FINAL
NO FURTHER RESPONSE ACTION PLANNED DECISION DOCUMENT MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT

SITES RW011, CD012 AND TU014
AIR NATIONAL GUARD
MINNEAPOLIS-ST. PAUL, MINNESOTA

Contract #: W9133L-14-D-0002
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July 2020

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LIST OF ACRONYMS

amsl	Above mean sea level
ANG	Air National Guard
AOC	Area of concern
bgs	Below ground surface
BTOC	Below Top of Casing
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COCs	Constituents of concern
DD	Decision Document
DRO	Diesel range organics
ERP	Environmental Restoration Program
°F	Degrees Fahrenheit
ft	Feet
FS	Feasibility Study
GRO	Gasoline range organics
HRL	Health Risk level
LLPAH	Low Level Polynuclear Aromatic Hydrocarbons
MCL	Maximum Contaminant Limits
MDH	Minnesota Department of Health
MDL	method detection limits
MNANG	Minnesota Air National Guard
MPCA	Minnesota Pollution Control Agency
MSPIA	Minnesota St. Paul International Airport
NEPA	National Environmental Policy Act
NCDC	National Climatic Data Center
NFA	No Further Action
NFRAP	No Further Response Action Planned
OWS	Oil/water separator
PAH	Petroleum Aromatic Hydrocarbons
PA/SI	Preliminary Assessment/Site Investigation
RI	Remedial Investigation
RSL	Reginal Screening Level
SB	Soil boring
SI	Site Investigation
SRV	Soil reference Value
SVOC	Semi-volatile organic compound
TP	Test Pit
TPH	Total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
UU/UE	Unlimited Use / unrestricted exposure

VOCs	Volatile organic compounds
VWR	Vehicle wash rack
WP	Work Plan

DECLARATION

Name of Installation

Minnesota Air National Guard
133rd Airlift Wing
Located at Minneapolis-St. Paul International Airport
Minneapolis-St. Paul, Minnesota

Site Name and Location

RW011 – Former Vehicle Wash Rack
CD012 – Former Contaminated Soil Piles
TU014 – Former Pump House Dry Well

Statement of Basis and Purpose

This No Further Response Action Planned (NFRAP) Decision Document (DD) presents the selected response action for sites RW011, CD012 and TU014 at the Minnesota Air National Guard base located at Minneapolis-St. Paul International Airport in Minneapolis, Minnesota. This decision is based on the results of a *Preliminary Assessment/Site Investigation* (PA/SI) (Leidos, 2015) that was conducted under the Environmental Restoration Program (ERP) and the *Remedial Investigation Feasibility Studies Work Plan*, and *Remedial Investigation Feasibility Studies Work Plan Addendum* prepared by Wood Environment & Infrastructure (Formerly Amec Foster Wheeler), dated 8 July 2016 and 6 February 2017, respectively.

Description of the Selected Remedy

Based on the current conditions at sites RW010, CD012, and TU014, it has been determined that the sites pose no significant risk or threat to public health or the environment. Therefore, the sites fall under the NFRAP Category II (a NFRAP decision based on the results of a PA/SI) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and no further investigation is required for each site.

Declaration Statement

This Category II NFRAP DD has been prepared in accordance with the June 1995 United States Air Force NFRAP Guide. This NFRAP DD presents the selected response action for sites RW011, CD012 and TU014 developed in accordance with the CERCLA, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. It also satisfies the requirements of the National Environmental Policy Act (NEPA) that apply to CERCLA response actions. According to the 2009 Air National Guard Investigation Guidance, a Category II NFRAP is appropriate after a Site Investigation has been conducted at an Area of Concern. It has been determined that the selected remedy of no further action (NFA) allowing for unlimited use and unrestricted exposure (UU/UE) is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate, and is cost effective. The statutory preference for further investigation is not applicable because the sites have been determined to present no significant threat to human health or the environment; therefore, NFA is warranted for each of these three sites.

Concurrence Record
For the No Further Response Action Planned Decision at:

RW011 – Former Vehicle Wash Rack
CD012 – Former Contaminated Soil Piles
TU014 – Former Pump House Dry Well

Minneapolis-St. Paul International Airport
Minnesota Air National Guard
Minneapolis, Michigan

Elaine Magdinec
ANG/A4V Environmental Division Chief

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1.0 INTRODUCTION

This Decision Document (DD) supports a No Further Action (NFA) decision for Site RW011- Former Vehicle Wash Rack, Site CD012 – Former Contaminated Soil Piles, and Site TU014- Former Pump House Dry Well at the Minneapolis-St Paul International Airport (MSPIA), Minnesota Air National Guard (MNANG), Minneapolis – St. Paul, Minnesota (herein referred to as "the Base").

MSPIA is located in Hennepin County approximately 10 miles south of the city of Minneapolis and 10 miles southwest of St. Paul, Minnesota. The MSPIA is a public, corporate-owned facility of the Metropolitan Airports Commission that occupies approximately 3,400 acres of land.

The Remedial Investigation Feasibility Study (RI/FS) Work Plan (WP) (Amec Foster Wheeler, 2016) originally included additional remedial activities at the sites. Proposed activities included combining Sites RW011 and CD012 and advancing up to 16 soil borings (2 soil samples collected from each), installing up to 8 temporary monitoring wells (1 groundwater sample collected from each), sampling 4 existing monitoring wells, and installing 6 permanent monitoring wells (2 groundwater samples to be collected from each). At Site TU014, proposed activities included advancing up to 6 soil borings (2 soil samples collected from each), installing up to 6 temporary monitoring wells (1 groundwater sample collected from each), sampling 3 existing monitoring wells, and installing 4 permanent monitoring wells (2 groundwater samples to be collected from each).

Based on the recommendation of the Minnesota Pollution Control Agency (MPCA) during review of the WP (Amec Foster Wheeler, 2016), no investigative work was conducted on sites RW011, CD012 and TU014 during the 2016 RI field activities. Wood Environment & Infrastructure Solutions (Wood, formerly Amec Foster Wheeler) prepared and submitted an addendum to the Final RI/FS WP (Amec Foster Wheeler, 2016). The addendum, titled *Minneapolis-St. Paul International Airport RI/FS Work Plan Addendum* dated 6 February 2017, (WP Addendum) summarized Wood's originally proposed investigation activities at the sites, a summary of MPCA's comments stating that no further investigation activities are warranted, and Wood's request for formal closure for the sites in this DD.

The purpose of this Category II DD is to summarize the existing data, to evaluate potential risks to human health and the environment, and to provide the rationