SS08B1	1	Outdoor Firing Range	11/12/99	180
FR2SB08B2	2	Outdoor Firing Range	11/12/99	28.7
FR2SB08C2	2	Outdoor Firing Range	11/15/99	176
FR2SS08E1	1	Outdoor Firing Range	11/15/99	360
FR2SS08F1	1	Outdoor Firing Range	11/12/99	153
FR2SB08F2	2	Outdoor Firing Range	11/12/99	15.4
FR2SS08G1	1	Outdoor Firing Range	11/15/99	75
FR2SB08G2	2	Outdoor Firing Range	11/15/99	11.3
FR2SS09A1	1	Outdoor Firing Range	11/15/99	357
FR2SB09A2	2	Outdoor Firing Range	11/15/99	16.3
FR2SS09B1	1	Outdoor Firing Range	11/12/99	234
FR2SD09B1	1	Outdoor Firing Range	11/12/99	219
FR2SD09B2	2	Outdoor Firing Range	11/12/99	27.7
FR2SB09B2	2	Outdoor Firing Range	11/12/99	28.1
FR2SS09C1	1	Outdoor Firing Range	11/15/99	174
FR2SD09C1	1	Outdoor Firing Range	11/15/99	292
FR2SS09D1	1	Outdoor Firing Range	11/15/99	170
FR2SS09E1	1	Outdoor Firing Range	11/15/99	99.9
FR2SD09E1	1	Outdoor Firing Range	11/15/99	201
FR2SS97A1	1	Outdoor Firing Range	11/24/99	18.5
FR2SS97B1	1	Outdoor Firing Range	11/24/99	201
FR2SS97C1	1	Outdoor Firing Range	11/24/99	220
FR2SS97D1	1	Outdoor Firing Range	11/24/99	107
FR2SS97Y1	1	Outdoor Firing Range	11/24/99	52.9
FR2SS97Z1	1	Outdoor Firing Range	11/24/99	93.1
FR2SB98A2	2	Outdoor Firing Range	11/30/99	5.9
FR2SB98B2	2	Outdoor Firing Range	11/30/99	5.7
FR2SB98C2	2	Outdoor Firing Range	11/30/99	7.8
FR2SS98D1	1	Outdoor Firing Range	11/24/99	80.1
FR2SS98Y1	1	Outdoor Firing Range	11/24/99	269
FR2SD98Z2	2	Outdoor Firing Range	11/30/99	9.4
FR2SB98Z2	2	Outdoor Firing Range	11/30/99	7.9
FR2SB99C2	2	Outdoor Firing Range	11/30/99	16.1
FR2SS99D1	1	Outdoor Firing Range	11/24/99	46.5
FR2SS99Y1	1	Outdoor Firing Range	11/24/99	210
FR2SB99Z2	2	Outdoor Firing Range	11/30/99	8.9
2TH(600)-10	0	Outdoor Firing Range	6/22/95	440
2TH(600)-10	1	Outdoor Firing Range	6/22/95	55
2TH(600)-10	2	Outdoor Firing Range	6/22/95	<1.2
2TH(600)-7	0	Outdoor Firing Range	6/22/95	363
2TH(600)-7	1	Outdoor Firing Range	6/22/95	7.72
2TH(600)-7	2	Outdoor Firing Range	6/22/95	21.7
2TH(600)-1	0	Outdoor Firing Range	6/22/95	261
2TH(600)-2	0	Outdoor Firing Range	6/22/95	104
2TH(600)-3	0	Outdoor Firing Range	6/22/95	209
2TH(600)-4	0	Outdoor Firing Range	6/22/95	30.2
2TH(600)-5	0	Outdoor Firing Range	6/22/95	192
2TH(600)-6	0	Outdoor Firing Range	6/22/95	228
27D-TH-600-3	0	Outdoor Firing Range	6/22/95	210

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
2TH(600)-11	0	Outdoor Firing Range	6/22/95	280
2TH(600)-11	1	Outdoor Firing Range	6/22/95	6.84
2TH(600)-11	2	Outdoor Firing Range	6/22/95	11.9
2TH(600)-9	2	Outdoor Firing Range	6/22/95	59
2FDTH(600)-9	2	Outdoor Firing Range	6/22/95	26.1
			AREA 3 - Mean Lead Result (mg/kg):	**146**
			Total Number of Samples:	128
			Size of Exposure Area (acres):	0.50
			Samling Frequency (samples/acre):	256

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
AREA 4				
SB063 (2')	2	Site H	11/13/87	12.4
H109SS	0	Site H	10/31/92	294
H11S046-04	2	Site H	9/28/99	6.9
H11S001D00	0	Site H	6/17/99	37.4
H11S005D00	0	Site H	5/14/99	545
H11S006D00	0	Site H	6/17/99	141
H11S009-00	0	Site H	5/5/99	200
H11S010-01	0.5	Site H	7/22/99	8.2
H11S011-03	1.5	Site H	7/22/99	3.7
H11S012-00	0	Site H	5/5/99	128
H11S012D00	0	Site H	5/14/99	56.1
H11S015-00	0	Site H	5/5/99	81.8
H11S016D00	0	Site H	6/17/99	145
H11S017-02	1	Site H	7/22/99	52.7
H11S018-00	0	Site H	5/5/99	123
H11S019-00	0	Site H	5/5/99	27.3
H11S021D00	0	Site H	6/17/99	221
H11S022D00	0	Site H	6/17/99	8.3
H11S023-03	1.5	Site H	7/23/99	5.6
H11S024D00	0	Site H	6/17/99	203
H11S025D00	0	Site H	6/17/99	118
H11S026-00	0	Site H	5/5/99	140
H11S027-00	0	Site H	5/5/99	37.5
H11S027D00	0	Site H	5/14/99	54
H11S028-00	0	Site H	5/5/99	76.6
H11S028D00	0	Site H	5/14/99	75.2
H11S029D00	0	Site H	8/17/99	62.9
H11S030-02	1	Site H	9/28/99	7.6
H11S031D00	0	Site H	6/17/99	164
H11S032D00	0	Site H	6/17/99	326
H11S033D00	0	Site H	6/17/99	370
H11S034-00	0	Site H	4/20/01	11.8
H11S035-01	0.5	Site H	7/5/00	6.5
H11S036D00	0	Site H	6/17/99	71.4
H11S037-00	0	Site H	4/20/01	106
H11S038-00	0	Site H	5/5/99	81
H11S038D00	0	Site H	11/8/99	88
H11S042-00	0	Site H	5/5/99	85.9
H11S042D00	0	Site H	5/14/99	133
H11S043D00	0	Site H	6/17/99	5.9
H11S044-00	0	Site H	5/5/99	99.5
H11S044D00	0	Site H	5/14/99	114
H11S045-00	0	Site H	5/17/99	176
H11S048-00	0	Site H	5/17/99	186
H11S049D00	0	Site H	7/15/99	55.1
H11S050-01	0.5	Site H	7/22/99	67.3
H11S051D00	0	Site H	6/17/99	280
H11S052-00	0	Site H	5/17/99	83.9
H11S058-00	0	Site H	5/17/99	89.4
H11S059D00	0	Site H	7/1/99	150
H11S060D00	0	Site H	7/15/99	139
H11S061-00	0	Site H	5/17/99	47
H11S062D00	0	Site H	7/22/99	117
H11S063D00	0	Site H	7/22/99	190
H11S064D00	0	Site H	6/17/99	65
H11S065-00	0	Site H	5/17/99	46
H11S066-01	0.5	Site H	7/22/99	27.5
H11S067D00	0	Site H	6/17/99	473
H11S068D00	0	Site H	7/19/99	231
H11S072-00	0	Site H	5/17/99	81
H11S073D00	0	Site H	6/18/99	104

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
H11S083D00	0	Site H	6/17/99	8.8
H11S084D00	0	Site H	6/29/99	224
H11S085D00	0	Site H	6/29/99	171
H11S086-01	0.5	Site H	7/22/99	166
H11S087D00	0	Site H	6/17/99	252
H11S089D00	0	Site H	6/17/99	39.4
H11S090-02	1	Site H	7/22/99	23.5
H11S091D00	0	Site H	6/18/99	101
H11S098-00	0	Site H	6/17/99	193
H11S099-00	0	Site H	6/17/99	81.9
H11S100-00	0	Site H	6/17/99	161
H11S101-00	0	Site H	6/17/99	73
H11S102-00	0	Site H	6/17/99	172
H11S103-00	0	Site H	6/16/99	112
H11S108-00	0	Site H	6/16/99	80.1
H11S111-00	0	Site H	7/15/99	127
H11S112-00	0	Site H	7/15/99	142
H11S113-00	0	Site H	7/15/99	304
H11S114-00	0	Site H	6/18/99	100
H11S115-00	0	Site H	6/18/99	77.2
H11S116-02	1	Site H	7/22/99	6.1
H11S120-00	0	Site H	7/15/99	55.2
H11S121-00	0	Site H	7/15/99	86.1
H11S123-00	0	Site H	7/1/99	144
H11S124-00	0	Site H	7/1/99	97.6
H11S125-00	0	Site H	7/1/99	113
H11S129-01	0.5	Site H	7/27/99	10.2
H11S130-00	0	Site H	6/16/99	101
H11S131-00	0	Site H	7/15/99	90.1
H11S133-00	0	Site H	6/16/99	68.2
H11S134-00	0	Site H	6/16/99	79.3
H11S135-00	0	Site H	7/1/99	72.9
H11S136-00	0	Site H	6/17/99	46.7
H11S137-01	0.5	Site H	7/22/99	5.4
H11S138-00	0	Site H	6/17/99	77.8
H11S140-00	0	Site H	6/18/99	102
H11S140D00	0	Site H	6/29/99	72.5
H11S142-00	0	Site H	6/16/99	87.1
H11S143-00	0	Site H	6/16/99	113
H11S145-00	0	Site H	6/18/99	43.6
H11S146-00	0	Site H	6/18/99	151
H11S149-00	0	Site H	6/18/99	52.8
H11S150-00	0	Site H	6/18/99	83.1
H11S151-00	0	Site H	6/18/99	139
H11S155-00	0	Site H	6/29/99	42.4
H11S158-00	0	Site H	6/16/99	97.7
H11S159-02	1	Site H	7/22/99	7.8
H11S160-00	0	Site H	6/16/99	188
H11S161-00	0	Site H	6/16/99	97.9
H11S162-00	0	Site H	6/16/99	52.2
H11S163-01	0.5	Site H	7/22/99	77.6
H11S164-01	0.5	Site H	7/22/99	25.6
H11S165-00	0	Site H	6/16/99	101
H11S166-00	0	Site H	6/17/99	53.7
H11S167-00	0	Site H	6/29/99	66
H11S168-00	0	Site H	6/29/99	48.1
H11S169-00	0	Site H	6/18/99	37.3
H11S170-00	0	Site H	6/18/99	53.8
H11S174-00	0	Site H	7/15/99	435
H11S189-00	0	Site H	6/16/99	79
H11S190-00	0	Site H	6/16/99	157
H11S195-00	0	Site H	7/1/99	45.6
H11S199-00	0	Site H	6/16/99	52

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
H11S200-00	0	Site H	7/1/99	35.3
H11S201-00	0	Site H	7/1/99	32.6
H11S202-00	0	Site H	6/17/99	27
H11S203-02	1	Site H	7/22/99	9
H11S224-00	0	Site H	7/16/99	43
H11S226-00	0	Site H	7/1/99	71.5
H11S227-00	0	Site H	7/1/99	78.6
H11S228-00	0	Site H	6/17/99	54.1
H11S229-02	1	Site H	7/22/99	54.6
H11S230-00	0	Site H	7/1/99	207
H11S231-00	0	Site H	7/15/99	437
H11S232-00	0	Site H	6/17/99	102
H11S233-01	0.5	Site H	7/22/99	19.4
H11S234-00	0	Site H	7/15/99	256
H11S235-00	0	Site H	7/15/99	272
H11S236-00	0	Site H	7/1/99	135
H11S237-00	0	Site H	7/1/99	101
H11S238-03	1.5	Site H	7/23/99	4.2
H11S239-00	0	Site H	7/1/99	116
H11S239D00	0	Site H	7/23/99	176
H11S243-00	0	Site H	7/26/99	114
H11S244-00	0	Site H	6/29/99	50.2
H11S245-00	0	Site H	6/29/99	19.2
H11S246-00	0	Site H	6/29/99	35
H11S247-00	0	Site H	6/29/99	31.2
H11S255-00	0	Site H	7/16/99	99.4
H11S256-03	1.5	Site H	7/23/99	3.7
H11S257-03	1.5	Site H	7/23/99	6.2
H11S258-00	0	Site H	7/16/99	**768**
H11S259-01	0.5	Site H	7/23/99	11
H11S260-00	0	Site H	7/15/99	152
H11S261-01	0.5	Site H	7/22/99	94.7
H11S262-01	0.5	Site H	7/22/99	4.6
H11S263-00	0	Site H	7/15/99	31.7
H11S264-00	0	Site H	7/15/99	133
H11S265-00	0	Site H	7/15/99	115
H11S266-01	0.5	Site H	7/22/99	5.9
H11S267-00	0	Site H	7/16/99	108
H11S268-02	1	Site H	7/23/99	4.1
H11S270-00	0	Site H	7/16/99	25.3
H11S271-00	0	Site H	7/15/99	41.4
H11S272-00	0	Site H	7/16/99	31.5
H11S273-01	0.5	Site H	7/22/99	237
H11S274-01	0.5	Site H	7/22/99	9.1
H11S275-00	0	Site H	7/15/99	140
H11S276-00	0	Site H	7/15/99	195
H11S277-00	0	Site H	7/15/99	34.3
H11S278-00	0	Site H	7/15/99	31.7
H11S279-01	0.5	Site H	7/22/99	130
H11S280-00	0	Site H	7/15/99	92.1
H11S281-02	1	Site H	7/22/99	76
H11S282-00	0	Site H	7/15/99	47.4
H11S283-00	0	Site H	7/16/99	119
H11S284-00	0	Site H	7/16/99	66.2
H11S285-02	1	Site H	7/23/99	14.3
H11S286-01	0.5	Site H	7/22/99	4.6
H11S287-00	0	Site H	7/16/99	31.9
H11S288-01	0.5	Site H	7/22/99	5.8
H11S289-00	0	Site H	7/15/99	71.9
H11S290-00	0	Site H	7/15/99	167
H11S291-01	0.5	Site H	7/23/99	4.7
H11S292-00	0	Site H	7/15/99	86.4
H11S293-00	0	Site H	7/15/99	280

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
H11S294-00	0	Site H	7/15/99	80.5
H11S295-00	0	Site H	7/15/99	105
H11S296-00	0	Site H	7/15/99	79.6
H11S297-02	1	Site H	7/22/99	12.6
H11S298-00	0	Site H	7/15/99	102
H11S298D00	0	Site H	10/19/99	57
H11S298T00	0	Site H	11/8/99	110
H11S299-00	0	Site H	7/15/99	88.5
H11S300-00	0	Site H	7/15/99	108
H11S301-01	0.5	Site H	7/22/99	13.3
H11S302-00	0	Site H	7/16/99	84.5
H11S303-00	0	Site H	7/16/99	80.9
H11S304-00	0	Site H	7/16/99	429
H11S305-00	0	Site H	7/16/99	29.1
H11S306-00	0	Site H	7/16/99	18
H11S307-01	0.5	Site H	7/22/99	3.7
H11S308-00	0	Site H	7/16/99	25.4
H11S309-00	0	Site H	7/16/99	49
H11S310-00	0	Site H	7/15/99	55
H11S311-00	0	Site H	7/15/99	99.6
H11S312-00	0	Site H	7/15/99	40.1
H11S313-00	0	Site H	7/15/99	52.5
H11S314-00	0	Site H	7/26/99	65
H11S314-00	0	Site H	7/26/99	77.5
H11S315-02	1	Site H	7/23/99	74.5
H11S316-00	0	Site H	7/15/99	51.3
H11S317-00	0	Site H	7/19/99	93.3
H11S318-00	0	Site H	7/16/99	50.6
H11S319-01	0.5	Site H	7/22/99	6.2
H11S320-00	0	Site H	7/16/99	22.5
H11S321-01	0.5	Site H	7/23/99	89
H11S322-01	0.5	Site H	7/23/99	135
H11S323-01	0.5	Site H	7/23/99	234
H11S324-00	0	Site H	7/19/99	156
H11S325-00	0	Site H	7/19/99	127
H11S326-00	0	Site H	7/16/99	28.1
H11S327-00	0	Site H	7/16/99	36.6
H11S328-00	0	Site H	7/16/99	31.2
H11S329-00	0	Site H	7/26/99	62.4
H11S329-00	0	Site H	7/26/99	74.1
H11S330-00	0	Site H	7/23/99	91.7
H11S331-00	0	Site H	7/23/99	80.5
H11S332-00	0	Site H	7/19/99	142
H11S333-00	0	Site H	7/23/99	141
H11S334-00	0	Site H	7/19/99	147
H11S335-00	0	Site H	7/26/99	87.7
H11S335-00	0	Site H	7/26/99	63.9
		AREA 4 - Mean Lead Result (mg/kg):		**99**
			Total Number of Samples:	234
			Size of Exposure Area (acres):	1.2
			Samling Frequency (samples/acre):	195

ATTACHMENT 8

ANALYSIS OF FIVE EXPOSURE AREAS

Sample ID	Sample Depth (ft)	Sampling Site	Sampling Date	Lead (mg/kg)
AREA 5				
FR1SS05E1	1	Outdoor Firing Range	11/11/99	323
FR1SS05F1	1	Outdoor Firing Range	11/11/99	140
FR1SS05F1	1	Outdoor Firing Range	11/11/99	192
FR1SS05G1	1	Outdoor Firing Range	11/11/99	105
FR1SS06E1	1	Outdoor Firing Range	11/11/99	425
FR1SS06E2	2	Outdoor Firing Range	11/11/99	**1170**
FR1SS06G1	1	Outdoor Firing Range	11/11/99	97.1
FR1SS06H1	1	Outdoor Firing Range	11/11/99	171
FR1SS07H1	1	Outdoor Firing Range	11/11/99	366
FR1SS08D1	1	Outdoor Firing Range	11/11/99	6.2
FR1SS08E1	1	Outdoor Firing Range	11/15/99	**919**
FR1SS08G1	1	Outdoor Firing Range	11/11/99	40.3
FR1SS08H1	1	Outdoor Firing Range	11/11/99	84.5
FR1SS09D1	1	Outdoor Firing Range	11/11/99	6.1
FR1SS09D2	2	Outdoor Firing Range	11/11/99	11
FR1SD09E2	2	Outdoor Firing Range	11/11/99	168
FR1SB05E2	2	Outdoor Firing Range	11/11/99	18.8
FR1SS09G2	2	Outdoor Firing Range	12/1/99	39.6
FR1SS09H1	1	Outdoor Firing Range	12/1/99	94.2
FR1SS10D1	1	Outdoor Firing Range	11/11/99	15.3
FR1SS10F1	1	Outdoor Firing Range	11/11/99	86.8
FR1SB10F2	2	Outdoor Firing Range	11/11/99	156
FR1SS10G1	1	Outdoor Firing Range	11/11/99	148
FR1SS10G1	1	Outdoor Firing Range	12/1/99	22.8
FR1SS10H1	1	Outdoor Firing Range	12/1/99	224
FR1SS11D1	1	Outdoor Firing Range	11/11/99	6.9
FR1SB11D2	2	Outdoor Firing Range	11/11/99	35.7
FR1SB11E2	2	Outdoor Firing Range	11/11/99	393
FR1SS11F1	1	Outdoor Firing Range	11/11/99	56.4
FR1SB11F2	2	Outdoor Firing Range	11/11/99	223
FR1SS11G1	1	Outdoor Firing Range	11/11/99	40.2
FR1SB11G2	2	Outdoor Firing Range	11/11/99	30.8
2OH(175)-4	0	Outdoor Firing Range	6/23/95	36
2OH(175)-5	0	Outdoor Firing Range	6/22/95	155
2OH(175)-5	1	Outdoor Firing Range	6/22/95	8.21
2OH(175)-5	2	Outdoor Firing Range	6/22/95	6.9
3OH175-1	0	Outdoor Firing Range	12/5/96	32
3OH175-1	2	Outdoor Firing Range	12/5/96	7.1
3OH175-3	0	Outdoor Firing Range	12/5/96	6.8
3OH175-3	1	Outdoor Firing Range	12/5/96	5.6
3OH175-3	2	Outdoor Firing Range	12/5/96	5.4
3OH175-4	0	Outdoor Firing Range	12/5/96	5.2
3OH175-4	1	Outdoor Firing Range	12/5/96	5.4
3OH175-4	2	Outdoor Firing Range	12/5/96	5.3
3OH175-5	0	Outdoor Firing Range	12/5/96	6
3OH175-5	1	Outdoor Firing Range	12/5/96	3.9
3OH175-5	2	Outdoor Firing Range	12/5/96	7.2
3FDD-3OH175-2	2	Outdoor Firing Range	12/5/96	5.4
		AREA 5 - Mean Lead Result (mg/kg):		**127**
		Total Number of Samples:		48
		Size of Exposure Area (acres):		0.34
		Samling Frequency (samples/acre):		141

Notes:

Results are mg/kg (dry weight corrected)

Sample depth is the nominal depth from original (pre-excavation) ground surface.

Bolding (in red color) indicates exceedance of the MPCA Industrial Soil Reference Value (SRV).

APPENDIX D

Technical Memorandum, Supporting Documentation for Revision 4

Technical Memorandum

Supporting Documentation for Revision 4,
Operable Unit 2 Land Use Control Remedial Design

New Brighton/Arden Hills Superfund Site

Wenck Associates, Inc.

August 21, 2016

Purpose and Summary

The purpose of this Technical Memorandum is to document the information used as the basis for regulatory approval of Revision 4 for the Operable Unit 2 Land Use Control Remedial Design (OU2 LUCRD). Revision 4 affects land use controls (LUCs) for 380 acres of Ramsey County-owned/leased property (referred to as the "California-shaped area"), subsequently referred to together as the "subject property", as shown on Attachment 1. This revision removes the previous "blanket soil LUCs" that limited property use in the subject property to industrial (or similar) property uses and documents that the subject property has been approved for unlimited use and unrestricted exposure by the Minnesota Pollution Control Agency (MPCA) and the U.S. Environmental Protection Agency (USEPA). This revision only affects LUCs for soils on the subject property. Groundwater LUCs on the subject property are not affected by this revision. Also, LUCs for groundwater, groundwater infrastructure, soils, and soil covers in the federally-owned property having LUCs are not affected by this revision.

Background

Revision 1 of the OU2 LUCRD was approved by the USEPA and MPCA in September 2010 (the draft document was considered Revision 0 and the final document was considered Revision 1). The OU2 LUCRD was developed to satisfy requirements for LUCs set forth in Amendments and Explanations of Significant Differences associated with the OU2 Record of Decision (ROD). LUCs are a component of the remedies for various areas of concern for protection of human health. While the need for LUCs is clear for the individual areas of concern, it is less clear for surrounding areas. To expedite the approval process, the U.S. Army elected to implement "blanket LUCs" across most of OU2, including the subject property, and also the Arden Hills Army Training Site (AHATS) and the U.S. Army Reserve Center (USARC). However, it was anticipated that, in the future, the U.S. Army (and future property owners) would undertake efforts to reduce the footprint of the "blanket LUCs" to allow less restrictive activities on certain portions of OU2. Revisions 2 and 3 of the OU2 LUCRD, which were approved by the USEPA and MPCA in June 2011and March 2015, changed the AHATS cantonment area and the USARC from the "blanket LUC" for soils to uses compatible with "restricted commercial use".

Relative to Revision 4, the subject property was transferred out of federal ownership to Ramsey County in April 2013, except for 30 acres of the subject property that were temporarily leased to Ramsey County, before the final transfer that will be completed in 2016. Ramsey County was required to maintain the "blanket LUC" for soils as part of the 2013 property transfer/lease.

However, Ramsey County has since completed additional soil investigation and remediation (and building/utility demolition) in the subject property under the MPCA's Voluntary Investigation and Cleanup (VIC) Program. This work was conducted in 2014 and 2015. The regulatory-approved soil cleanup levels utilized for this work allow for unlimited use and unrestricted exposure. Revision 4 will document removal of the "blanket LUC" for soils in the subject property and the suitability of the subject property for unlimited use and unrestricted exposure.

As additional background, in 2002, Plexus Scientific Corporation (Plexus) conducted a Phase I/Phase II Environmental Site Assessment on 774 acres of the larger TCAAP property on behalf of the General Services Administration. Plexus subdivided the 774 acres into 39 sections loosely associated with historical industrial activity or land use to facilitate historical review and management and collection of the extensive amount of environmental data generated with respect to the 774 acre property. The subject property lies entirely within the 774 acres assessed by Plexus and includes all or portions of 30 of the original 39 Plexus sections. The Plexus section numbering system and geography was retained for the 2014/2015 Ramsey County soil investigation and remediation work, and ultimately for the various documentation reports. The locations of the various Plexus sections within the subject property are shown on Attachment 2.

Description of Subject Property

Attachment 1 shows the location of the subject property within OU2, and also shows the location of the federally-owned property.

Former Land Use on Subject Property

The Twin Cities Army Ammunition Plant (TCAAP) was constructed in 1941 to produce small-caliber ammunition for the United States military. Production activities included manufacturing small arms ammunition and related materials, proof-testing small arms ammunition and related items as required, and handling and storing strategic and critical materials for other government agencies. Ammunition production and related activities have occurred periodically, commensurate with operations in wars, conflicts, and other national emergencies, and ceased in 2005.

Proposed Land Use on Subject Property

Ramsey County intends to develop the subject property with mixed use, including, but not limited to, residential, recreational, and commercial/industrial uses. Given that the subject property has received regulatory approval for unlimited use and unrestricted exposure, a more specific detailing of the proposed property uses (with associated areas) is not necessary, i.e., the subject property is approved for all uses (except as limited by the groundwater LUCs that remain in place over the entire subject property).

Previous Environmental Studies and Investigations

Environmental investigations at TCAAP began in the early 1980s with the discovery of groundwater contamination. TCAAP was placed on the National Priorities List as part of the New Brighton/Arden Hills Superfund Site in 1983.

For the purposes of this OU2 LUCRD revision, the key reports are the documentation reports prepared by Wenck Associates, Inc., which detail Ramsey County's soil investigation and remediation work conducted under the MPCA's VIC Program. The documentation reports reference one or more of the previously-noted "Plexus sections" (with the locations of the relevant Plexus sections shown on Attachment 2). Each report documents the soil remediation and building/utility demolition work conducted within the Plexus section(s) covered by that report, and documents the suitability of those Plexus section(s) for unlimited use and unrestricted exposure. Collectively, the following reports document the suitability of the entire subject property for unlimited use and unrestricted exposure:

Final Documentation Report, Section 1001, May 2016

Final Documentation Report, Section 1002, February 2016

Final Documentation Report, Section 1003, April 2016

Final Documentation Report, Section 1004, February 2016

Final Documentation Report, Section 1005, February 2016

Final Documentation Report, Section 1006, February 2016

Final Documentation Report, Section 1007, February 2016

Final Documentation Report, Section 1008, February 2016

Final Documentation Report, Section 1009, February 2016

Final Documentation Report, Section 1010, May 2016

Final Documentation Report, Section 1011, February 2016

Final Documentation Report, Section 1012, February 2016

Final Documentation Report, Section 1013, June 2016

Final Documentation Report, Section 1014, April 2016

Final Documentation Report, Section 1015, April 2016

Final Documentation Report, Section 1016, May 2016

Final Documentation Report, Section 1017, April 2016

Final Documentation Report, Section 3001, February 2016

Final Documentation Report, Section 3002, April 2016

Final Documentation Report, Section 4001, April 2016

Final Documentation Report, Section 4002 & 4003, April 2016

Final Documentation Report, Section 4004 & 4005, May 2016

Final Documentation Report, Section 4006, May 2016

Final Documentation Report, Section 4007, June 2016

Final Documentation Report, Section 4008, June 2016

Final Documentation Report, Section 4009, May 2016

Final Documentation Report, Compendium, July 2016

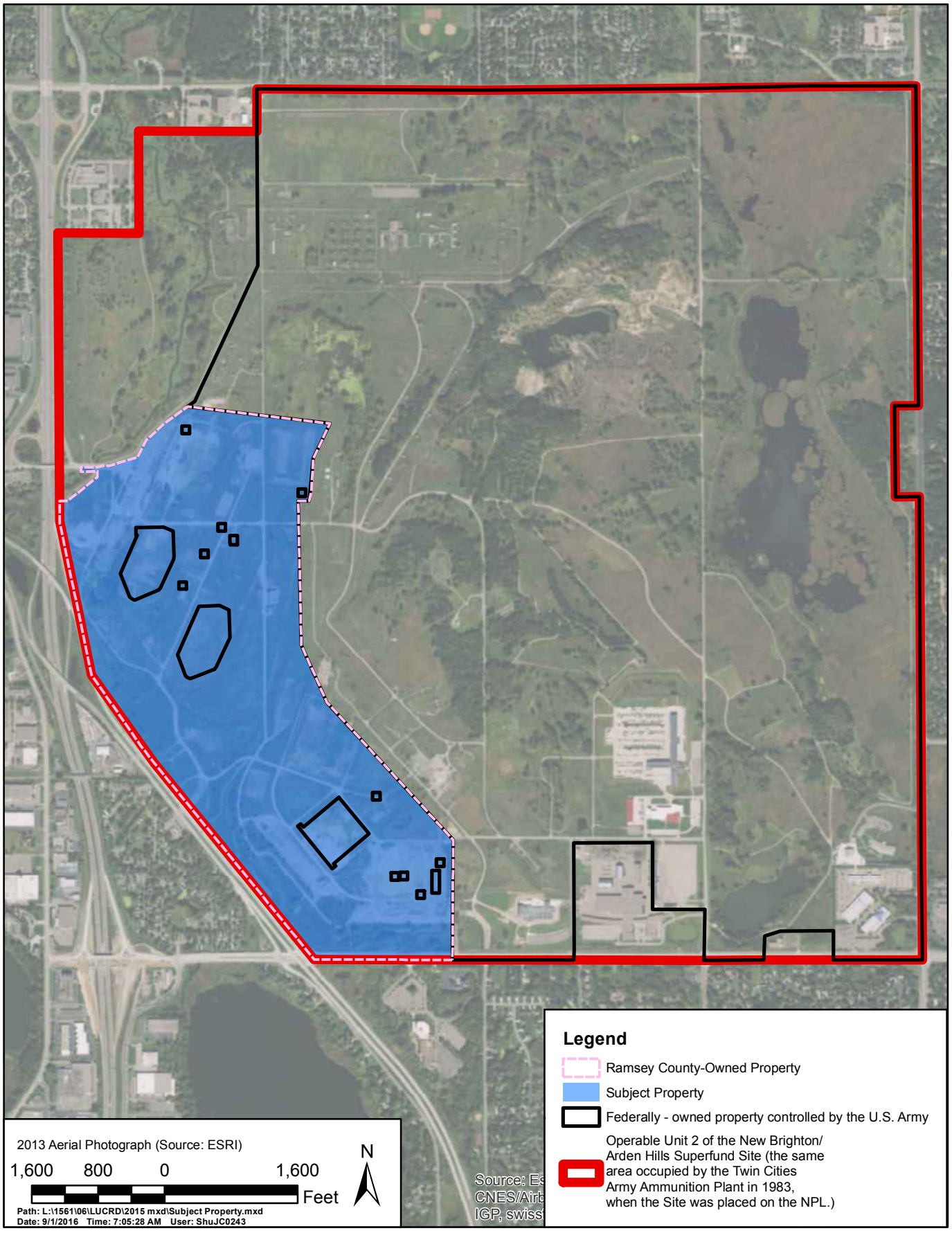
Data Compilation and Analysis

The required data compilation and analysis that was needed to obtain regulatory approval for unlimited use and unrestricted exposure for the subject property is presented in the documentation reports listed above.

Conclusions and Recommendations

Given the prior regulatory approval for unlimited use and unrestricted exposure within the subject property, as documented in the MPCA Certificate of Completion included as Attachment 3, it is recommended that Revision 4 of the OU2 LUCRD be approved to document this change.

Groundwater LUCs are to remain in place over the entire subject property.

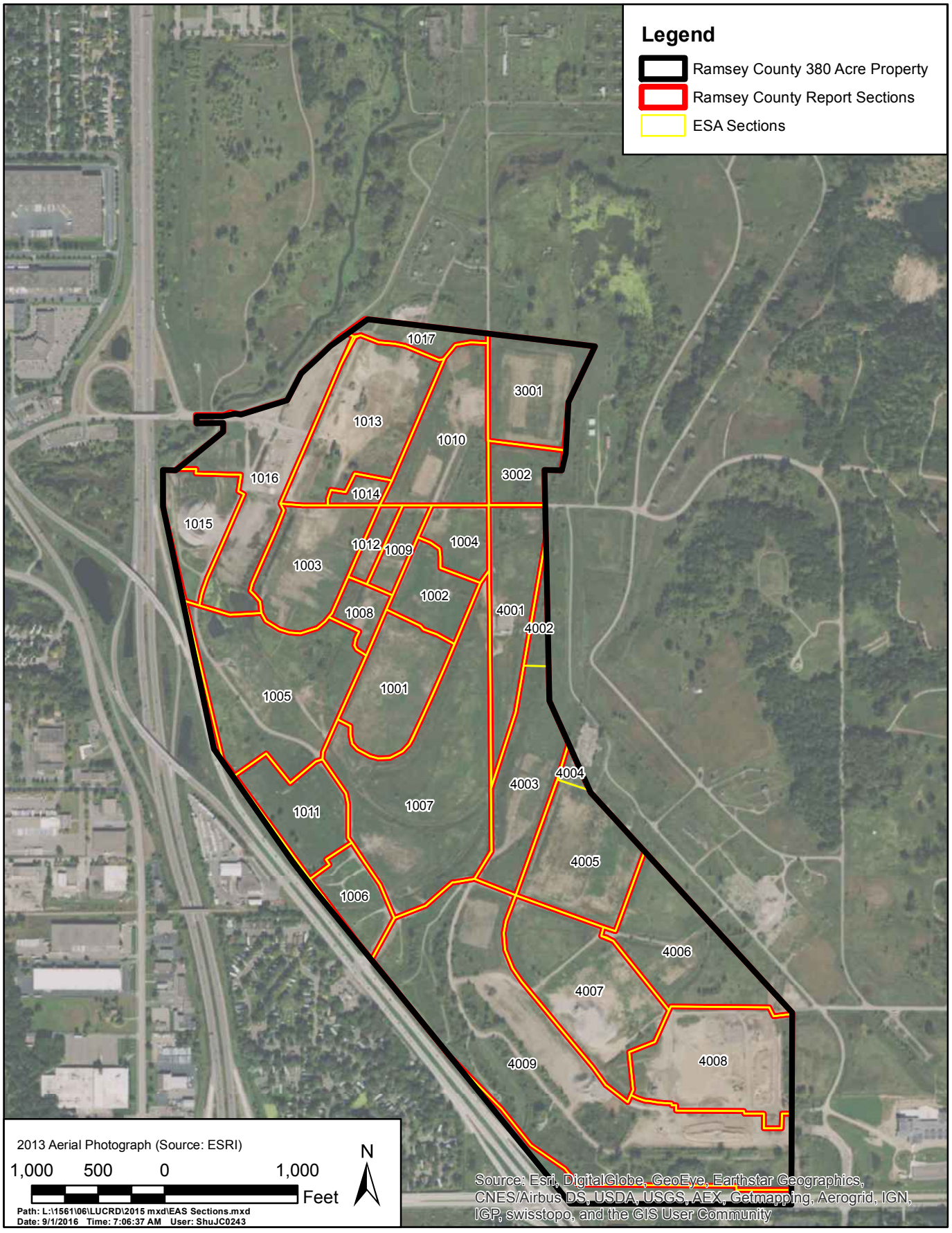


OPERABLE UNIT 2 LUCRD
Location of Subject Property for Revision 4 of OU2 LUCRD

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

AUG 2016

Attachment 1



OPERABLE UNIT 2 LUCRD

PLEXUS ESA Sections

WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

AUG 2016

Attachment 2

Attachment 3

MPCA Certificate of Completion

Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

July 12, 2016

Ms. Heather Worthington
Deputy County Manager, Ramsey County
Economic Growth and Community Investment
15 W. Kellogg Blvd.
Saint Paul, MN 55102

RE: TCAAP Redevelopment Site, 4700 Highway 10, Arden Hills
MPCA Project Number VP22891
Certificate of Completion

Dear Ms. Worthington:

The Minnesota Pollution Control Agency (MPCA) staff in the Voluntary Investigation and Cleanup Program is pleased to send the enclosed Commissioner's Certificate of Completion of Response Actions Under the Land Recycling Act of 1992, As Amended (Certificate of Completion).

Thank you for the time and resources that Ramsey County has devoted to making the western portion of TCAAP suitable for redevelopment. The MPCA staff appreciates and commends the good work of the many project partners who helped make the project a success.

If you have any questions about the enclosed Certificate of Completion, please contact me at 651-757-2402 or by email at amy.hadiaris@state.mn.us or Shanna Schmitt at 651-757-2697 or by email at shanna.schmitt@state.mn.us.

Sincerely,

Sandeep R. Burman, PG, Manager
Site Remediation & Redevelopment Section
Remediation Division

AH:bhj

Enclosure

cc: Beth Engum, Ramsey County Public Works
Joe Otte, Wenck
Mark Ryan, Carl Bolander & Sons
Rick Kubler, Gray Plant Mooty
Rick Van Allen, Bay West
Mike Fix, U.S. Army
Tom Barounis, EPA Region 5
Sue Iverson, Acting City Administrator, Arden Hills
Larry Carlson, Ramsey County Environmental Health
Lyle Salmela, TCAAP Restoration Advisory Board

STATE OF MINNESOTA
POLLUTION CONTROL AGENCY

Commissioner's Certificate
of Completion of Response Actions
Under the Land Recycling Act of 1992, As Amended

Whereas, Ramsey County has undertaken soil response actions pursuant to Minn. Stat. § 115B.175 (the Land Recycling Act of 1992, as amended) at the TCAAP Redevelopment #2 site, VP22891, located at 4700 Highway 10, in Arden Hills, and further described in a legal description in Exhibit A to this CERTIFICATE (the Site) and shown on the map in Exhibit D to this CERTIFICATE; and

Whereas, Ramsey County submitted a Voluntary Response Action Plan (comprised of the documents and reports listed as nos. 1 through 55 in Exhibit B of this CERTIFICATE) including an Investigation Report (comprised of the documents and reports listed as nos. 1 through 18 in Exhibit B of this CERTIFICATE), to the Minnesota Pollution Control Agency (MPCA) under Minn. Stat. § 115B.17, subd. 14, governing review of voluntary investigation and response actions; and

Whereas, in accordance with Minn. Stat. §§ 115B.17 subd. 14, and 115B.175, the Commissioner of the MPCA (Commissioner) or the Commissioner's delegate has determined that the Investigation Report adequately identified and evaluated the nature and extent of the releases and threatened releases to soil at the Site; and

Whereas, the Commissioner or the Commissioner's delegate has approved a Voluntary Response Action Plan (comprised of documents 1 through 55 in Exhibit B of this CERTIFICATE) including the soil response actions determined by the Commissioner or the Commissioner's delegate to be necessary to protect public health and welfare, and the environment, from releases or threatened releases of hazardous substances, pollutants, or contaminants to soil at the Site, as described in Exhibit C of this CERTIFICATE; and

Whereas, the United States Army has evaluated the nature and extent of releases and threatened releases to groundwater at the Site, as documented in the MPCA's Superfund administrative record, and retains responsibility for additional groundwater investigation at the Site, as needed; and

Whereas, the United States Army is conducting groundwater response actions at the Site, in accordance with the Record of Decision (ROD) for Operable Unit 2 (OU2), along with various OU2 ROD amendments and other documents in the Superfund administrative record, and retains responsibility for future groundwater response actions at the Site, in accordance with these documents; and

Whereas, based upon information contained in the affidavit of Heather Worthington, Deputy County Manager of Ramsey County, dated January 28, 2016, the MPCA Commissioner or Commissioner's delegate has determined that Ramsey County is qualified to obtain protection from liability provided by the Land Recycling Act of 1992, as amended, as a person not otherwise responsible for the release or threatened release of hazardous substances, pollutants, or contaminants at the Site under Minn. Stat. §§ 115B.01 to 115B.18; and

Whereas, Ramsey County has completed the soil response actions set forth in the approved Voluntary Response Action Plan, including the actions necessary to remove the existing land use controls at the Site and carry out any reuse or development of the Site, including but not limited to residential development, in a manner that protects public health and welfare and the environment.

Now, Therefore, pursuant to Minn. Stat. § 115B.175, subd. 5,

The COMMISSIONER OF THE MINNESOTA POLLUTION CONTROL AGENCY CERTIFIES UNDER MINN. STAT. § 115B.175 (THE LAND RECYCLING ACT OF 1992, AS AMENDED), THAT SOIL RESPONSE ACTIONS HAVE BEEN COMPLETED AS SET FORTH IN THE APPROVED VOLUNTARY RESPONSE ACTION PLAN FOR THE SITE.

Upon issuance of this CERTIFICATE, the persons qualified for protection under Minn. Stat. § 115B.175, subd. 6, are entitled to protection from liability under Minn. Stat. §§ 115B.01 to 115B.18, to the extent provided in the Land Recycling Act of 1992, as amended. The protection from liability provided under Minn. Stat. § 115B.175, does not apply to any person excluded from that protection under Minn. Stat § 115B.175, subd. 7.

This CERTIFICATE and the protection from liability under the Land Recycling Act of 1992, as amended, referred to in this CERTIFICATE apply to releases and threatened releases to soil at the Site which were not required to be removed or remediated, and to releases and threatened releases to groundwater at the Site which are being remediated by the U.S. Army, in accordance with the OU2 ROD and other applicable documents for the New Brighton/Arden Hills Superfund site, conditioned and upon compliance by Ramsey County and subsequent owners of the Site, and their successors and assigns, with the Environmental Covenant and Easement (Environmental Covenant) as approved and executed by the MPCA and Ramsey County. The Environmental Covenant was recorded on April 16, 2013 with the Ramsey County Registrar of Titles (Document #2207138) and with the Ramsey County Recorder (Document #4396482). An Amended Environmental Covenant lifting the existing land use controls, but retaining existing groundwater restrictions, will be filed shortly after issuance of this CERTIFICATE.

Nothing in this CERTIFICATE or in the Land Recycling Act of 1992, as amended, affects the authority of the MPCA or the MPCA Commissioner to exercise any powers or duties under Minn. Stat §§ 115B.01 to 115B.18, or other law with respect to any release or threatened release at the Site, or the right of the MPCA or the MPCA Commissioner to seek any relief available under those sections against any person who is not entitled to protection from liability under the Land Recycling Act of 1992, as amended, with respect to such release or threatened release.

SIGNED AND CERTIFIED this 12 day of July, 2016

Sandeep R. Burman, Delegate of ~~the~~ Commissioner
Manager
Remediation Division
Minnesota Pollution Control Agency

STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

The foregoing was acknowledged before me this 12th day of July, 2016, by Sandeep R. Burman, pursuant to delegation by John Linc Stine, Commissioner of the Minnesota Pollution Control Agency, a state agency, on behalf of the State of Minnesota.

Elizabeth O'Gara
Notary Public

My Commission Expires January 2020

EXHIBIT A
LEGAL DESCRIPTION

TCAAP REDEVELOPMENT SITE #2
MPCA VIC PROJECT NUMBER VP22891

LEGAL DESCRIPTION OF 380-ACRE PARCEL
(A.K.A "CALIFORNIA-SHAPED" PARCEL)

That part of BROOK LAND ACRES, Ramsey Co., Minn., and that part of the South Half of Section 9, Township 30 North, Range 23 West, Ramsey County, Minnesota, lying southerly of the North 49.5 feet of the Southwest Quarter of said Section 9, now known as a portion of Town Road "H2", vacated, as dedicated on the plat of BROOK LAND ACRES, Ramsey County, Minnesota, and that part of Section 16, said Township 30 North, Range 23 West, EXCEPT the southerly 133.00 feet of said Section 16, all lying easterly of the following described line:

Commencing at the west quarter corner of said Section 9; thence easterly on an azimuth of 90 degrees 01 minute 58 seconds along the east and west quarter line thereof and the boundary of Minnesota Department of Transportation Right of Way Plat No. 62-44, as the same is on file and of record in the office of the County Recorder in and for said County, for 182.41 feet to Right of Way Boundary Corner B4406 and the point of beginning of the line to be described; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said plat for 1,176.34 feet to Right of Way Boundary Corner B1; thence on an azimuth of 160 degrees 23 minutes 53 seconds along the boundary of said plat for 771.62 feet to Right of Way Boundary Corner B2; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said plat for 140.00 feet to Right of Way Boundary Corner B3; thence on an azimuth of 218 degrees 11 minutes 13 seconds along the boundary of said plat for 398.25 feet to Right of Way Boundary Corner B4; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said plat for 287.49 feet to Right of Way Boundary Corner B4405 as shown on said Plat No. 62-44 also being Right of Way Boundary Corner B4405 as shown on Minnesota Department of Transportation Right of Way Plat No. 62-43 as the same is on file and of record in the office of the County Recorder in and for said County; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said Plat No. 62-43 for 18.24 feet to Right of Way Boundary Corner B1; thence on an azimuth of 166 degrees 27 minutes 32 seconds along the boundary of said plat for 1,951.24 feet to Right of Way Boundary Corner B2; thence on an azimuth of 144 degrees 50 minutes 10 seconds along the boundary of said plat for 774.66 feet to Right of Way Boundary Corner B3; thence southeasterly for 113.63 feet along the boundary of said plat on a circular curve, concave to the northeast, having a radius of 5,579.58 feet, a delta angle of 01 degree 10 minutes 01 second, and a chord azimuth of 144 degrees 15 minutes 10 seconds, to Right of Way Boundary Corner B4; thence southeasterly for 275.90 feet along the boundary of said plat on a compound curve, concave to the northeast, having a radius of 5,579.58 feet, a delta angle of 02 degrees 49 minutes 59 seconds, and a chord azimuth of 142 degrees 15 minutes 10 seconds, to Right of Way Boundary Corner B5; thence on an azimuth of 140 degrees 50 minutes 10 seconds along the boundary of said plat for 51.18 feet to Right of Way Boundary Corner B4306 as shown on said Plat No. 62-43 also being Right of Way Boundary Corner B4306 as shown on Minnesota Department of Transportation Right of Way Plat No. 62-42 as the same is on file and of record in the office of the County Recorder in and for said County; thence continue on an azimuth of 140 degrees 50 minutes 10 seconds along the boundary of said Plat No.

62-42 for 1,579.05 feet, more or less, to a point on said boundary line distant 1,310.00 feet northwesterly of Right of Way Boundary Corner B2 as shown on said Plat No. 62-42; thence leaving said boundary line on an azimuth of 135 degrees 16 minutes 13 seconds for a distance of 567.07 feet, more or less, to a point on a line lying 55 feet northeasterly of, as measured at right angles to, and parallel with said boundary line; thence on an azimuth of 140 degrees 50 minutes 10 seconds, along said parallel line, for a distance of 347.74 feet; thence leaving said parallel line on an azimuth of 124 degrees 28 minutes 44 seconds for a distance of 312.47 feet, more or less, to a point on a line lying 143 feet northeasterly of, as measured at right angles to, and parallel with said boundary line; thence on an azimuth of 140 degrees 50 minutes 10 seconds, along said parallel line, for a distance of 154.84 feet, more or less, to a point 45 feet northerly of, as measured at right angles to, the boundary line of said Plat No. 62-42 lying between Right of Way Boundary Corners B2 and B3 as shown on said Plat No. 62-42; thence on an azimuth of 90 degrees 13 minutes 30 seconds for a distance of 1,192.96 feet, more or less, to a point on a line run northerly and perpendicular from the easterly extension of said boundary line from a point on said extended line distant 1,340.00 feet easterly of said Right of Way Boundary Corner B2 and said point on said perpendicular line being 30.00 feet northerly of said extended boundary line; thence on an azimuth of 179 degrees 30 minutes 16 seconds, along said perpendicular line, for a distance of 30.00 feet, more or less, to the northerly line of said southerly 133.00 feet of said Section 16, and said line there terminating.

And lying westerly of the following described line:

Commencing at the north quarter corner of said Section 9; thence North 89 degrees 52 minutes 51 seconds West, along the north line of the Northwest Quarter of said Section 9, a distance of 50.00 feet; thence South 00 degrees 43 minutes 50 seconds East, along a line parallel with the east line of said Northwest Quarter, a distance of 550.00 feet; thence North 89 degrees 52 minutes 51 seconds West, along a line parallel with said north line of the Northwest Quarter, a distance of 1,425.22 feet to the point of beginning of the line to be described; thence South 00 degrees 33 minutes 53 seconds East, along a line parallel with the west line of said Northwest Quarter, a distance of 2,206.32 feet; thence South 18 degrees 39 minutes 57 seconds West a distance of 1,896.72 feet to a point hereinafter referred to as **"Angle Point P13"**; thence South 82 degrees 05 minutes 01 second East a distance of 242.81 feet to a point hereinafter referred to as **"Angle Point P12"**; thence North 72 degrees 44 minutes 31 seconds East a distance of 363.88 feet; thence North 26 degrees 57 minutes 40 seconds East a distance of 227.73 feet; thence North 46 degrees 51 minutes 46 seconds East a distance of 398.07 feet; thence North 53 degrees 46 minutes 21 seconds East a distance of 232.79 feet; thence South 83 degrees 27 minutes 05 seconds East a distance of 1,744.23 feet; thence South 25 degrees 05 minutes 46 seconds West a distance of 465.00 feet; thence South 05 degrees 24 minutes 36 seconds West a distance of 515.00 feet; thence North 89 degrees 48 minutes 32 seconds West a distance of 131.10 feet; thence South 01 degree 30 minutes 22 seconds East a distance of 1,737.59 feet; thence South 24 degrees 24 minutes 27 seconds East a distance of 754.68 feet; thence South 42 degrees 48 minutes 32 seconds East a distance of 2,248.42 feet; thence South 00 degrees 02 minutes 56 seconds West a distance of 1,466.80 feet, more or less, to the south line of the Southeast Quarter of said Section 16 and said line there terminating.

And lying southerly of the following described line:

LEGAL DESCRIPTION CONTINUED

TCAAP REDEVELOPMENT SITE #2
MPCA VIC PROJECT NUMBER VP22891

Commencing at the west quarter corner of said Section 9; thence easterly on an azimuth of 90 degrees 01 minute 58 seconds along the east and west quarter line thereof and the boundary of Minnesota Department of Transportation Right of Way Plat No. 62-44, as the same is on file and of record in the office of the County Recorder in and for said County, for 182.41 feet to Right of Way Boundary Corner B4406; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said plat for 1,176.34 feet to Right of Way Boundary Corner B1; thence on an azimuth of 160 degrees 23 minutes 53 seconds along the boundary of said plat for 771.62 feet to Right of Way Boundary Corner B2 and the point of beginning of the line to be described; thence leaving said boundary line on a bearing of South 83 degrees 47 minutes 26 seconds East (azimuth of 96 degrees 12 minutes 34 seconds) a distance of 100.58 feet to hereinbefore described **"Angle Point P13"**; thence South 82 degrees 05 minutes 01 second East a distance of 242.81 feet to hereinbefore described **"Angle Point P12",** and said described line there terminating.

LEGAL DESCRIPTION OF 47-ACRE PARCEL
(A.K.A "NORTH THUMB")

That part of the Southwest Quarter of the Northwest Quarter of Section 9, Township 30, Range 23, lying southerly of the following described line:

Commencing at a point on the north line of said Northwest Quarter of Section 9 distant fifty (50) feet Westerly of the Northeast corner of said Northwest Quarter; thence Southerly along a line parallel with the East line of said Northwest Quarter a distance of 550.00 feet; thence Westerly along a line parallel with the North line of said Northwest Quarter a distance of 1,425.22 feet to the point of beginning of the line to be described; thence Southerly along a line parallel with the West line of said Northwest Quarter a distance of 1,235.00 feet; thence Westerly along a line parallel with the North line of said Northwest Quarter a distance of 1,160.0 feet, more or less, to said West line of the Northwest Quarter, and said described line there terminating.

And lying Westerly of the following described line:

Commencing at the North Quarter corner of said Section 9; thence North 89 degrees 52 minutes 51 seconds West, assumed bearing, along the North line of said Northwest Quarter a distance of 50.00 feet; thence South 00 degrees 43 minutes 50 seconds East along a line parallel with the East line of said Northwest Quarter a distance of 550.00 feet; thence North 89 degrees 52 minutes 51 seconds West along a line parallel with the North line of said Northwest Quarter a distance of 1,425.22 feet to the point of beginning of the line to be described; thence South 00 degrees 33 minutes 53 seconds East along a line parallel with the West line of said Northwest Quarter a distance of 2,206.32 feet and said described line there terminating.

And lying Easterly of the following described line:

Commencing at the West Quarter corner of said Section 9; thence Easterly on an azimuth of 90 degrees 01 minute 58 seconds along the East and West Quarter line thereof and the boundaries of

LEGAL DESCRIPTION CONTINUED

TCAAP REDEVELOPMENT SITE #2
MPCA VIC PROJECT NUMBER VP22891

Minnesota Department of Transportation Right of Way Plats No. 62-44 and 62-45, as the same are on file and of record in the office of the Registrar of Titles in and for Ramsey County, Minnesota, for 182.41 feet to Right of Way Boundary Corner B4406; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said Right of Way Plat No. 62-44 for 1176.34 feet to Right of Way Boundary Corner B 1 and the point of beginning of the line to be described; thence on an azimuth of 359 degrees 18 minutes 09 seconds along the boundary of said plat for 1176.34 feet to said Right of Way Boundary Corner B4406; thence continuing on said azimuth of 359 degrees 18 minutes 09 seconds along the boundary of said Right of Way Plat No. 62-45, for 5.78 feet to Right of Way Boundary Corner B7; thence on an azimuth of 359 degrees 25 minutes 22 seconds along the boundary of said plat for 850.31 feet to Right of Way Boundary Corner B6; thence continuing on said azimuth of 359 degrees 25 minutes 22 seconds, along the Northerly extension of the last described boundary line, for 100.00 feet and said described line there terminating.

(Torrens Property)

Together with

That part of the North 49.5 feet of the Southwest Quarter of Section 9, Township 30, Range 23, now known as a portion of Town Road "H2", vacated, as dedicated on the plat of BROOK LAND ACRES, Ramsey County, Minnesota, lying westerly of the following described line:

Commencing at the North Quarter corner of said Section 9; thence North 89 degrees 52 minutes 51 seconds West, assumed bearing, along the north line of said Northwest Quarter a distance of 50.00 feet; thence South 00 degrees 43 minutes 50 seconds East along a line parallel with the east line of said Northwest Quarter a distance of 550.00 feet; thence North 89 degrees 52 minutes 51 seconds West along a line parallel with the north line of said Northwest Quarter a distance of 1,425.22 feet to the point of beginning of the line to be described; thence South 00 degrees 33 minutes 53 seconds East along a line parallel with the west line of said Northwest Quarter a distance of 2,206.32 feet and said described line there terminating.

And lying easterly of the following described line:

Commencing at the west quarter corner of said Section 9; thence easterly on an azimuth of 90 degrees 01 minute 58 seconds along the east and west quarter line thereof and the boundaries of Minnesota Department of Transportation Right of Way Plats No. 62-44 and 62-45, as the same are on file and of record in the office of the Registrar of Titles in and for Ramsey County, Minnesota, for 182.41 feet to Right of Way Boundary Corner B4406; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said Right of Way Plat No. 62-44 for 1176.34 feet to Right of Way Boundary Corner B 1 and the point of beginning of the line to be described; thence on an azimuth of 359 degrees 18 minutes 09 seconds along the boundary of said plat for 1176.34 feet to said Right of Way Boundary Corner B4406; thence continuing on said azimuth of 359 degrees 18 minutes 09 seconds along the boundary of said Right of Way Plat No. 62-45, for 5.78 feet to Right of Way Boundary Corner B7; thence on an azimuth of 359 degrees 25 minutes 22 seconds along the boundary of said plat for 850.31 feet to Right of Way Boundary Corner B6; thence continuing on

said azimuth of 359 degrees 25 minutes 22 seconds, along the northerly extension of the last described boundary line, for 100.00 feet and said described line there terminating.

(Torrens Property)

Together with

That part of BROOK LAND ACRES, Ramsey Co., Minn., and that part of the South Half of Section 9, Township 30 North, Range 23 West, Ramsey County, Minnesota, lying southerly of the North 49.5 feet of the Southwest Quarter of said Section 9, now known as a portion of Town Road "H2", vacated, as dedicated on the plat of BROOK LAND ACRES, Ramsey County, Minnesota, all lying westerly of the following described line:

Commencing at the north quarter corner of said Section 9; thence North 89 degrees 52 minutes 51 seconds West, along the north line of the Northwest Quarter of said Section 9, a distance of 50.00 feet; thence South 00 degrees 43 minutes 50 seconds East, along a line parallel with the east line of said Northwest Quarter, a distance of 550.00 feet; thence North 89 degrees 52 minutes 51 seconds West, along a line parallel with said north line of the Northwest Quarter, a distance of 1,425.22 feet to a point hereinafter referred to as **"Angle Point P15"**; thence South 00 degrees 33 minutes 53 seconds East, along a line parallel with the west line of said Northwest Quarter, a distance of 2,206.32 feet to a point hereinafter referred to as **"Angle Point P14"**; thence South 18 degrees 39 minutes 57 seconds West a distance of 1,896.72 feet to a point hereinafter referred to as **"Angle Point P13"**; thence South 82 degrees 05 minutes 01 second East a distance of 242.81 feet to a point hereinafter referred to as **"Angle Point P12"**; thence North 82 degrees 05 minutes 01 second West, along the last described course, a distance of 212.76 feet, more or less, to a point distant 30.05 feet easterly of hereinbefore described **"Angle Point P13"**, and the point of beginning of the line to be described; thence northerly a distance of 16.95 feet along a non-tangential curve concave to the east having a radius of 51.00 feet, a central angle of 19 degrees 02 minutes 20 seconds and a chord bearing North 00 degrees 41 minutes 58 seconds East a distance of 16.87 feet; thence North 10 degrees 13 minutes 08 seconds East, tangent to last curve, a distance of 55.68 feet; thence northerly 69.59 feet along a tangential curve concave to the west having a radius of 400.00 feet and a central angle of 09 degrees 58 minutes 04 seconds, more or less, to the intersection of the line between the previously described points **"Angle Point P13"** and **"Angle Point P14"**; thence North 18 degrees 39 minutes 57 seconds East along said intersected line a distance of 1,752.40 feet, more or less, to said **"Angle Point P14"**; thence North 00 degrees 33 minutes 53 seconds West a distance of 2,206.32 feet to previously described **"Angle Point P15",** and said described line there terminating.

And lying easterly and northerly of the following described line:

Commencing at the west quarter corner of said Section 9; thence easterly on an azimuth of 90 degrees 01 minute 58 seconds along the east and west quarter line thereof and the boundary of Minnesota Department of Transportation Right of Way Plat No. 62-44, as the same is on file and of

record in the office of the County Recorder in and for said County, for 182.41 feet to Right of Way Boundary Corner B4406 and the point of beginning of the line to be described; thence on an azimuth of 179 degrees 18 minutes 09 seconds along the boundary of said plat for 1,176.34 feet to Right of Way Boundary Corner B1; thence on an azimuth of 160 degrees 23 minutes 53 seconds along the boundary of said plat for 771.62 feet to Right of Way Boundary Corner B2; thence leaving said boundary line on a bearing of South 83 degrees 47 minutes 26 seconds East (azimuth of 96 degrees 12 minutes 34 seconds) a distance of 100.58 feet to hereinbefore described **"Angle Point P13"**; thence South 82 degrees 05 minutes 01 second East a distance of 242.81 feet to hereinbefore described **"Angle Point P12",** and said described line there terminating.

(Abstract Property)

EXHIBIT B
SITE DOCUMENTS

TCAAP REDEVELOPMENT SITE #2
MPCA VIC PROJECT NUMBER VP22891

Investigation Reports

1. *Phase I Environmental Site Assessment*, 427 Acres of the New Brighton/Arden Hills Superfund Site, (Former Twin Cities Army Ammunition Plant), February 2013, Wenck Associates, Inc. (Wenck)
2. *UFP-Quality Assurance Project Plan, TCAAP Redevelopment #2 Site*, October 15, 2013, Wenck
3. *Additional Investigation Work Plan, Building 101*, April 4, 2014, Wenck
4. *Additional Investigation Work Plan Building 501*, April 25, 2014, Wenck
5. *QAPP Addendum #1, UFP-Quality Assurance Project Plan*, June 10, 2014, Wenck
6. *Technical Memorandum, Drain Sampling - Building 103 (Site K),* September 11, 2014, Wenck
7. *Additional Investigation Work Plan, Site I-Building 502*, October 1, 2014, Wenck
8. *Investigation Report, Building 101,* January 2015, Wenck
9. *Building 502 Bulk Concrete Sampling Protocol*, January 16, 2015, Wenck
10. *Supplemental Remedial Investigation Report, Site I, Building 502,* March 2015, Wenck
11. *Sampling Protocol for Stockpile Footprints, Building 502,* March 24, 2015, Wenck
12. *Supplemental Investigation Report, Building 501*, April 1, 2015, Wenck
13. *QAPP Addendum #2, UFP-Quality Assurance Project Plan*, April 20, 2015, Wenck
14. *Technical Memorandum, Discrete PAH Sampling Event – Section 1010,* June 1, 2015, Wenck
15. *Technical Memorandum, ISM Status/Test Pit Results – Section 1010,* September 10, 2015, Wenck
16. *Technical Memorandum, 1,4-Dioxane Soil Results,* October 28, 2015, Wenck
17. *Soil Gas Data Package,* November 21, 2013, Wenck
18. *Response to Comments Regarding Soil Gas Data Package*, June 9, 2015, Wenck

Voluntary Response Action Plan and Response Action Implementation Reports

19. *Construction Contingency Plan, Former Twin Cities Army Ammunition Plant,* May 2, 2013, Wenck
20. *Response Action Plan/Development Response Action Plan ("Hot-Spot RAP")*, October 2013, Wenck
21. *Response Action Plan, Building 102*, February 26, 2014, Wenck
22. *Response Action Plan IRP Site K,* April 24, 2014, Wenck
23. *Response Action Plan, High Bay Area and Hot Spots, Site I, Building 502 ("PCB RAP")*, July 22, 2014, Wenck
24. *Response Action Plan Amendment (IRP Site K and Building 102),* July 23, 2014, Wenck
25. *Minor Addendum to High Bay Area and Hot Spots RAP, Building 502 (Site I),* October 7, 2014, Wenck
26. *Response Action Plan/Development Response Action Plan, Building 501*, January 22, 2015, Wenck
27. *Response Action Plan/Development Response Action Plan, Building 101,* February 19, 2015, Wenck
28. *Response Action Plan, Site I, Building 502 ("VOC RAP"),* April 2015, Wenck
29. *Final Documentation Report, Section 1001*, May 2016, Wenck
30. *Final Documentation Report, Section 1002*, February 2016, Wenck
31. *Final Documentation Report, Section 1003*, April 2016, Wenck
32. *Final Documentation Report, Section 1004*, February 2016, Wenck
33. *Final Documentation Report, Section 1005*, February 2016, Wenck
34. *Final Documentation Report, Section 1006*, February 2016, Wenck
35. *Final Documentation Report, Section 1007*, February 2016, Wenck
36. *Final Documentation Report, Section 1008*, February 2016, Wenck
37. *Final Documentation Report, Section 1009*, February 2016, Wenck
38. *Final Documentation Report, Section 1010*, May 2016, Wenck
39. *Final Documentation Report, Section 1011*, February 2016, Wenck

SITE DOCUMENTS CONTINUED

TCAAP REDEVELOPMENT SITE #2
MPCA VIC PROJECT NUMBER VP22891

40. *Final Documentation Report, Section 1012*, February 2016, Wenck
41. *Final Documentation Report, Section 1013*, June 2016, Wenck
42. *Final Documentation Report, Section 1014*, April 2016, Wenck
43. *Final Documentation Report, Section 1015*, April 2016, Wenck
44. *Final Documentation Report, Section 1016*, May 2016, Wenck
45. *Final Documentation Report, Section 1017*, April 2016, Wenck
46. *Final Documentation Report, Section 3001*, February 2016, Wenck
47. *Final Documentation Report, Section 3002*, April 2016, Wenck
48. *Final Documentation Report, Section 4001*, April 2016, Wenck
49. *Final Documentation Report, Section 4002 & 4003*, April 2016, Wenck
50. *Final Documentation Report, Section 4004 & 4005*, May 2016, Wenck
51. *Final Documentation Report, Section 4006*, May 2016, Wenck
52. *Final Documentation Report, Section 4007*, June 2016, Wenck
53. *Final Documentation Report, Section 4008*, June 2016, Wenck
54. *Final Documentation Report, Section 4009*, May 2016, Wenck
55. *Final Documentation Report, Compendium*, July 2016, Wenck

EXHIBIT C
SITE SUMMARY

TCAAP REDEVELOPMENT #2 SITE
MPCA VIC PROJECT NUMBER VP22891

The TCAAP Redevelopment #2 site encompasses approximately 427 acres in the western portion of the former Twin Cities Army Ammunition Plant (TCAAP) facility, as shown on the map in Exhibit D (the Site).

History of TCAAP
The TCAAP facility was used for the production, storage, and testing of small arms ammunition at various intervals from the 1940s to the mid-1990s. Many of the production and support buildings were located on the redevelopment parcel, as can be seen on the map in Exhibit D, while certain areas in the eastern and northern portions of the larger TCAAP facility were used for weapons testing and waste disposal. In response to the discovery of off-site groundwater contamination originating from TCAAP, the facility was placed on the National Priority List in 1983 as the New Brighton/Arden Hills Superfund Site.

U.S. Army's Activities at the Site
A 1987 Federal Facilities Agreement and a 1997 Record of Decision (ROD) for Operable Unit 2 (OU2), along with various OU2 ROD Amendments and other documents in the Superfund administrative record, lay out the U.S. Army's obligations with respect to environmental contamination at the Site. These enforcement documents, as well as the many investigation reports, cleanup plans, and closure reports generated by the U.S. Army under the oversight of the federal and state Superfund programs, can be found in the U.S. Environmental Protection Agency's (EPA) file for the New Brighton/Arden Hills Superfund Site (EPA ID Number MN7213820908) or the Minnesota Pollution Control Agency's (MPCA) file for the TCAAP Superfund Site (MPCA ID Number SR313).

Groundwater impacts at the Site include chlorinated solvents and 1,4-dioxane in deep groundwater, and chlorinated solvents in shallow perched groundwater. To treat chlorinated solvents in deep groundwater, the U.S. Army operates the TCAAP Groundwater Recovery System (TGRS) at the Site - a series of extraction wells that pump contaminated groundwater to an on-site air stripping treatment building. Remedial measures for 1,4-dioxane impacts to deep groundwater are under consideration, and the U.S. Army will modify the TGRS in the future as needed to allow for implementation of a 1,4-dioxane groundwater remedy. Chlorinated solvents in three shallow plumes at the Site are being remediated via a collection trench and air stripping tower (Site K) or monitored natural attenuation (Building 102 and Site I). The U.S. Army retains responsibility for the ongoing groundwater monitoring activities at the Site and continued operation of groundwater treatment systems, in accordance with plans approved by the EPA and MPCA.

All soil cleanup activities conducted by the U.S. Army at the Site and the larger TCAAP facility were based on an exposure scenario for a site-specific industrial use, and land use controls were established accordingly. In 2002, the federal government declared a portion of the TCAAP facility, including but not limited to the Site, to be excess land no longer needed by the Department of Defense. Additional soil investigation and cleanup by the new owner was necessary prior to lifting land use controls at the Site to allow for redevelopment.

Ramsey County's Activities at the Site
Ramsey County acquired most of the Site (397 acres) on April 15, 2013 and leased the remainder of the Site (30 acres) until certain environmental investigation and cleanup criteria were met. Ramsey County will acquire the leased acreage shortly after this Certificate of Completion is issued. Upon ownership of the full 427 acres, Ramsey County will file an Amended Environmental Covenant which removes land use controls at the Site but retains the existing groundwater restrictions.

Hazardous material abatement and demolition

Environmental oversight during removal of building slabs, pavements, buried utilities, and other subsurface features was provided by Wenck Associates on behalf of Carl Bolander & Sons Co., with additional support from Bay West LLC, on behalf of Ramsey County.

- All structures were inspected for the presence of hazardous building materials (asbestos-containing materials, lead-based paint, mercury switches, etc.) and abated as needed prior to demolition.
- Approximately 30 buildings were demolished, in addition to several slabs and buried foundations of former buildings.
- Approximately 9.4 miles of storm sewer were removed
- Approximately 9.8 miles of sanitary sewer were removed
- Approximately 13.5 miles of water service line were removed
- Approximately 7 miles of natural gas line were removed
- Approximately 1.7 miles of asbestos-wrapped steam line were removed
- Approximately 7 miles of railroad track and subgrade material were removed
- Approximately 7.4 miles of chain-link fencing were removed.
- Three electrical power substations were removed.

Recycling and Reuse

- Over 400,000 tons of concrete and pavements were processed into recycled aggregate for on- and off-site reuse.
- Wooden timbers from buildings were salvaged for off-site reuse
- Steel, rebar, and other metal was recycled
- Railroad ties in good condition were collected for off-site reuse
- Railroad track was salvaged for off-site reuse

Soil Investigation

To supplement soil data previously collected at the Site by the U.S. Army and others, Ramsey County conducted the following additional soil investigation activities:

- Collected soil samples at selected floor penetrations (sumps, pits, floor drains) from within the footprint of buildings in which manufacturing activities had taken place (Buildings 101, 102, 103, 104, 111, 112, 114, 115, 151, 157, 501, 502, 503, 557, and 587). Floor penetration samples were analyzed for volatile organic compounds (VOCs).
- Excavated test pits within the footprint of Buildings 101 and 501 for more comprehensive coverage. Selected soil samples were analyzed for polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), varied metals, cyanide, and diesel range organics (DRO).
- Advanced soil borings within the footprint of Building 502 to better define the extent and magnitude of contamination in the vicinity of a former degreaser and a former solvent storage tank. Selected soil samples were analyzed for VOCs and 1,4-dioxane.
- After removal of railroad tracks, ballast, and six inches of subgrade material, selected soil samples were analyzed for PAHs, pesticides, Resource Conservation and Recovery Act (RCRA) metals, and DRO. Typically, composite samples were collected from the stockpile of removed subgrade material. If the stockpile sample had contaminant concentrations above actionable levels, additional soil was removed from the rail bed, followed by discrete soil confirmation samples that were analyzed only for the contaminant(s) that had exceeded the cleanup goal. In other cases only discrete confirmation samples were collected from the former rail bed after removal of six inches of subgrade material; these discrete samples were analyzed for the full suite of parameters listed above.

- After removal of all structures and excavation of all known areas of soil contamination at the Site, Incremental Sampling Methodology (ISM) was used as a final check to evaluate the concentration of PAHs and metals in shallow soil across the Site. Approximately 2,400 shallow soil borings were advanced across the Site in a grid pattern during the ISM investigation. The ISM sampling results indicate that the average concentration of PAHs and metals (antimony, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury and thallium) in the upper four feet of soil across the Site are less than the MPCA's residential soil reference values (SRVs).

Soil Response Actions and Cleanup Goals

Seven MPCA-approved response action plans (RAPs) were implemented at the Site. Collectively, the RAPs addressed soil impacts ranging from isolated, minor exceedances of a cleanup goal, to large areas impacted by chlorinated solvents and high concentrations of PCBs. The cleanup goal for chlorinated solvents was the MPCA's soil leaching values (SLVs). The cleanup goal for PAHs, PCBs, cyanide, and most metals was the MPCA's residential SRVs. Site-specific cleanup goals were established for two metals – iron and vanadium – based on their respective residential SRV being less than site background soil concentrations.

Petroleum-impacted soil at the Site is under the oversight of the MPCA's Petroleum Brownfields Program, and is not covered by this Certificate of Completion. Soil response actions for petroleum-impacted soil at the Site were based on a chosen DRO cleanup goal of 100 milligrams per kilogram (mg/kg).

Impacted soil was excavated and hauled to a permitted landfill for disposal, as summarized below:

- 9,281 tons of PCB hazardous waste (soil and concrete)
- 99,698 tons of non-hazardous impacted soil
- 7,054 tons of asbestos-containing buried debris

Confirmation soil samples collected from the base and sidewalls of each remedial excavation were analyzed for the specific contaminants of concern driving that excavation. Confirmation soil sample results indicate that cleanup goals across the Site were achieved, with the exception of three discrete areas where chlorinated solvents remain at depth, as described below.

Residual Soil Contamination (Chlorinated Solvents)

Two areas of residual soil contamination are associated with former Building 502 (Site I). Details can be found in the Final Documentation Report for Section 4008. The other area is associated with former Building 103 (Site K). Details can be found in the Final Documentation Report for Section 1013. The residual soil contamination does not pose a human health risk, given its limited aerial extent and depth below current grade. Existing groundwater remedies are in place to address groundwater impacts due to the leaching of these chlorinated solvents.

- Soil in the vicinity of a former solvent above-ground storage tank, located just southwest of former Building 502, was excavated to depths ranging from 10 to 13 feet below current grade. Based on historical data (e.g. previously-identified soil impacts at depths greater than 13 feet), trichloroethene (TCE) remains in soil at concentrations exceeding the MPCA's SLV at depths greater than 13 feet below current grade. Known concentrations of residual TCE include 8.72 and 8.69 mg/kg.

- Soil just southeast of the former Kendall degreaser, located within the footprint of former Building 502, was excavated to depths ranging from 10 to 18 ½ feet below current grade. The concentration of TCE in one confirmation soil sample (39.5 mg/kg at 16 to 17 feet) exceeded the residential SRV. At this sample location and several others within this discrete area, the concentration of TCE had been increasing with depth when the excavation was terminated.

- Soil beneath and near a portion of the former Building 103 slab was excavated to a depth of five to six feet below current grade, at which point the perched water table was encountered. Ramsey County was only responsible for removing impacted soils in the unsaturated zone. No soil confirmation samples were collected from the base of this remedial excavation due to saturated conditions. Based on historical data, TCE contamination at a concentration greater than the residential SRV is present in a discrete area below the perched water table at depths greater than six feet below current grade. Known concentrations of residual TCE exceeding the residential SRV include 804 mg/kg, 140 mg/kg, 70 mg/kg, and 31 mg/kg.

Redevelopment Plan

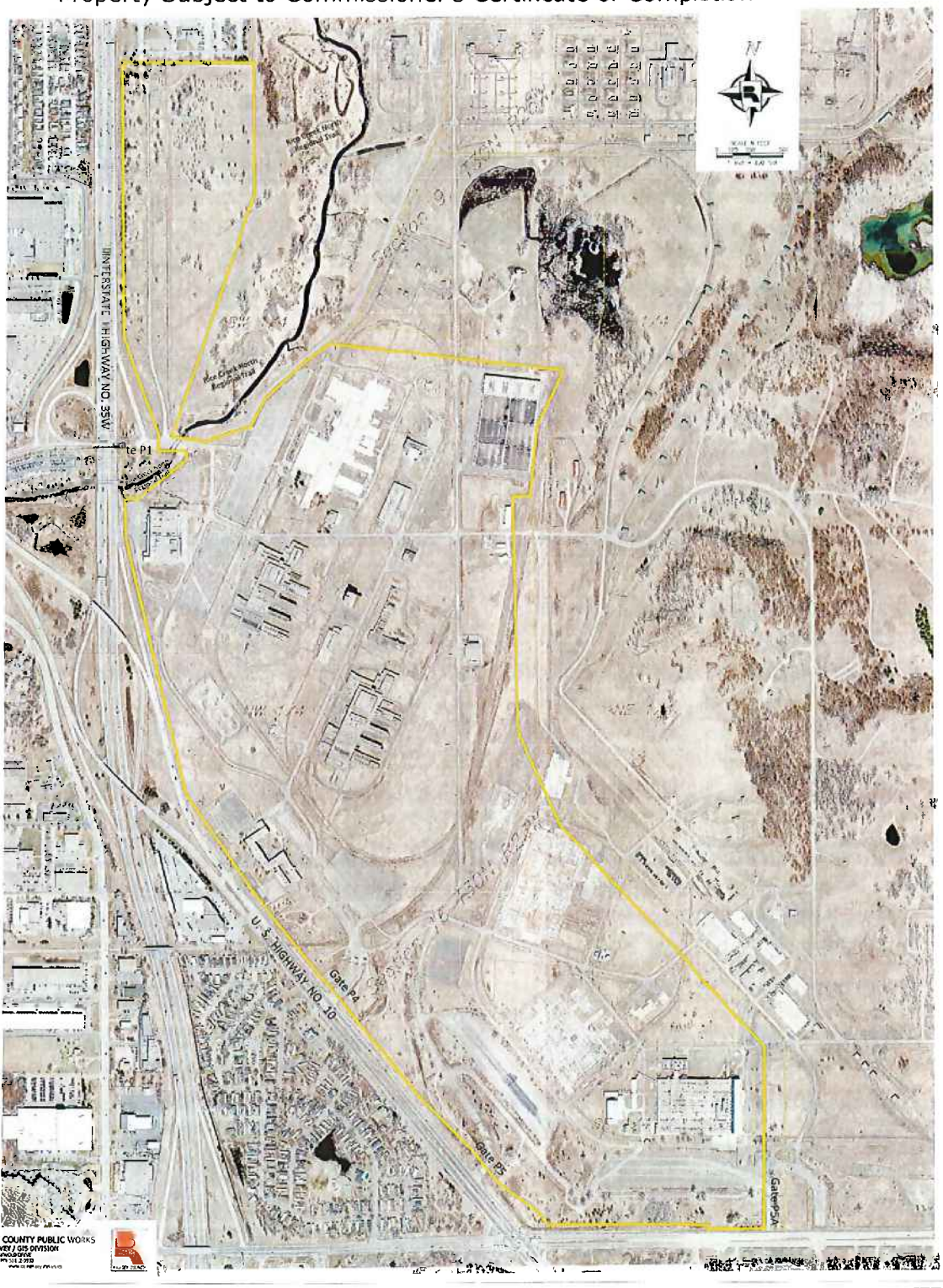
While a specific redevelopment plan is not yet available, Ramsey County's response actions have achieved conditions suitable for residential or recreational use across the Site, and the existing land use controls will be lifted accordingly, once Ramsey County has ownership of the full 427 acres. The actual redevelopment plan will likely be a mix of residential, recreational, and office/commercial uses.

Additional assessment of soil vapor impacts will be necessary in some portions of the Site, depending on the specific redevelopment plan, to determine the need for building-specific vapor mitigation systems.

EXHIBIT D
SITE MAP

TCAAP REDEVELOPMENT SITE #2
MPCA VIC PROJECT NUMBER VP22891

Property Subject to Commissioner's Certificate of Completion



APPENDIX E

Technical Memorandum, Supporting Documentation for Revision 5

Technical Memorandum

Supporting Documentation for Revision 5,
Operable Unit 2 Land Use Control Remedial Design

New Brighton/Arden Hills Superfund Site

Arcadis PIKA JV

March 1, 2018

Purpose and Summary

The purpose of this Technical Memorandum is to document the information used as the basis for regulatory approval of Revision 5 for the Operable Unit 2 Land Use Control Remedial Design (OU2 LUCRD). Revision 5 affects land use controls (LUCs) for 108 acres (Parcels A through D) in the western portion of the Twin Cities Army Ammunition Plant (TCAAP), which are to be used as part of the Rice Creek Regional Trial Corridor, subsequently referred to together as the "subject property", as shown on Attachment 1. Ramsey County has completed soil response actions on the subject property, achieving cleanup levels suitable for recreational use. This revision only affects LUCs for soils on the subject property. Groundwater LUCs on the subject property are not affected by this revision. Also, LUCs for groundwater, groundwater infrastructure, soils, and soil covers in the federally-owned property having LUCs are not affected by this revision, with the exception of Parcel C of the subject property, which will remain under federal ownership.

Background

Revision 1 of the OU2 LUCRD was approved by the U.S. Environmental Protection Agency (USEPA) and MPCA in September 2010 (the draft document was considered Revision 0 and the final document was considered Revision 1). The OU2 LUCRD was developed to satisfy requirements for LUCs set forth in Amendments and Explanations of Significant Differences associated with the OU2 Record of Decision (ROD). LUCs are a component of the remedies for various areas of concern for protection of human health. While the need for LUCs is clear for the individual areas of concern, it is less clear for surrounding areas. To expedite the approval process, the U.S. Army elected to implement "blanket LUCs" across most of OU2, including the subject property, and also the Arden Hills Army Training Site (AHATS) and the U.S. Army Reserve Center (USARC). However, it was anticipated that, in the future, the U.S. Army (and future property owners) would undertake efforts to reduce the footprint of the "blanket LUCs" to allow less restrictive activities on certain portions of OU2. Revisions 2 and 3 of the OU2 LUCRD, which were approved by the USEPA and MPCA in June 2011and March 2015, changed the AHATS cantonment area and the USARC from the "blanket LUC" for soils to uses compatible with "restricted commercial use". Revision 4 documented removal of the "blanket LUC" for soils on the "California-Shaped Area" of the TCAAP Redevelopment site and the suitability of that area for unlimited use and unrestricted exposure.

Attachment 1 - MPCA No Further Action Determination for Soil

MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

September 27, 2017

Scott Yonke
Ramsey County Parks & Recreation Dept.
2015 N. Van Dyke Street
Maplewood, MN 55109

RE: No Further Action Determination for Soil
Rice Creek Regional Trail, Arden Hills
MPCA Site ID: VP26640
Billing ID: 199943

Dear Scott Yonke:

The Minnesota Pollution Control Agency (MPCA) staff in the Voluntary Investigation and Cleanup (VIC) Program has been requested to provide a No Further Action Determination for releases identified at the Rice Creek Regional Trail site, which is a subset of the former Twin Cities Army Ammunition Plant (TCAAP). Specifically, the site is composed of four parcels, A through D, as depicted on Attachment B and which together comprise approximately 108 acres in the western portion of TCAAP (the Site).

Ramsey County is redeveloping the Rice Creek Regional Trail site for recreational use, including a public trail that runs along the north and east perimeter of the TCAAP redevelopment area (VP22891) and greenspace immediately north of the redevelopment area. The County intends to acquire three of the parcels – Parcels A, B, and D – from the federal government. The federal government will retain ownership of Parcel C but intends to grant Ramsey County a permanent easement allowing its use as part of the trail corridor.

Parcel A contains a former U.S. Army waste disposal and waste burning area that is referred to as Installation Restoration Program (IRP) Site C. The U.S. Army constructed a soil cover at IRP Site C in 2008, following excavation, stabilization, and landfill disposal of approximately 21,450 cubic yards of metals-impacted soil. The soil cover is monitored and maintained by the U.S. Army, as required under the existing Superfund land use controls for the larger TCAAP site. The federal and state Superfund programs provided closure for soil at IRP Site C in 2009. However, because the U.S. Army's soil remediation was based on site-specific industrial cleanup values (e.g. 1200 milligrams per kilogram for lead), residual contamination in shallow soil along the south and southeast perimeter of the existing soil cover remained at concentrations greater than the MPCA's industrial and/or residential soil reference values (SRV). Parcel A also contained the 120-Series Magazine Area, a collection of small buildings formerly used to store containerized explosives and self-contained explosive items. In 1998, these buildings were cleaned of any explosive residue and subsequently classified as being in a decontaminated state with respect to explosives.

Parcel B is the westernmost end of the former 1,3,5-Primer Tracer Area (135-PTA). The larger 135-PTA was used for the manufacture of primers and tracers, which are the ignition components of ballistic rifle ammunition. The portion of 135-PTA that comprises Parcel B was not intensively used for production; most of the former buildings on Parcel B were used for storage of raw and finished materials. Historical

sampling efforts had identified polynuclear aromatic hydrocarbons (PAHs) and lead in a few soil samples on Parcel B at concentrations exceeding the MPCA's industrial SRVs.

Parcel C was once occupied by the western end of a long narrow building, which served as an indoor firing range. Parcel D is an approximately 150-foot wide strip that borders the north and east side of the TCAAP redevelopment area.

Ramsey County conducted a soil investigation in selected portions of the Site in 2011, to supplement previous data collected by the U.S. Army and others. With the exception of one soil sample on Parcel B that contained an elevated concentration of PAHs, no additional impacted areas were identified during the 2011 investigation. For the purpose of this letter, the identified release at the Site is defined as lead, antimony, copper, thallium, arsenic, and PAHs in soil (Identified Release).

Soil response actions completed by Ramsey County at the Site are described in two implementation reports: *Final Documentation Report for Parcel B of the Rice Creek Regional Trail Corridor*, dated February 2017, and *Final Documentation Report for Parcels A and D of the Rice Creek Regional Trail Corridor*, dated September 2017. No response actions were necessary on Parcel C.

Ramsey County demolished all existing structures at the Site and excavated soil in discrete areas where metals and PAHs exceeded residential SRVs. The four-foot thick soil cover at IRP Site C was extended to the south and southeast to address residual contamination around the perimeter of the original cap. After completion of response actions, Incremental Sampling Methodology (ISM) was used to document that the average concentration of metals and PAHs in the upper four feet of Parcels A, B, and D met their respective residential SRVs. During ISM sampling, field screening of soil identified an area on Parcel A which exhibited staining, a petroleum odor, and elevated organic vapors. Soil testing revealed petroleum-related volatile organic compounds and lead exceeding MPCA's industrial SRVs, and a high concentration of diesel range organics. The impacts in this area were similar to other previously discovered waste disposal and waste burning areas associated with IRP Site C. Additional impacted soil was excavated from Parcel A, to depths up to 8 to 12 feet below grade in some areas, at which point the shallow water table was encountered. Altogether, approximately 12,180 cubic yards of contaminated soil was excavated from the Site during Ramsey County's response actions. Impacted soil intermixed with debris remains on a portion of Parcel A below a depth of four feet, beneath the engineered cover at IRP Site C and north of IRP Site C. An environmental covenant will be recorded on the property deed for Parcels A, B, and D when Ramsey County acquires the property.

Based on a review of the information provided to the MPCA, the MPCA staff will not request any further investigation or remediation of the Identified Release at the Site. Furthermore, the MPCA is issuing a determination to take no action under Minn. Stat. §§ 115B.01-115B.18, with respect to the Identified Release. Specifically, the MPCA staff will not refer the Identified Release to the U.S. Environmental Protection Agency for inclusion on the Comprehensive Environmental Response, Compensation and Liability Information System list, to the State Site Assessment staff for preparation of a Hazard Ranking System score, or to the MPCA Commissioner for the placement of the Site on the Permanent List of Priorities.

This determination is based solely on the results of the soil investigation conducted at the Site. The U.S. Army continues to treat and/or monitor groundwater contamination beneath the Site, as per the requirements of the TCAAP Operable Unit 2 Record of Decision and related amendments.

Please be advised that the determination made in this letter is subject to the disclaimers found in Attachment A. If you have any questions about the contents of this letter, please contact Amy Hadiaris at 651-757-2402 or by email at amy.hadiaris@state.mn.us, or Shanna Schmitt at 651-757-2697 or by email at shanna.schmitt@state.mn.us.

Sincerely,

Gary L. Krueger

This document has been electronically signed.

Gary Krueger
Supervisor
Site Remediation & Redevelopment Section
Remediation Division

GLK/AH/bhj

Enclosure

ec: Beth Engum, Ramsey County
Rick Kubler, Gray Plant Mooty
Rick Van Allen, Bay West
Joe Otte, Wenck
Tom Barounis, EPA

Attachment A

Disclaimers

Rice Creek Regional Trail

MPCA Site ID: VP26640

1. Reservation of authorities

   The Minnesota Pollution Control Agency (MPCA) Commissioner reserves the authority to take any appropriate actions with respect to any release, threatened release, or other conditions at the Site. The MPCA Commissioner also reserves the authority to take such actions if the voluntary party does not proceed in the manner described in this letter or if actions taken or omitted by the voluntary party with respect to the Site contribute to any release or threatened release, or create an imminent and substantial danger to public health and welfare.

2. No MPCA assumption of liability

   The MPCA, its Commissioner and staff do not assume any liability for any release, threatened release or other conditions at the Site or for any actions taken or omitted by the voluntary party with regard to the release, threatened release, or other conditions at the Site, whether the actions taken or omitted are in accordance with this letter or otherwise.

3. Letter based on current information

   All statements, conclusions and representations in this letter are based upon information known to the MPCA Commissioner and staff at the time this letter was issued. The MPCA Commissioner and staff reserve the authority to modify or rescind any such statement, conclusion or representation and to take any appropriate action under his authority if the MPCA Commissioner or staff acquires information after issuance of this letter that provides a basis for such modification or action.

4. Disclaimer regarding use or development of the property

   The MPCA, it's Commissioner and staff do not warrant that the Site is suitable or appropriate for any particular use.

5. Disclaimer regarding investigative or response action at the property

   Nothing in this letter is intended to authorize any response action under Minn. Stat. § 115B.17, subd. 12.

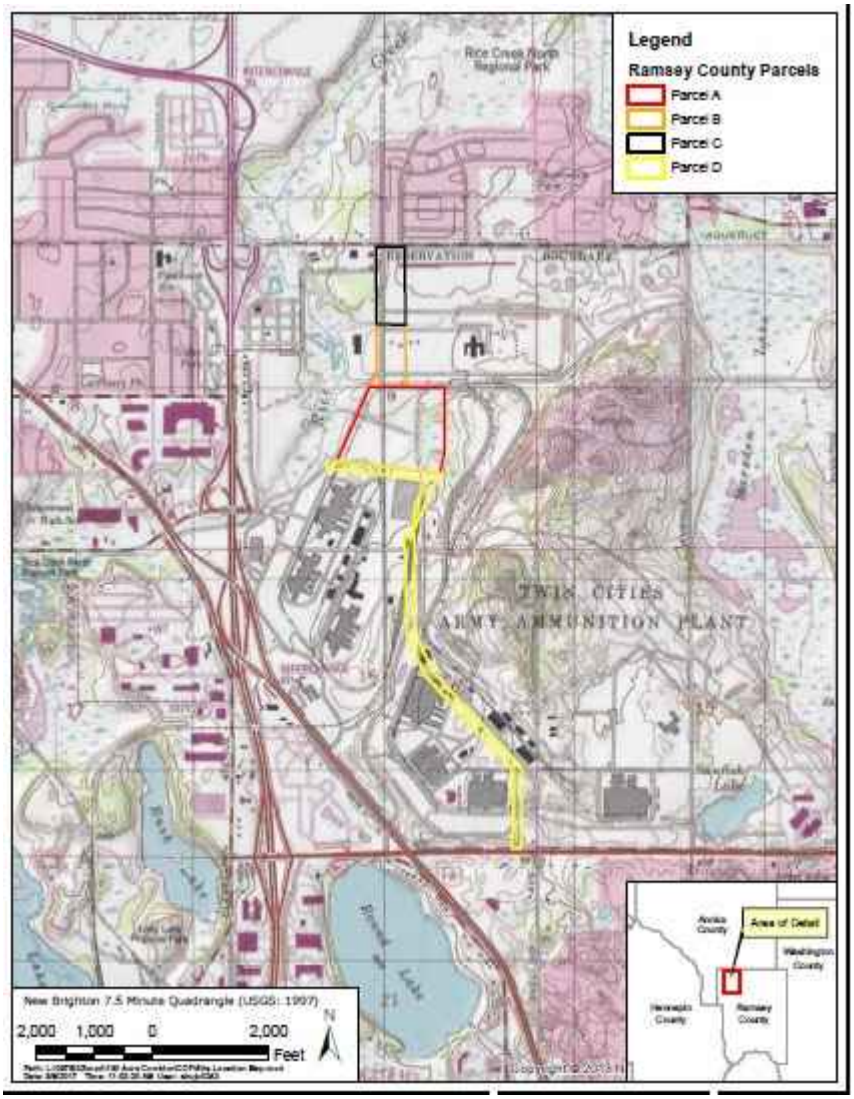
6. This approval does not supplant any applicable state or local stormwater permits, ordinances, or other regulatory documents.

Attachment B

Site Boundary

Rice Creek Regional Trail

MPCA Site ID: VP26640



Revision 5 removes the blanket LUC for soil for the 108 acre subject property to allow activities compatible with recreational use. The subject property will be redeveloped for recreational use, including a public trail and greenspace. Ramsey County will acquire Parcels A, B, and D from the federal government for this purpose. The federal government will retain ownership of Parcel C, but intends to grant Ramsey County a perpetual easement to allow use of Parcel C for the trail corridor.

Description of Subject Property

The subject property, which is a subset of the former TCAAP, is composed of four parcels, A through D, and together comprise approximately 108 acres in the western portion of TCAAP (Attachment 1).

Former Land Use on Subject Property

TCAAP was constructed in 1941 to produce small-caliber ammunition for the United States military. Production activities included manufacturing small arms ammunition and related materials, proof-testing small arms ammunition and related items as required, and handling and storing strategic and critical materials for other government agencies. Ammunition production and related activities have occurred periodically, commensurate with operations in wars, conflicts, and other national emergencies, and ceased in 2005.

Proposed Land Use on Subject Property

Ramsey County intends to develop the subject property for recreational use as part of the Rice Creek Regional Trail Corridor, including a public trail and greenspace that runs along the north and east perimeter of the TCAAP redevelopment area and greenspace immediately north of the redevelopment area.

Previous Environmental Studies and Investigations

Environmental investigations at TCAAP began in the early 1980s with the discovery of groundwater contamination. TCAAP was placed on the National Priorities List as part of the New Brighton/Arden Hills Superfund Site in 1983.

For the purposes of this OU2 LUCRD revision, the key reports are the documentation reports prepared by Wenck Associates, Inc., which detail Ramsey County's soil investigation and remediation work conducted under the MPCA's Voluntary Investigation and Cleanup Program. Collectively, the following reports document the suitability of the Rice Creek Regional Trail site for recreational use:

- Phase II Environmental Site Assessment, Rice Creek Regional Trail Corridor (Portions of the Twin Cities Army Ammunition Plant), Wenck Associates, Inc., December 2011
- Quality Assurance Project Plan, Rice Creek Regional Trail Corridor (108-Acre Portion of Former Twin Cities Army Ammunition Plant), Wenck Associates, Inc., November 6, 2012 (Revision 3)
- Final Documentation Report for Parcel B of the Rice Creek Regional Trail Corridor, February 2017

- Final Documentation Report for Parcels A and D of the Rice Creek Regional Trail Corridor, September 2017
- MPCA No Further Action Determination for Soil Letter, September 2017 (included as Attachment 1)

Data Compilation and Analysis

The required data compilation and analysis to support the change in soil LUCs to allow recreational use at the subject property is presented in the documentation reports listed above.

Conclusions and Recommendations

Based on the data compilation and analysis referenced above and the MPCA No Further Action Determination for Soil included as Attachment 1, it is recommended that soil LUCs on the subject property be changed to allow recreational use. Groundwater LUCs are to remain in place over the entire subject property.

APPENDIX F

Technical Memorandum, Supporting Documentation for Revision 6

Technical Memorandum

Supporting Documentation for Revision 6,
Land Use Control Remedial Design Report

New Brighton/Arden Hills Superfund Site

October 2020

Purpose and Summary

The purpose of this Technical Memorandum is to document the information used as the basis for regulatory approval of Revision 6 for the Land Use Control Remedial Design (LUCRD) Report. Revision 6 is necessary because the U.S. Environmental Protection Agency (USEPA), with the concurrence of the Minnesota Pollution Control Agency (MPCA) and the United States Department of the Army (U.S. Army), has concluded that appropriate response actions for soil (shallow and deep) within operable unit (OU)2 and surface water and sediment at five aquatic sites located within OU2 (Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South, and Pond G) have been completed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). USEPA issued the final Notice of Partial Delisting from the National Priorities List (NPL) on September 23, 2019 and MPCA issued its concurrence on May 1, 2020. The soil LUCs associated with the soil remedies remain in place as described in the LUCRD Report. The remaining areas at the New Brighton/Arden Hills (NB/AH) Superfund Site, including OU1, OU3, groundwater in OU2, and a sixth aquatic site (Round Lake) located south west of OU2, will remain on the NPL.

Background

The LUCRD Report describes the current LUCs in place at the NB/AH Superfund Site in Ramsey County, Minnesota. Following numerous property transfers and remedial progress, soil LUCs for OU2 have been revised. As a result, several revisions (Revisions 1 through 5) to the LUCRD Report have been made as summarized in technical memoranda included as Appendices B through E of the LUCRD Report.

Revision 6 of the LUCRD Report documents the delisting of soils for OU2. This includes a change in the LUC for the Arden Hills Army Training Site (AHATS) and the Army Reserve Center from a restricted commercial exposure scenario to the blanket LUC industrial scenario. Further, the LUCRD Report has been updated to provide a summary of LUCs at OU1 and OU3.

Description of Subject Property

OU2 consists of affected soil, sediment, surface water, and groundwater within the TCAAP facility as it existed in 1983 the site was placed on the NPL as the NB/AH Superfund Site. Revision 6 to the LUCRD Report affects blanket LUCs for soil throughout OU2.

Former Land Use on Subject Property

The TCAAP was constructed in 1941 to produce small-caliber ammunition for the United States military. Production activities included manufacturing small arms ammunition and related materials, proof-testing small arms ammunition and related items as required, and handling and storing strategic and critical materials for other government agencies. Ammunition production and related activities have occurred periodically, commensurate with operations in wars, conflicts, and other national emergencies, and ceased in 2005.

Proposed Land Use on Subject Property

Land use in OU2 will be restricted to an industrial scenario for areas covered by the blanket LUC.

Previous Environmental Studies and Investigations

Environmental investigations at TCAAP began in the early 1980s with the discovery of groundwater contamination. TCAAP was placed on the NPL as part of the NB/AH Superfund Site in 1983.

For the purposes of this OU2 LUCRD revision, the following document the basis for this revision:

- USEPA Partial Delisting of the NB/AH Superfund Site (dated September 23, 2019; included as Attachment 1)
- MPCA Notice of Partial Delisting of the NB/AH Superfund Site (dated May 1, 2020; included as Attachment 2)

Data Compilation and Analysis

The required data compilation and analysis to support the change in soil LUCs are presented in the documents listed above.

Conclusions and Recommendations

In accordance with the final Notice of Partial Delisting from the NPL issued by USEPA on September 23, 2019 included as Attachment 1, response actions for soil (shallow and deep) located within OU2 and for surface water and sediment at five aquatic sites located within OU2 are completed. It is recommended that the blanket soil LUC for all of OU2 (including the AHATS and the Army Reserve Center) be changed to an industrial scenario consistent with the blanket LUC for OU2 soil. The exceptions to this blanket soil LUC are the portions of OU2 released to Ramsey County, Site F, and the "watchable wildlife area," which allow unrestricted use and no soil LUCs are required. In addition, for individual areas that have a soil cover as part of the remedy, LUCs remain in place to restrict activities that would disrupt the effectiveness of the cover. Groundwater LUCs are to remain in place over all of OU2, as well as OU1 and OU3.

Attachment 1 - USEPA Partial Delisting of the New Brighton/Arden Hills Superfund Site

Administrator finds that an IRB, investigator, sponsor, or institution has materially failed to comply with the terms of this subpart.

§ 26.1124 [Reserved]

§ 26.1125 Prior submission of proposed human research for EPA review.

Any person or institution who intends to conduct or sponsor human research covered by § 26.1101(a) shall, after receiving approval from all appropriate IRBs, submit to EPA prior to initiating such research all information relevant to the proposed research specified by § 26.1115(a), and the following additional information, to the extent not already included:

(a) A discussion of:

(1) The potential risks to human subjects;

(2) The measures proposed to minimize risks to the human subjects;

(3) The nature and magnitude of all expected benefits of such research, and to whom they would accrue;

(4) Alternative means of obtaining information comparable to what would be collected through the proposed research; and

(5) The balance of risks and benefits of the proposed research.

(b) All information for subjects and written informed consent agreements as originally provided to the IRB, and as approved by the IRB.

(c) Information about how subjects will be recruited, including any advertisements proposed to be used.

(d) A description of the circumstances and methods proposed for presenting information to potential human subjects for the purpose of obtaining their informed consent.

(e) All correspondence between the IRB and the investigators or sponsors.

(f) Official notification to the sponsor or investigator, in accordance with the requirements of this subpart, that research involving human subjects has been reviewed and approved by an IRB.

■ 7. Revise § 26.1302 to read as follows:

§ 26.1302 Definitions.

The definitions in § 26.1102 apply to this subpart as well.

[FR Doc. 2019–15665 Filed 7–22–19; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 300

[EPA–HQ–SFUND–1983–0002 FRL–9996–98–Region 5]

National Oil and Hazardous Substances Pollution Contingency Plan; National Priorities List: Partial Deletion of the New Brighton/Arden Hills/Twin Cities Army Ammunition Plant (TCAAP) Superfund Site

AGENCY: Environmental Protection Agency (EPA).

ACTION: Direct final rule.

SUMMARY: The Environmental Protection Agency (EPA) Region 5 is publishing a direct final Notice of Partial Deletion of all soil and five aquatic sites in Operable Unit 2 (OU2) of the New Brighton/Arden Hills/TCAAP Superfund Site in Minnesota from the National Priorities List (NPL). The NPL, promulgated pursuant to Section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, is an appendix of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This direct final partial deletion is being published by EPA with the concurrence of the State of Minnesota, through the Minnesota Pollution Control Agency, because all appropriate response actions for soil and these five aquatic sites under CERCLA, other than maintenance, monitoring and five-year reviews, have been completed. However, this partial deletion does not preclude future actions under Superfund.

DATES: This direct final partial deletion is effective September 23, 2019 unless EPA receives adverse comments by August 22, 2019. If adverse comments are received, EPA will publish a timely withdrawal of the direct final partial deletion in the **Federal Register** informing the public that the partial deletion will not take effect.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA–HQ–SFUND–1983–0002 by one of the following methods:

https://www.regulations.gov. Follow the on-line instructions for submitting comments. Once submitted, comments cannot be edited or removed from *Regulations.gov.* The EPA may publish any comment received to its public docket. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Multimedia submissions (audio, video, etc.) must be accompanied by a written comment. The written comment is considered the official comment and should include discussion of all points you wish to make. The EPA will generally not consider comments or comment contents located outside of the primary submission (*i.e.,* on the web, cloud, or other file sharing system). For additional submission methods, the full EPA public comment policy, information about CBI or multimedia submissions, and general guidance on making effective comments, please visit *https://www2.epa.gov/dockets/commenting-epa-dockets.*

Email: cano.randolph@epa.gov.

Mail: Randolph Cano, NPL Deletion Coordinator, U.S. Environmental Protection Agency Region 5 (ST–6J), 77 West Jackson Boulevard, Chicago, IL 60604, (312) 886–6036.

Hand deliver: Superfund Records Center, U.S. Environmental Protection Agency Region 5, 77 West Jackson Boulevard, 7th Floor South, Chicago, IL 60604, Phone: (312) 886–0900. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information. The normal business hours are Monday through Friday, 8 a.m. to 4 p.m., excluding Federal holidays.

Instructions: Direct your comments to Docket ID no. EPA–HQ–SFUND–1983–0002. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *https://www.regulations.gov,* including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *https://www.regulations.gov* or email. The *https://www.regulations.gov* website is an ''anonymous access'' system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an email comment directly to EPA without going through *https://www.regulations.gov,* your email address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA

cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

Docket: All documents in the docket are listed in the *https://www.regulations.gov* index. Although listed in the index, some information is not publicly available, *e.g.,* CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically at *https://www.regulations.gov* or electronically or in hard copy at:

U.S. Environmental Protection Agency, Region 5, Superfund Records Center, 77 West Jackson Boulevard, 7th Floor South, Chicago, IL 60604, Phone: (312) 886–0900, Hours: Monday through Friday, 8 a.m. to 4 p.m., excluding Federal holidays.

Minnesota National Guard, 4761 Hamline Avenue North, Arden Hills, MN 55112, Contact: Mary Lee, Arden Hills Army Training Site, Phone: (651) 282–4420. Hours: Monday through Friday, 8 a.m. to 3:30 p.m., excluding State holidays.

FOR FURTHER INFORMATION CONTACT: Randolph Cano, NPL Deletion Coordinator, U.S. Environmental Protection Agency Region 5 (ST–6J), 77 West Jackson Boulevard, Chicago, IL 60604, Phone: (312) 886–6036, or via email at *cano.randolph@epa.gov.*

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Introduction

EPA Region 5 is publishing this direct final Notice of Partial Deletion for the New Brighton/Arden Hills/Twin Cities Army Ammunition Plant Site (NB/AH/TCAAP Site), from the NPL. This partial deletion pertains to all soil (shallow and deep) located within the boundary of OU2 of the NB/AH/TCAAP Site and to the surface water and sediment (not groundwater) of the five aquatic sites located within the OU2 boundary: Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South and Pond G (see Figures 2–2 and 11–1 in the Docket). The remaining areas at the NB/AH/TCAAP Site, including OU1, OU3, groundwater in OU2 and a sixth aquatic site, Round Lake located southwest of the OU2 boundary, will remain on the NPL and are not being considered for deletion as part of this action.

The NPL constitutes Appendix B of the NCP, which EPA promulgated pursuant to CERCLA. EPA maintains the NPL as the list of sites that appear to present a significant risk to public health, welfare, or the environment. Sites on the NPL may be the subject of remedial actions financed by the Hazardous Substance Superfund (Fund). This partial deletion of the NB/AH/TCAAP Site is proposed in accordance with 40 CFR 300.425(e) and is consistent with the Notice of Policy Change: Partial Deletion of Sites Listed on the National Priorities List. 60 FR 55466 (Nov. 1, 1995). As described in 40 CFR 300.425(e)(3) of the NCP, a portion of a site deleted from the NPL remains eligible for Fund-financed remedial actions if future conditions warrant such actions.

Section II of this document explains the criteria for deleting sites from the NPL. Section III discusses procedures that EPA is using for this action. Section IV discusses the shallow and deep soil and the five aquatic sites located within OU2 of the NB/AH/TCAAP Site and demonstrates how they meet the deletion criteria. Section V discusses EPA's action to partially delete the soil and five aquatic sites located within the OU2 boundary of the NB/AH/TCAAP Site from the NPL unless adverse comments are received during the public comment period.

II. NPL Deletion Criteria

The NCP establishes the criteria that EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites, or portions thereof, may be deleted from the NPL where no further response is appropriate. In making such a determination pursuant to 40 CFR 300.425(e), EPA will consider, in consultation with the state, whether any of the following criteria have been met:

i. Responsible parties or other persons have implemented all appropriate response actions required;

ii. all appropriate Fund-financed response under CERCLA has been implemented, and no further response action by responsible parties is appropriate; or

iii. the remedial investigation has shown that the release poses no significant threat to public health or the environment and, therefore, the taking of remedial measures is not appropriate.

Pursuant to CERCLA Section 121(c) and the NCP, EPA conducts five-year reviews to ensure the continued protectiveness of remedial actions where hazardous substances, pollutants, or contaminants remain at a site above levels that allow for unlimited use and unrestricted exposure. EPA conducts such five-year reviews even if a site or a portion of a site is deleted from the NPL. EPA may initiate further action to ensure continued protectiveness at a deleted site if new information becomes available that indicates it is appropriate. Whenever there is a significant release from a site deleted from the NPL, the deleted site may be restored to the NPL without application of the hazard ranking system.

III. Deletion Procedures

The following procedures apply to the deletion of the soil portion of OU2 and to the five aquatic sites located within the OU2 boundary of the NB/AH/TCAAP Site:

(1) EPA consulted with the State of Minnesota prior to developing this direct final Notice of Partial Deletion and the Notice of Intent for Partial Deletion co-published today in the ''Proposed Rules'' section of the **Federal Register**.

(2) EPA has provided the State 30 working days for review of this notice and the parallel Notice of Intent for Partial Deletion prior to their publication today, and the State, through the MPCA, has concurred on the partial deletion of the NB/AH/TCAAP Site from the NPL.

(3) Concurrent with the publication of this direct final Notice of Partial Deletion, an announcement of the availability of the parallel Notice of Intent for Partial Deletion is being published in three major local newspapers, the Minneapolis Star Tribune, The Mounds View/New Brighton Sun Focus and the Shoreview Press. The newspaper notices announce the 30-day public comment period concerning the Notice of Intent for Partial Deletion of the NB/AH/TCAAP Site from the NPL.

(4) The EPA placed copies of documents supporting the partial deletion in the deletion docket and made these items available for public inspection and copying at the NB/AH/TCAAP Site information repositories identified above.

(5) If adverse comments are received within the 30-day public comment period on this partial deletion action, EPA will publish a timely notice of withdrawal of this direct final Notice of Partial Deletion before its effective date and will prepare a response to comments and continue with the deletion process on the basis of the

Notice of Intent for Partial Deletion and the comments already received.

Deletion of a portion of a site from the NPL does not itself create, alter, or revoke any individual's rights or obligations. Deletion of a portion of a site from the NPL does not in any way alter EPA's right to take enforcement actions, as appropriate. The NPL is designed primarily for informational purposes and to assist EPA management. Section 300.425(e)(3) of the NCP states that the deletion of a site from the NPL does not preclude eligibility for further response actions, should future conditions warrant such actions.

IV. Basis for Partial Site Deletion

The following information provides EPA's rationale for deleting the soil portion of OU2 and the five aquatic sites located within the OU2 boundary (Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South and Pond G) of the NB/AH/TCAAP Site from the NPL:

Site Background and History

The NB/AH/TCAAP Site (CERCLIS ID: MN7213820908) consists of a 25-square mile area located in Ramsey County, Minnesota. The NB/AH/TCAAP Site includes the 4-square mile area of the original TCAAP facility (about 2,370 acres) operated by the U.S Army (Army), located east of U.S. Interstate Highway 35W and north of Ramsey County Highway 96 at the time of NPL listing in 1983 (OU2) and portions of seven nearby communities with Site-related groundwater contamination (OU1 and OU3). These communities include: New Brighton, Arden Hills, St. Anthony, Shoreview, Mounds View, Columbia Heights and Minneapolis. See Figure 2–1 in in the Docket.

The TCAAP facility manufactured, stored and tested small-caliber ammunition and related materials for the United States military and handled and stored strategic and critical materials for other government agencies from 1941 to 2005. Between 1941 and 1981, the facility disposed of waste materials including volatile organic compounds (VOCs), heavy metals, corrosive materials and explosives at several locations on the TCAAP property. Alliant Techsystems Inc. (Alliant) was the Army's installation services contractor for TCAAP and also operated manufacturing facilities at the TCAAP property.

The U.S. Army Toxic Hazardous Materials Agency issued a report on waste disposal activities at TCAAP in 1978. In 1981, MPCA and the Minnesota Department of Health (MDH) began sampling water supply wells in the TCAAP area. The sampling found that municipal and private drinking water wells near the TCAAP facility and wells at TCAAP were contaminated with VOCs.

Due to the contamination, the City of New Brighton shut down six municipal wells, deepened two municipal wells and constructed three new municipal wells from 1982 to 1984. One of the City of St. Anthony's municipal wells was also contaminated and this well was closed.

In 1983 EPA installed carbon treatment filters on two of the City of New Brighton wells that were reopened to meet summertime peak demand. EPA also provided New Brighton with an additional deep well and carbon treatment for two of St. Anthony's municipal wells in the late 1980s.

In 1983, MPCA connected several private well users adjacent to the TCAAP facility to New Brighton's and Arden Hills' water mains. In 1984, MPCA constructed a temporary water connection from the City of St. Anthony to the City of Roseville to alleviate a water shortage due to the shutdown of one of St. Anthony's wells.

EPA proposed the NB/AH/TCAAP Site to the NPL on December 30, 1982 (47 FR 58476). EPA finalized the NB/AH/TCAAP Site on the NPL on September 8, 1983 (48 FR 40658).

The Army began a Phase I investigation at the TCAAP facility in 1981. The Army installed and sampled a significant number of monitoring wells at TCAAP to identify the overall contribution of the facility to the groundwater contamination identified by MPCA and MDH.

Site records and investigations conducted at TCAAP subsequent to the Army's 1978 waste disposal report identified 14 source areas of contamination at TCAAP. These areas were used for the burial or open-burning of waste or were industrial sources of contamination. The Army designated the source areas as Sites A, B, C, D, E, F, G, H, I, J, K, 129–3, 129–5 and 129–15. See Figure 3 in the Docket.

The Army entered into a Federal Facilities Agreement (FFA) with EPA and the State of Minnesota in 1987. The FFA establishes the framework, schedule and requirements for the Army to conduct a remedial investigation (RI) and feasibility study (FS) at the TCAAP facility and to implement the selected cleanup actions.

The Army implemented several interim remedial actions (IRAs) at the TCAAP facility (*i.e.,* OU2 of the NB/AH/TCAAP Site) under the Army's Installation Restoration Program (IRP). The Army conducted the IRAs in the 1980s and 1990s before an overall remedy was selected for OU2 in the OU2 Record of Decision (ROD) in 1997. These actions included unilateral actions by the Army, actions with EPA and State concurrence, and other actions initiated by the Army/Alliant. The IRAs were coordinated with the State and Federal regulatory agencies.

The Army implemented unilateral removal actions at TCAAP using its own delegated removal authorities under CERCLA Section 104. These actions included installing in-situ soil vapor extraction (SVE) systems at Sites D and G to remediate VOC-contaminated soils in 1986 and installing groundwater pump-and-treat systems at Sites A and K to treat VOC-contaminated groundwater in 1988.

Army IRAs at TCAAP undertaken with EPA and State concurrence included: (1) Installing a Boundary Groundwater Recovery System (BGRS) in 1987 to prevent additional groundwater contaminants from flowing off of the TCAAP property pursuant to a 1987 ROD; (2) expanding the BGRS into the TCAAP Groundwater Recovery System (TGRS) with source control wells installed downgradient of Sites D, G and I; (3) thermally treating 1,400 cubic yards of soil contaminated with polychlorinated biphenyls (PCBs) at Site D in 1989 pursuant to a 1989 ROD on Removal Action for PCB-Contaminated Soils Near Site D; (4) remediating heavy metal soil contamination through soil washing/leaching technologies at Site F from 1993–1997 under the Resource Conservation and Recovery Act (RCRA); and (5) modifying the Site A groundwater remediation system installed in 1983 to include eight boundary extraction wells in 1994.

Other IRAs the Army implemented at TCAAP included: Cleaning of the sanitary sewer system lines (Site J) from 1984 to 1986 and closing Site J in accordance with the EPA and MPCA-approved Final Site J Closure Report issued in 1994; and excavation by Alliant of the PCB-contaminated soils around Building 502 in 1985 and disposing of the soils at a permitted off-site facility in 1996.

Several property ownership transfers and reassignments of control have occurred at the TCAAP property since the NB/AH/TCCAP Site was listed on the NPL. See Figure 4 in the Docket. Since 1983, control of over 1,500 acres of TCAAP has been reassigned to the National Guard Bureau which licenses the use of the property to the Minnesota Army National Guard for the operation of the Arden Hills Army Training Site (AHATS) and to the U.S. Army Reserve.

The National Guard Bureau and Army Reserve property is still federally-owned and is controlled by the Army, but it is no longer controlled by TCAAP, which reports to a different division.

Prior to 2010, the Army also transferred more than 270 acres of TCAAP that did not require land or groundwater use restrictions to Ramsey County and the City of Arden. This property consists of: Parcels 093023320001 and 093023240003 owned by Ramsey County (the unlabeled OU2 area in the northwest corner of OU2 on Figure 4 in the Docket); Parcel 153023340001 located at 1425 Paul Kirkwold Drive owned by Ramsey County; and Parcel ID 153023430001 located at 1245 Highway 96W owned by the City of Arden Hills (shown as the unlabeled OU2 areas along the southern boundary of OU2 on Figure 4).

In 2013, the Army transferred another 397 acres of TCAAP to Ramsey County and leased another 30 acres of TCAAP to the County. In 2017, the Army transferred the ownership of the 30 acres Ramsey County was leasing from the Army to Ramsey County.

Forty-seven of the 427 acres of property the Army transferred and leased to Ramsey County in 2013 did not require land or groundwater use restrictions (see the *Operation and Maintenance* section of this notice). The other 380 acres were restricted by land use controls (LUCs) for soil and groundwater.

Ramsey County conducted an additional soil investigation at the 380 acres of restricted property they owned or were leasing in 2014. Ramsey County remediated the areas of remaining soil contamination, including the soil contamination at Sites I and K located within the 380-acre area.

Following the additional cleanup, MPCA and EPA approved the soil in the 380-acre area to be suitable for unlimited use/unrestricted exposure (UU/UE). The Army removed the soil LUCs on the 380 acres in Revision 4 of the OU2 Land Use Control Remedial Design (LUCRD) dated August 2016. This property, however, is still subject to the groundwater LUCs (see Figure 5, Area with Groundwater LUCs, in the Docket).

The Army determined that the remaining 160 acres of the TCAAP property are surplus to the needs of the Federal government. This property is in the process of being transferred out of Federal ownership. These 160 acres are controlled by the Base Realignment and Closure (BRAC) Division of the Army, the organization to which TCAAP currently reports.

Ramsey County identified 108 acres of the remaining 160-acre TCAAP property (Parcels A through D) for use as part of the Rice Creek Regional Trail Corridor (RCRTC) (see Attachment B, Site Boundary—Rice Creek Regional Trail Parcels A–D in the Docket). Ramsey County completed an additional soil investigation and cleanup on the 108 acres to levels that are suitable for recreational use. The Army removed the soil LUCs on the 108-acre property in Revision 5 of the OU2 Land Use Control Remedial Design (LUCRD) dated March 2018.

The Army will transfer title to Parcels A, B, and D of the 108-acre property to Ramsey County. Parcel C will remain under Federal ownership, but the government intends to grant Ramsey County a perpetual easement to Parcel C for its use as part of the RCRTC.

This partial deletion pertains to all soil (shallow and deep) located within the OU2 boundary of the NB/AH/TCAAP Site (see Figure 2–2 in the Docket). This partial deletion also pertains to surface water and sediment (not groundwater) in the five aquatic sites located within the OU2 boundary of the NB/AH TCAAP Site: Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South and Pond G (see Figure 11–1 in the Docket).

The remaining areas at the NB/AH/TCAAP Site, including OU1, OU3, groundwater in OU2 and a sixth aquatic site, Round Lake located southwest of the OU2 boundary, will remain on the NPL and are not being considered for deletion as part of this action.

Remedial Investigation (RI) and Feasibility Study (FS)

The Army conducted a RI at the TCAPP portion of the NB/AH/TCAAP Site (OU2) from 1988 to 1991. The purpose of the RI was to characterize the nature and extent of soil, sediment, surface water and groundwater contamination within the OU2 boundary. The FS developed and evaluated cleanup alternatives to address the unacceptable risks identified at OU2.

The Army completed the OU2 RI and conducted an OU2 Terrestrial Ecological Risk Assessment in 1991. The Army conducted a Tier II Ecological Risk Assessment for the OU2 aquatic sites in 2004. Due to EPA and MPCA concerns, the Army conducted additional sampling at Marsden Lake and Pond G in 2008. The Army issued a separate FS for the five aquatic sites located within the OU2 site boundary in 2011. The Army is addressing Round Lake, which is still considered part of OU2 but is located outside of the OU2 site boundary, southwest of OU2, separately.

EPA completed a Human Health Risk Assessment (HHRA) addressing OU1, OU2 and OU3 of the NB/AH/TCAAP Site in 1991. In 1992, the Army collected additional data as part of the FS development process to further characterize the nature and extent of OU2. The Army completed the OU2 FS in 1997. The OU2 FS included an updated list of additional contaminants of concern (COCs) and cleanup levels.

The Agency for Toxic Substances and Disease Registry (ATSDR) completed a Public Health Assessment of the NB/AH portion of the NB/AH/TCAAP Site (OU1 and OU3) in 1994. Based on the assessment, ATSDR considered the NB/AH portion of the NB/AH/TCAAP Site to be a ''public health hazard'' because people were exposed to past groundwater contaminants from TCAAP at concentrations that could result in adverse health effects.

The Army's RI identified all known or suspected sources of contamination at OU2 of the NB/AH/TCAAP Site. The RI separated the OU2 contamination into four categories: Shallow soil sites, with soil contamination less than 12 ft-bgs (Sites A, C, E, H, 129–3 and 129–5); deep soil sites, with soil contamination greater than 12 ft-bgs, down to depths between 50 and 170 feet (Sites D and G); shallow (Unit 1) groundwater contamination (Sites A, I and K); and deep (Units 3 and 4) groundwater contamination (groundwater underlying the southwestern portion of OU2, originating primarily from Sites D, G and I). Although Sites D and G were considered deep soil sites, shallow soil contaminants were also present at Site D, and Site G also contains a dump.

The Army addressed Sites F (RCRA) and J (sewer line cleaning) separately and did not include these areas in the OU2 RI. Also, the Army did not find any contamination in Site B other than part of a dump (Site B–3) that would require additional investigation.

The RI and additional FS sampling indicated that the shallow soil sites (Sites A, C, E, H, 129–3 and 129–5) were contaminated by heavy metals, VOCs, polynuclear aromatic hydrocarbons (PAHs) and PCBs. The contamination was generally present in the upper five to 10 feet of soil. Contaminated soil volumes ranged from as little as 15 cubic yards (CY) at Site 129–5 to as much as 2,600 CY at Site C.

Unpermitted landfills or dumps also existed within the boundaries of shallow soil Sites A, E and H. The estimated material in these dumps ranged from 4,400 CY at Site A to 12,200 CY at Site E. The RI identified

two additional dumps in OU2. Dump Site B–3 was estimated to contain 12,400 CY of material. The other dump is Site 129–15 and is estimated to be 53,000 CY.

The RI did not investigate the material at Site B–3 or Site 129–15. The RI indicated that additional characterization would be required before response actions could be selected for these areas. There was no clear indication, however, that either dump was contaminating the groundwater.

The Army updated EPA's 1991 HHRA in the 1997 OU2 FS to incorporate the results of the additional sampling. The updated risk assessment in the FS indicated that the surface soil and debris at Sites A, C, H and 129–3 posed an unacceptable cancer and/or noncancer risk to on-site workers under a current industrial exposure scenario. Subsurface soil and debris at Sites A, C, H and 129–3 and at Sites D, E, G and 129–5 also posed an unacceptable cancer and/or noncancer risk to future construction workers in these areas. The risks were primarily due to the incidental ingestion of and dermal contact with surface and/or subsurface soil and debris.

According to the updated HHRA, surface soil and debris at Sites A, C, E, H and 129–3 posed an unacceptable cancer and/or noncancer risk to potential future residents living in these areas under a future residential exposure scenario. These risks were primarily due to the incidental ingestion of and dermal contact with surface soil and debris and to the ingestion of home-grown fruits and vegetables.

The Army developed remedial action objectives (RAOs) for the OU2 cleanup in the FS based on the current and most probable future land use for the property, which was industrial. The FS then developed numerical remediation goals for the cleanup based on applicable or relevant and appropriate requirements (ARARs), health-based risk values, background concentrations of metals, contaminant migration potential and technological limitations.

The health-based risk values developed for surface soil were based on the lower of either an excess lifetime cancer risk equal to one in a million or a noncancer hazard of one, adjusted for exposure to multiple contaminants. The industrial values were calculated based on the primary routes of exposure which were ingestion and dermal contact. The cleanup levels for the deep soil Sites D and G were based primarily on leaching-based goals that are protective of the underlying groundwater for use as residential drinking water. For Site 129–15, a one-time commercial, industrial or utility construction scenario was utilized. The construction scenario assumed that construction workers would be exposed to excavated soils for 40 days (*i.e.,* a two-month construction period) a year for two years. See the *Cleanup Levels* section below for additional information. The FS developed general response actions for the OU2 cleanup based on the technical applicability and the contaminant characteristics of each individual site within OU2. After initial screening, the FS retained a set of final cleanup alternatives for full evaluation. The alternatives evaluated for the shallow soil Sites A, C, E, H, 129–3 and 129–5 were: No action, in-situ fixation/capping, soil washing/soil leaching and excavation/stabilization with off-site disposal. The alternatives evaluated for the deep soil Sites D and G were: No action, continue shallow SVE, or expand the SVE systems vertically.

The only alternative the FS evaluated for the unpermitted landfills in Sites A, E and H was excavation and off-site disposal. The FS indicated that the landfills in Site B and Site 129–15 would require further characterization.

Selected Remedy

EPA, MPCA and the Army selected an industrial cleanup remedy for the OU2 shallow soil sites, dumps and deep soil sites in a 1997 OU2 ROD. The agencies also selected remedies for the five aquatic sites located within the OU2 boundary in OU2 ROD Amendment #4 (Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South and Pond G).

The selected remedy for the shallow soil Sites A, C, E, H, 129–3 and 129–5 and for the dumps within Sites A, E and H in the 1997 OU2 ROD included the following remedial components (see the 1997 ROD for information about the groundwater components of the OU2 remedy):

(1) Identification/characterization of contaminated soil boundaries, surface and subsurface debris and dump contents;

(2) Excavation and sorting of hazardous and nonhazardous dump materials, debris and ordnance;

(3) Removal and disposal of ordnance, debris and oversized material;

(4) On-site stabilization of hazardous and contaminated soils from Sites A, E, H, 129–3 and 129–5;

(5) Off-site disposal of stabilized materials from Sites A, E, H, 129–3 and 129–5;

(6) Off-site transport, incineration and disposal of soils containing low levels of dioxin-furans from Site C (if required);

(7) Backfill/regrade excavations;

(8) Restrict site access and use during remedy implementation; and

(9) A limited period of monitoring to verify remedy effectiveness.

The selected remedy for the dumps at shallow soil Sites B and 129–15 was characterization to determine the contents of the dumps. If the contents were found to be toxic, hazardous or contaminated, then a remedy for the landfill would be documented through a ROD Amendment. If the contents were not toxic, hazardous or contaminated then a no further action remedy will be selected.

The selected remedy for the shallow and deep soil contamination at Site D and for the deep soil contamination and dump at Site G was to expand the SVE systems vertically. The remedy included:

(1) Groundwater monitoring;

(2) Access and use restrictions;

(3) Installation and operation of deep SVE systems with modified shallow SVE systems, as appropriate;

(4) Evaluation and potential use of enhancements to the SVE systems;

(5) Maintenance of existing soil caps and surface drainage controls; and

(6) Characterization of shallow soils at Site D and the dump at Site G following cessation of SVE system operation to determine appropriate action.

The remedy in the 1997 OU2 ROD also included the characterization of the unsaturated Unit 1 soil at Site K as part of the Site K shallow groundwater remedy.

The 1997 OU2 ROD clarified that Site F, a former disposal area within OU2, was being closed under RCRA and was not addressed in the OU2 ROD. The 1997 OU2 ROD also confirmed that the 1994 Final Site J Closure Report for the sanitary sewer cleaning was approved by the regulatory agencies, documented the absence of contaminants above background levels and recommended no further action for this area.

Between 2007 and 2014, EPA, MPCA and the Army issued five ROD Amendments and an Explanation of Significant Differences (ESD) modifying various components of the selected remedies for the shallow soil sites, dumps and deep soil sites in the 1997 OU2 ROD and selecting remedies for the five aquatic sites located within the OU2 boundary.

OU2 ROD Amendment #1, issued in 2007, modified the requirements for Site C–2 shallow soil and sediment contamination discovered in 2004 in two Site C–2 ditches. Because the depth to groundwater is shallow at Site C–2, it was not feasible to remove all of the contaminated soil and sediment from

this area. The OU2 ROD Amendment #1 modified the remedy to allow the placement of a 4-foot thick soil cover over the Site C–2 areas where the contamination remains in-place above the cleanup levels instead of excavating the material. The OU2 ROD Amendment #1 also specified LUCs to maintain the integrity of the soil cover, prohibit unauthorized disturbance to the underlying soil and sediment and to restrict the Site C area outside the soil cover to site-specific industrial use. The OU2 ROD Amendment #1 also included the creation of a new wetland within the TCAAP facility to replace the loss of existing wetland.

OU2 ROD Amendment #3 was issued in 2009 and modified the remedies for the shallow soil and dump sites as follows:

(1) Documented, as a final remedy, the additional actions performed for shallow soil at Site D (soil cover for residual PCB-contaminated soil following the 1985 interim remedial action and 1989 thermal treatment selected in the 1989 ROD for Removal Action for PCB-Contaminated Soils Near Site D, and excavation, stabilization and off-site disposal of other contaminated Site D soil) after completing the deep soil cleanup at Site D.

(2) Documented, as a final remedy, the additional action (capping) implemented for the dump at Site G after completing the Site G deep soil cleanup.

(3) Documented the use of soil covers as part of the final remedies, in addition to excavation and off-site disposal, at Sites E and H and as the primary remedy for the dump at Site 129–15.

(4) Documented that three OU2 areas not addressed in the 1997 OU2 ROD were acceptable for unrestricted use: 135 Primer/Tracer Area (PTA) Stormwater Ditch, Trap Range Site and Water Tower Area. The OU2 ROD Amendment #3 determined that the previous soil removals at the 135 PTA Stormwater Ditch in 2005 and at the Water Tower Area in 1993 reduced soil contamination to levels that allow for unrestricted use. ROD Amendment #3 also determined that, based on the 1999 preliminary assessment of the Trap Range Site, that the Trap Range Site is acceptable for unrestricted use.

(5) Documented the final remedies for two OU2 areas not addressed in the 1997 ROD: Grenade Range and Outdoor Firing Range. The OU2 ROD Amendment #3 determined that the 1993 and 1999 soil and unexploded ordnance removal actions at the Grenade Range and at the Outdoor Firing Range, and the construction of a soil cover at the Outdoor Firing Range in 2003–2004, cleaned up these areas to levels that are acceptable for industrial use.

(6) Requires long-term LUCs as an additional remedy component for shallow soil and dump Sites: D, E, G, H, 129–15, Grenade Range, and Outdoor Firing Range. The LUCs restrict these areas to site-specific industrial use, require the integrity of the soil covers to be maintained, and prohibit the unauthorized disturbance of materials underlying the soil covers. The exact details of the LUCs were to be specified and maintained in accordance with a LUCRD document approved by EPA and MPCA. ROD Amendment #3 concluded that LUCs are not needed for the 135 PTA Stormwater Ditch or Trap Range because contamination levels in these areas are suitable for UU/UE. The Amendment also concluded the Water Tower Area is suitable for UU/UE; however, it is located within the area of ''blanket LUCs'' the Army implemented as specified in the 2010 LUCRD so it is restricted.

ESD #2, issued in 2009, modified the 1997 OU2 ROD by requiring long-term LUCs as an additional remedy component for Sites A, C–1, 129–3 and 129–5 restricting these areas to industrial use. ESD #2 also documented that based on an additional investigation, the Site B dump is cleared for unrestricted use and no further action is the final remedy for Site B.

OU2 ROD Amendment #4 was signed in 2012. The OU2 ROD Amendment #4 documented remedy decisions for the five aquatic sites located within the OU2 boundary and the 535 PTA Site, which were not addressed in the 1997 OU2 ROD. OU2 ROD Amendment #4 also documented the remedy decision for the Site K unsaturated Unit 1 soil characterized as part of the Site K shallow groundwater remedy.

OU2 ROD Amendment #4 determined:

(1) No action is needed for Rice Creek, Sunfish Lake, Marsden Lake North or Marsden Lake South. The 2011 FS, which the Army prepared following the 2004 Tier II Ecological Risk Assessment, documented that there are no human health risks associated with these areas and that the ecological risks are considered to be acceptable. These aquatic areas are acceptable for unrestricted use.

(2) In-situ treatment to raise hardness is the selected cleanup remedy for Pond G. No human health risks were associated with Pond G, however, Pond G surface water contains lead above the State water quality standard and may not be protective of the entire aquatic ecosystem. Pond G surface water was to be chemically altered and monitored to verify that the adjusted level of hardness increases to the minimum required level to comply with the Class 2Bd Minnesota chronic surface water quality standard for lead.

(3) The 2009 removal actions at the 535 PTA Site and for the VOC-contaminated soil at Site K, which involved the excavation and off-site disposal of contaminated soil, cleaned up the soils for unrestricted use. No further action is necessary for the soil in these areas and LUCs are not required.

OU2 ROD Amendment #5 was signed in 2014. The OU2 ROD Amendment #5 documented remedy decisions for three additional areas of soil contamination not addressed in the 1997 OU2 ROD. The Army remediated these areas as a 2013 removal action and addressed: (1) Additional metal contamination at Site A, (2) PAH-contamination at Site 135 PTA, and (3) PAH and/or metals contamination discovered in two areas during an environmental baseline survey (EBS Areas) conducted by the Minnesota National Guard before the property was transferred to the National Guard Bureau.

The 2013 soil removal action involved excavating the soil that was contaminated above industrial use cleanup levels in these areas and disposing of the contaminated materials off-site. OU2 ROD Amendment #5 documented that the completed 2013 removal action constitutes the final remedy for these soil areas of concern. OU2 ROD Amendment #5 also added the requirement that these areas be covered by a LUC restricting the areas to industrial use.

Decision documents that address the groundwater components of the OU2 remedy (groundwater not included in this partial deletion) include: OU2 ROD (1997), OU2 ROD Amendment #2 (2009), OU2 ESD #1 (2009), OU2 ROD Amendment #4 (2012) and OU2 ROD Amendment #6 (2017).

Response Actions

The Army constructed a corrective action management unit (CAMU) to aid in the OU2 cleanup and initiated shallow soil site remediation in 1998 beginning with Site A. The CAMU was a bermed, asphalt pad with lined ponds to store rainwater runoff from the pad. The CAMU was to be a central staging area where soils from each site would be brought for treatment before loading for off-site disposal at a permitted landfill. In 1999, however, the Army discovered asbestos-containing material (ACM) at the shallow soil sites which made further use of the CAMU impractical. The safeguards needed to control the

asbestos during handling defeated the cost savings of the central processing pad. The Army determined that it was more convenient and cost-effective to treat the soil at each site instead of moving the contaminated material to a central location for treatment.

The Army removed the CAMU in 2002. The Army decontaminated and removed the storage and storm water holding ponds, tested for contamination under the pad and ponds, and monitored the groundwater. EPA and MPCA approved the Army's CAMU Closeout Report in 2004. The CAMU Closeout Report states that there were no adverse impacts to soil or groundwater due to CAMU operations and that no LUCs are required for this area.

The Army completed the remedial actions at the shallow soil Sites A, C, E, H, 129–3, 129–5 and the Outdoor Firing Range from 1999 to 2010. The Army excavated debris and contaminated soil above industrial cleanup levels, stabilized the material and disposed of it at an off-site landfill. The Army excavated approximately: 16,300 CY from Site A; 21,450 CY from Site C; 20,900 CY from Site E; 8,620 CY from Site H; 3,470 CY from Site 129–3; 100 CY from Site 129–5 and 100 CY from the Outdoor Firing Range.

The Army also constructed a 2-foot thick protective soil cover over a portion of Site E and a 30-inch thick soil cover over a portion of Site H where ACM remains in-place; a 4-foot thick soil cover over portions of Site C where metals-contaminated soils and sediment from the former ditches remain in-place; and a 2-foot thick soil cover at the 1900 Yard Range of the Outdoor Firing Range where PAH-contaminated soils remain in place.

The Army investigated the Site 129–5 dump then constructed a protective soil cover over the materials. The Army also constructed a new wetland at Site C to replace the loss of existing wetlands when the Site C ditches were backfilled.

The Army completed the remediation work (shallow and deep soils) at the deep soil Sites D and G in 2004. The Army dismantled the SVE systems in 2000 after the deep soil cleanups were complete. At Site D, the Army then excavated 1,300 CY of shallow soils contaminated with non-VOCs and disposed of them at an off-site landfill. The Army also constructed a four to six foot soil cover over residual PCB-contaminated soils remaining at Site D after the 1985 interim remedial action. At Site G, the Army characterized the dump then constructed a 2-foot thick protective soil cover over the material.

The Army conducted five years of groundwater monitoring at the shallow soil sites and Site D from 2003 through 2007. The Army conducted three years of groundwater monitoring at the Grenade Range from 1999 to 2004. The Army conducted the monitoring to verify that the groundwater beneath these areas was not impacted by remediation activities.

The Army conducted the groundwater monitoring in accordance with groundwater monitoring plans that were reviewed and updated annually as part of the Army's Annual Performance Report (APR). Based on the monitoring data, the Army extended the monitoring at Site H. The groundwater sampling is now complete at all shallow soils sites and confirms that there are no adverse remedy impacts to groundwater in these areas. Groundwater monitoring for VOCs, however, continues as part of OU2 deep groundwater monitoring in the vicinity of Sites D and G.

The Army treated the Pond G surface water in 2012 in accordance with the Pond G RD/RA Work Plan. The Army monitored the Pond G surface water in 2012 and 2013. The monitoring results verified that the surface water in Pond G was in compliance with the surface water standard for lead. Since the Pond G remedy does not result in hazardous substances remaining in the Pond above levels that allow for UU/UE, long-term maintenance, monitoring, and LUCs are not required.

Reports documenting the completion of remedial activities for the shallow soil Sites A, C, E, H, 129–3, 129–5, 129–15, the shallow and deep soil in deep soil Site D and the deep soil and dump in deep soil Site G are in the Docket in the following reports: Final Remedial Action Completion and Shallow Soil Sites Close Out, Volumes I through VIII; Final Site 129–15 Dump Investigation, Characterization and Remedial Action Completion and Close Out Report; Final Site D Shallow and Deep Soil Volatile Organic Compound Investigation and Close Out Report; Final Site G Volatile Organic Compound Investigation and Dump Close Out Report; and Outdoor Firing Range 1900 Yard Range Cover Construction: Addendum to the Final Close Out Report, Outdoor Firing Range and #150 Reservoir Site Removal. The completed Pond G remedial action work and surface water monitoring results are documented in the 2013 Remedial Action Completion and Close Out Report, Pond G.

No action or no further action (other than LUCs) was required for shallow soil Site B, Site J, the Unit 1 soil in Site K, Grenade Range, Site 135 PTA, Site 135 PTA Stormwater Ditch, Site 535 PTA, the EBS areas, Water Tower Area, the Trap Range Site, Former Building 576, Rice Creek, Sunfish Lake, Marsden Lake North or Marsden Lake South. Also, Site F was closed under RCRA. Additional information about these areas is documented in the 1997 OU2 ROD, 2009 OU2 ROD Amendment #3, 2009 ESD #2, 2012 OU2 ROD Amendment #4 and 2014 ROD Amendment #5 and the following reports in the Docket: Final Site B Dump Investigation, Characterization, and Close Out Report; Final Close Out Report, Outdoor Firing Range and #150 Reservoir Site Soil Removal Action, Completion of Soil Removal; Remedial Action Report, Site K; Lead-Impacted Soil Cleanup documentation, TCAAP Former Building 576; Close Out Report: Removal of Contaminated Sediment at the 135 Primer/Tracer Area Stormwater Outfall; Removal Action Completion Report, Site K; Final Close Out Report for Soil Removal Action at 535 Primer/Tracer Area; and Removal Action Completion Report for Soil Areas of Concern—Site A, 135 Primer/Tracer Area, EBS Areas.

Cleanup Levels

The cleanup levels for shallow soils in the 1997 OU2 ROD were derived specifically for each shallow soil site because MPCA did not have published rules or guidance values for soil at the time. The ROD selected cleanup levels for shallow soils based on background levels, ARARs and the more stringent of either the site-specific industrial health-based value or leaching-based goal (see Table 8 in the 1997 OU2 ROD in the Docket). The health-based values were the lower of either an excess lifetime cancer risk equal to one in a million or a noncancer hazard of one, adjusted for exposure to multiple contaminants. The cleanup levels for the deep soil Sites D and G were based primarily on leaching-based goals that are protective of the underlying groundwater.

The site-specific health-based values calculated for the shallow soils sites assumed that adult industrial workers at TCAAP would be exposed to contaminated soil through dermal contact and ingestion for 250 days a year for 25 years. The calculations assumed an adult body weight of 70 kilograms, a soil ingestion rate of 50 milligrams/day and a dermal exposure over 0.31 square meters of body surface.

For Site 129–15, a one-time commercial, industrial or utility construction scenario was utilized. The construction scenario assumed that construction workers would be exposed to excavated soils for 40 days (*i.e.,* a two-month construction period) a year

for two years. The construction exposure assumes that the excavated soils are managed to eliminate or greatly reduce exposure to fugitive dusts; all other parameters were assumed to be the same as the industrial exposure scenario.

The leaching-based goals for shallow and deep soils were calculated by MPCA using a soil model for chemicals that were found at the site in groundwater above drinking water or health-based standards. The industrial soil cleanup level for lead of 1,200 milligrams per kilogram (mg/Kg) was calculated by EPA using the Exposure Model for Assessing Risks Associated with Adult Exposure to Lead in Soil. Additional information concerning the soil cleanup standards is in Appendix C of the 1997 OU2 ROD.

Additional soil cleanup standards were later added based on subsequent investigations for Site A (tetrachloroethene and TCE), Site D (antimony, lead, and nitroglycerine) and Site 129–15 (lead). PCBs were not specifically listed as COCs for Site D in the OU2 ROD; however, the PCBs that were ''secured in-place'' exist at concentrations that exceed the ARAR of 10 mg/Kg cited in the OU2 ROD, so the cleanup standard for PCBs is considered to be 10 mg/Kg. Nitroglycerine was listed as a COC for Site 129–3 in the OU2 ROD; however, no cleanup level was established. The current cleanup level for nitroglycerine was calculated at the time of soil remediation work at Site 129–3.

In 1999, the background number for arsenic in the TCAAP soils increased from 4 mg/Kg to 10 mg/Kg, as documented in a June 14, 1999 MPCA letter to the Army. This resulted in the cleanup level for arsenic increasing to 10 mg/Kg at Sites C and H. At Site 129–15 the highest arsenic concentration detected in soils was 5 mg/Kg and arsenic was dropped as a COC.

In 2002, the soil cleanup level for TCE at Site G increased to 36.1 mg/Kg. This revised cleanup standard is based on an updated soil leaching analysis that specifically accounted for the lower permeability of the Site G cover. EPA and MPCA agreed with this change on July 24, 2002. For cleanup levels that were established subsequent to the OU2 ROD, the health risk calculations are noted to be based on the same methodology and input parameters that were documented in Appendix C of the OU2 ROD.

The current cleanup standards for the OU2 shallow and deep soils sites are provided in Table 1 of the 2018 LUCRD Revision 5. A copy of Table 1 and the complete 2018 LUCRD document are available in the Docket.

The cleanup level for lead in Pond G is the Minnesota Class 2Bd surface water quality standard for lead, as promulgated in Minnesota Rule 7050.0222. The lead standard is calculated based on the hardness value of the surface water. At Pond G, the calculated lead standard ranged from a concentration of 11.4 micrograms per liter (µg/L) after initial treatment with lime and calcium to 1.6 to 2.0 µg/L approximately one year later.

The Army confirmed that the soil cleanup levels were attained at each of the shallow and deep soils sites through extensive soil verification sampling around each of the excavated areas, and by soil sampling below the shallow and deep vents at the SVE systems at Sites D and G. The Army conducted the verification sampling at the shallow soil Sites A, C, E, H, 129–3, 129–5, 129–15, the shallow soil at deep soil Site D and the dump at deep soil Site G through field and laboratory sampling and analysis at gridded locations in accordance with the 2000 Final Comprehensive Work Plan, Final Sampling and Analysis Plan and Final Site Safety and Health Plan, Shallow Soil Sites RD/RA Activities and associated Work Plan Clarifications. The Army conducted the verification sampling for deep soil at deep soil Sites D and G in accordance with the 1997 Final Work Plan, Sites D and G Pilot Study and the 1999 Addendum 1, Final Work Plan Sites D and G Pilot Study. The Army conducted the verification sampling at the other sites in accordance with the Removal Action Work Plan or other work plan for each area.

The Army confirmed that the cleanup level for lead in the Pond G surface water was met through four rounds of post-treatment monitoring. The Army detected lead during the second monitoring event at an average concentration of 0.61 µg/L. This concentration was well below the calculated standard for lead of 10.6 µg/L based on the average surface water hardness of 255 mg/L for that event. The Army did not detect lead in any of the other rounds of post-treatment monitoring.

Complete documentation of the verification of the cleanup levels for Pond G and the shallow and deep OU2 soils is available in the Remedial Action Completion Reports, Removal Action Completion Reports and Final Close Out Reports referenced in the *Response Actions* section above which are available in the Docket.

Operation and Maintenance

Operation and maintenance (O&M) for the soil portion of OU2 (shallow and deep) is limited to inspecting and maintaining the cautionary warning signs and the thicknesses of the soil covers at Sites C, D, E, G, H, 129–15 and the Outdoor Firing Range; annually removing woody vegetation from the Site G soil cover to prevent deep rooting that could cause increased infiltration by any VOCs remaining below the cover; and to maintain, monitor and enforce the ESD and ROD Amendment-required LUCs, which are in the form of the Army's OU2 LUCRD document approved by EPA and MPCA. No O&M or LUCs are required for the five aquatic sites within the OU2 boundary: Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South or Pond G.

The Army issued the initial EPA and MPCA-approved OU2 LUCRD (Revision 1) in 2010. The Army updated the LUCRD in 2011, 2015, 2016 and 2018 as portions of OU2 were further characterized, remediated as needed, and transferred for reuse and redevelopment. The current LUCRD is LUCRD Revision 5 issued in 2018.

The LUCRD documents that since 1997, the working presumption is that the OU2 property outside of the individual areas of concern (*i.e.,* the OU2 property beyond Site A, Site C, Site D, etc.) does not have soil contamination above the typical ''industrial use'' cleanup levels derived for the areas of contamination within OU2. Ongoing and future uses of the OU2 property outside of the areas of concern would be compatible with past uses. Land used for manufacturing could continue to be used for manufacturing; open space could continue to be used for open space. As such, the mostly open space along Rice Creek and the former OU2 staff housing area the Army previously transferred to Ramsey County and other OU2 property the Army transferred to the City of Arden Hills without any use restrictions (approximately 270 acres total) would remain acceptable for UU/UE.

LUCRD Revision 1 and subsequent revisions formalize the Army's decision to implement ''blanket LUCs'' limiting the OU2 property to industrial land use and restricting groundwater use across the remaining federally-owned OU2 property at the time LUCRD Revision 1 was issued in 2010 (except for Site F which the Army cleaned up to unrestricted use under RCRA). A map showing the initial federally-owned property with LUCs at the time of the 2010 LUCRD is in the September 2010 Figure 4 in the Docket.

The ''blanket LUCs'' resolved the outstanding LUC issues for the OU2 property outside of the individual areas of concern (*i.e.,* OU2 property beyond Site A, Site C, Site D, etc.,) because the remedy-required LUCs in the OU2 ESDs and ROD Amendments only apply to each individual area of concern, not to the OU2 property outside of those areas. The Army's ''blanket LUCs'' also address the uncertainty associated with not having soil data to characterize the entire OU2 property outside of the areas of concern. The 2010 LUCRD and subsequent revisions include additional restrictions for OU2 areas with soil covers and components of the OU2 groundwater extraction and treatment systems to protect the integrity of these remedies.

The 2010 LUCRD and subsequent revisions allow and formalize a process for the Army to demonstrate to EPA and MPCA that less restrictive uses of OU2 property are acceptable in anticipation of future redevelopment and property transfers at the NB/AH/TCAAP site.

The Army issued Revisions 2, 3, 4 and 5 to the LUCRD from 2011 to 2018. These revisions: (1) Cleared the Watchable Wildlife Area of AHATS for unrestricted public use and revised the LUCs for a portion of the AHATS Cantonment Area to allow uses compatible with a restricted commercial exposure scenario (Revision 2, 2011); (2) revised the LUCs for the remainder of the Cantonment Area and the Army Reserve Center to restricted commercial use and documented the transfer/lease of 427 acres of Army/BRAC controlled property to Ramsey County (Revision 3, 2015); (3) revised the LUCs to eliminate soil LUCs from the 380-acre ''California-Shaped Area'' of the 427 acres transferred to Ramsey County in 2013 following the County's additional investigation and soil cleanup to levels consistent with UU/UE (Revision 4, 2016); and (4) revised the LUCs to allow recreational use on 108 acres in the western portion of OU2 to be used as part of the Rice Creek Regional Trail Corridor (Revision 5, 2018).

The specific details of the current OU2 soil and groundwater use restrictions and the provisions for long-term stewardship of the LUCs are contained in the 2018 OU2 LUCRD Revision 5 which is available in the Docket. The technical basis and supporting documentation for the LUC revisions are included in Appendices B through E of LUCRD Revision 5. Maps showing the areas covered by the current soil and groundwater LUCs for OU2 are in Figures 4 and 5 in the Docket.

The Army is the lead agency for the NB/AH/TAACP Site and is responsible for conducting routine inspections to ensure that the LUCs are maintained and enforced. The Army is responsible for reporting the results of the inspections and any breach of the LUCs to the MPCA and EPA.

Five-Year Review

The Army is required to conduct statutory five-year reviews (FYR) at the NB/AH/TCAAP Site because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for UU/UE. The Army completed the last FYR of the NB/AH/TCAAP Site in 2014. The FYR was approved by MPCA and by EPA on August 19, 2014.

The Army's 2014 FYR concluded that the remedy has been completed for the OU2 soils sites: Sites A, C, D, E, G, H, 129–3, 129–5, 129–15, the Grenade Range and the Outdoor Firing Range. The FYR also determined that the protective soil covers at Sites C, D, E, G, H, 129–15 and the Outdoor Firing Range, in conjunction with the implemented LUCs, effectively prevent exposure to contaminated soils/debris remaining at OU2 above industrial exposure levels. The protective soil cover at Site G also minimizes infiltration and reduces the leaching of any remaining VOCs below the cover.

The 2014 FYR concluded that OU2 has been restored for industrial use. The Army also reviewed the toxicity data that the 1991 and 1997 health risk assessments for the soil sites were based on and determined that no changes have occurred that could potentially affect the protectiveness of the soil remedies. The 2014 FYR did not identify any issues or recommendations for the OU2 soils sites.

For OU2 groundwater, the FYR concluded that the OU2 groundwater remedies are protective in the short term. The groundwater containment systems are meeting the containment objectives and the treatment systems are meeting their discharge requirements. The alternate water supply and well abandonment program, along with Ramsey County's Special Well Construction Area permitting system, mitigate potential risks associated with private wells. At Site A, monitored natural attenuation is adequately controlling plume migration and water quality trends indicate that aquifer restoration continues to occur in both shallow and deep groundwater. A vapor intrusion investigation the Army conducted north of County Road I in 2014 indicates that there are no significant soil vapor risks and no further vapor intrusion investigation work is warranted (see the 2014 Site A Vapor Intrusion Investigation Report in the Docket).

The Army must complete the next FYR of the NB/AH/TCAAP Site and have it approved by EPA and MPCA on or before August 19, 2019.

Community Involvement

The Army satisfied public participation activities for the NB/AH/TCAAP Site as required by Sections 113(k)(2)(B)(i–v) and 117 of CERCLA, 42 U.S.C. 9613(k)(2)(B)(i–v) and 9617. The communities near the NB/AH/TCAAP Site have been involved in NB/AH/TCAAP Site activities since the environmental problems were initially identified. The Army developed a Community Involvement Plan for the NB/AH/TCAAP Site in 1991 to establish processes for sharing knowledge and encouraging community participation concerning the hazardous waste remediation activities underway and planned at the NB/AH/TCAAP Site. The Community Relations Plan outlines specific community relations strategies for addressing these goals and for updating the plan as needed to adjust to evolving community needs and concerns. The Army updated the Community Involvement Plan in 1997.

Over the years the Army has prepared and distributed numerous fact sheets to a large number of local and interested residents to keep the community apprised of the remedial activities at the NB/AH/TCAAP Site. The Army sponsored tours of the facility and accompanying wildlife areas, in addition to providing monthly Technical Review Committee (TRC) meetings open to the public to review the status of restoration activities at the NB/AH/TCAAP Site.

The TCAAP Restoration Advisory Board (RAB) was established in 1996 to provide citizen input into the cleanup of the NB/AH/TCAAP Site. The RAB provides an opportunity for community representatives to review and analyze issues concerning the contamination and remediation of the NB/AH/TCAAP soils and groundwater; provide comments and recommendations regarding the remediation of contaminated areas at the site; and to provide advice on decisions that affect the quality of the environment of the communities that are impacted by the contamination.

The Army met the public participation requirements for selecting cleanup remedies and the amended cleanup remedies for the NB/AH/TCAAP Site required by CERCLA Sections 113(k)(a)(B)(i–v) and 117. The Army met these requirements by issuing

fact sheets and Proposed Plans, notifying the public of the availability of the Proposed Plans in newspaper advertisements, holding public meetings and holding 30-day public comment periods.

The Army involves project stakeholders in the FYR process by notifying them at the start of each FYR. Project stakeholders notified at the start of the 2014 FYR include EPA, MPCA, Alliant Techsystems, Army National Guard, U.S. Army Environmental Command, U.S. Army Corp of Engineers, City of New Brighton, and the RAB.

The Army published a notice indicating that the 2014 FYR for the NB/AH/TCAAP Site was starting during the week of November 18, 2013 in the following newspapers: Minneapolis Star Tribune, Mounds View/New Brighton Sun Focus, and the Shoreview Press. The notice invited anyone interested in the FYR process to contact the Army TCAAP representative. The City of New Brighton was interested in participating in the FYR process.

The Army published a notice indicating that the FYR was complete and included contact information and the location of the public repository for the report (470 West Hwy. 96, Suite 100, Shoreview, MN 55126) in the newspapers after the FYR was finalized.

EPA has satisfied public participation activities for this partial deletion of the NB/AH/TCAAP Site as required by CERCLA section 113(k), 42 U.S.C. 9613(k), and CERCLA section 117, 42 U.S.C. 9617. EPA arranged to publish advertisements announcing this proposed direct final Partial Deletion and the 30-day public comment period in the Minneapolis Star Tribune, the Mounds View/New Brighton Sun Focus, and the Shoreview Press concurrent with publishing this partial deletion in the **Federal Register**. Documents in the deletion docket, which EPA relied on for recommending the partial deletion of the NB/AH/TCAAP Site from the NPL, are available to the public in the information repositories and at *https://www.regulations.gov.* Documents in the Docket include maps which identify the NB/AH/TCAAP Site, the locations of the OU2 areas of contamination/sites, the OU2 area included with this proposed direct final Partial Deletion, and the LUCs implemented for OU2.

Determination That the Criteria for Partial Deletion Have Been Met

The soil (shallow and deep) portion of OU2 and the five aquatic sites located within the OU2 boundary of the NB/AH/TCAAP Site: Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South and Pond G, meet all of the site completion requirements specified in Office of Solid Waste and Emergency Response (OSWER) Directive 9320.2–22, Close-Out Procedures for National Priorities List Sites. All cleanup actions and remedial action objectives for OU2 shallow and deep soil and these five aquatic sites set forth in the 1997 ROD, 2007 ROD Amendment #1, 2009 ROD Amendment #3, 2009 ESD #2, 2012 ROD Amendment #4 and 2014 ROD Amendment #5 have been implemented for all pathways of exposure. The selected remedial actions, RAOs, and associated cleanup levels for OU2 soil and the five aquatic sites located within the OU2 boundary are consistent with EPA policy and guidance. No further Superfund response is necessary to protect human health or the environment from the soil portion of OU2 (shallow and deep) or from the five aquatic sites located within the OU2 boundary.

Section 300.425(e) of the NCP states that a Superfund site or a portion of a site may be deleted from the NPL when no further response action is appropriate. EPA, in consultation with the State of Minnesota, has determined that all required response actions have been implemented for all soil (shallow and deep) located within the OU2 boundary of the NB/AH/TCAAP Site and for the five aquatic sites located within the OU2 boundary: Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South and Pond G, and that no further response action by the Army is appropriate for these media/areas.

V. Deletion Action

EPA, with concurrence of the State of Minnesota, through the MPCA, has determined that all appropriate response actions under CERCLA, other than maintenance, monitoring and five-year reviews, have been completed for all soil (shallow and deep) located within the OU2 boundary and for the five aquatic sites located within the OU2 boundary: Rice Creek, Sunfish Lake, Marsden Lake North, Marsden Lake South and Pond G. Therefore, EPA is deleting all soil (shallow and deep) located within OU2 and these five aquatic sites located within the OU2 boundary from the NPL.

Because EPA considers this action to be noncontroversial and routine, EPA is taking it without prior publication. This action will be effective *September 23, 2019* unless EPA receives adverse comments by *August 22, 2019.* If adverse comments are received within the 30-day public comment period, EPA will publish a timely notice of withdrawal of this direct final Notice of Partial Deletion before its effective date and the partial deletion will not take effect. EPA will prepare a response to comments and continue with the deletion process on the basis of the notice of intent to partially delete and the comments already received. There will be no additional opportunity to comment.

List of Subjects in 40 CFR Part 300

Environmental protection, Air pollution control, Chemicals, Hazardous waste, Hazardous substances, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Superfund, Water pollution control, Water supply.

Dated: July 8, 2019.

Cathy Stepp,

Regional Administrator, Region 5.

For the reasons set out in this document, 40 CFR part 300 is amended as follows:

PART 300—NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN

■ 1. The authority citation for part 300 continues to read as follows:

Authority: 33 U.S.C. 1321(d); 42 U.S.C. 9601–9657; E.O. 13626, 77 FR 56749, 3 CFR, 2013 Comp., p. 306; E.O. 12777, 56 FR 54757, 3 CFR, 1991 Comp., p. 351; E.O. 12580, 52 FR 2923, 3 CFR, 1987 Comp., p. 193.

■ 2. Table 2 of Appendix B to part 300 is amended by revising the entry for ''MN, New Brighton/Arden Hills/Twin Cities Army Ammunition Plant, New Brighton'' to read as follows:

Appendix B to Part 300—[Amended]

TABLE 2—GENERAL SUPERFUND SECTION

State	Site name	City/county	Notes [a]
*	* * * * * *	*	
MN	New Brighton/Arden Hills/TCAAP (USARMY)	New Brighton	P

TABLE 2—GENERAL SUPERFUND SECTION—Continued

State	Site name	City/county	Notes [a]
*	* * * * * * *	*	*

[a] * * *

* P = Sites with partial deletion(s).

[FR Doc. 2019–15633 Filed 7–22–19; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 11

[PS Docket No. 15–94, FCC 18–39; PS Docket Nos. 15–91, 15–94, FCC 18–94]

Emergency Alert System; Wireless Emergency Alerts

AGENCY: Federal Communications Commission.

ACTION: Final rule; announcement of effective date.

SUMMARY: In this document, the Commission announces that the Office of Management and Budget (OMB) has approved, for a period of three years, the information collection associated with the *State EAS Plan Order* and *Alerting Reliability Order.* This document is consistent with the *State EAS Plan Order,* which stated that the Commission would publish a document in the **Federal Register** announcing OMB approval of these rules, and the *Alerting Reliability Order,* which stated that the Commission would publish a document in the **Federal Register** announcing the effective date of these rules.

DATES: *Effective date:* The amendments to 47 CFR 11.45(b) and 11.61 published at 83 FR 39610, August 10, 2018, are effective July 23, 2019.

Compliance date: The Commission will publish a document in the **Federal Register** announcing the compliance date for the amendments to 47 CFR 11.18 and 11.21. See the **SUPPLEMENTARY INFORMATION** for additional details.

FOR FURTHER INFORMATION CONTACT: Nicole McGinnis, Deputy Bureau Chief, Public Safety and Homeland Security Bureau, at (202) 418–7452, or by email at *Nicole.McGinnis@fcc.gov.*

SUPPLEMENTARY INFORMATION: This document announces that, on June 17, 2019, OMB approved, until June 30, 2022, the information collection requirements associated with (i) the Commission's *State EAS Plan Order,* PS Docket No. 15–94, FCC 18–39, adopted on March 28, 2018, released on April 10, 2018, and published at 83 FR 37750, August 2, 2018, which among other things required State Emergency Communications Committees (SECC) to file State EAS Plans electronically and established an online Alert Reporting System (ARS) for that purpose; and, (ii) the false alert notification requirements, and rules governing ''Live Code Tests'' of the EAS contained in the Commission's *Alerting Reliability Order,* PS Docket Nos. 15–94 and 15–91, FCC 18–94, adopted on July 12, 2018, released on July 13, 2018, and published at 83 FR 39610, August 10, 2018. The Commission publishes this document as an announcement of the effective date of the false alert notification requirements, and rules governing ''Live Code Tests'' of the EAS contained in the Commission's *Alerting Reliability Order.* In addition, the Commission publishes this document as an announcement of OMB's approval of the information collection requirements associated with the State EAS Plan online reporting requirements contained in the Commission's *State EAS Plan Order.* The *State EAS Plan Order* stated that compliance with the State EAS Plan online reporting requirements would be required within one year of publication in the **Federal Register** of a Public Notice announcing: (i) OMB approval of ARS information collection requirements or (ii) the availability of the ARS to receive such information, whichever is later. Accordingly, compliance with the State EAS Plan online reporting requirements contained in the Commission's *State EAS Plan Order* will be required within one year of publication in the **Federal Register** of a Public Notice announcing the availability of the ARS for filing State EAS Plans.

If you have any comments on the burden estimates listed below, or how the Commission can improve the collections and reduce any burdens caused thereby, please contact Nicole Ongele, Federal Communications Commission, Room 1–A620, 445 12th Street SW, Washington, DC 20554. Please include the OMB Control Number, 3060–0207, in your correspondence. The Commission will also accept your comments via email at *PRA@fcc.gov.*

To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an email to *fcc504@fcc.gov* or call the Consumer and Governmental Affairs Bureau at (202) 418–0530 (voice), (202) 418–0432 (TTY).

Synopsis

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507), the FCC is notifying the public that it received final OMB approval on June 17, 2019, for the information collection requirements contained in the modifications to the Commission's rules in 47 CFR part 11. Under 5 CFR part 1320, an agency may not conduct or sponsor a collection of information unless it displays a current, valid OMB Control Number.

No person shall be subject to any penalty for failing to comply with a collection of information subject to the Paperwork Reduction Act that does not display a current, valid OMB Control Number. The OMB Control Number is 3060–0207.

The foregoing notice is required by the Paperwork Reduction Act of 1995, Public Law 104–13, October 1, 1995, and 44 U.S.C. 3507.

The total annual reporting burdens and costs for the respondents are as follows:

OMB Control Number: 3060–0207.

OMB Approval Date: June 17, 2019.

OMB Expiration Date: June 30, 2022.

Title: Part 11, Emergency Alert System, (EAS), Orders, FCC 18–94.

Form Number: N/A.

Respondents: Business and other for-profit entities, Not-for-profit institutions, and State, Local and Tribal Government.

Number of Respondents and Responses: 63,084 respondents; 3,588,830 responses.

Estimated Time per Response: 0.017–100 hours.

Frequency of Response: One-time reporting requirement and on-occasion reporting requirements.

Obligation to Respond: Mandatory. The statutory authority for this information collection is contained in

Attachment 2 - MPCA Concurrence with Partial Delisting of the New Brighton/Arden Hills Superfund Site

MINNESOTA POLLUTION CONTROL AGENCY

Partial delisting of Twin Cities Army Ammunition Plant from state Superfund list

Friday, May 1, 2020

Contacts:

- Sara Swenson, 952-221-5368, sara@goffpublic.com
- Michael Rafferty, 651-757-2662

Arden Hills, Minn. – The Minnesota Pollution Control Agency (MPCA) today removed soil and surface water at the former Twin Cities Army Ammunition Plant (TCAAP) from the state's Superfund list. This action follows the U.S. Environmental Protection Agency's partial delisting of the site from its National Priorities List in September 2019. Groundwater contamination associated with TCAAP will remain on the state and federal Superfund lists until the cleanup goals have been achieved.

Ramsey County purchased 427 acres of the larger TCAAP site in 2013 and over the next three years cleaned up the soil to residential standards, under the oversight of the MPCA. The combined purchase and cleanup cost was $30 million. During demolition of the remaining buildings, 93% of the concrete, metal and other materials were recycled or reused.

"We are pleased that TCAAP soil and surface water has been removed from the state and federal Superfund list. This is a testament to Ramsey County's longstanding commitment and work with partners to return this property to the economic and social engine that it once was," said Ramsey County Board of Commissioners Chair Toni Carter. "We are proud that what was once the largest Superfund site in the state will always be safe for our residents to live, work and play."

The TCAAP property was placed on the federal National Priorities List as the New Brighton/Arden Hills Superfund site in 1983. As a part of the remediation work, Ramsey County worked with the MPCA through its Voluntary Investigation and Cleanup program and was issued a Certificate of Completion in 2016 for the 427-acre redevelopment area. The U.S. Army will continue to operate the existing groundwater cleanup system on the site for many years to come.

“For 30 years, local, regional and state leaders have been working to clean up the former Twin Cities Army Ammunition Plant,” said MPCA Commissioner Laura Bishop. “This is a major milestone only made possible by strong partnerships and a relentless commitment to improve the environment and vitality of the north metro.”

In 2016, Ramsey County and the City of Arden Hills selected Alatus LLC as the developer for Rice Creek Commons, the proposed development at the TCAAP site. The county is committed to moving forward with this transformative development to include a mix of affordable and market-rate housing with retail and commercial properties.

“Rice Creek Commons is an unparalleled development opportunity to create an eco-friendly community on what used to be one of the most polluted sites in the country,” said Ramsey County Commissioner Nicole Frethem, who represents the area surrounding Rice Creek Commons. “Now that the soil has been delisted as a Superfund site, we need to work together as partners to ensure that we are getting the maximum potential from this site for our residents and the future of our county.”

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APPENDIX G

Soil Cover Warning Sign Template

Soil Cover Warning Sign Template

The following template shall be used for warning signs posted around the soil covers at Sites C, D, E, G, H, 129-15, and the Outdoor Firing Range.

CAUTION

Solid Waste Disposal Area
Within This Perimeter

Do Not Dig or Disturb Soil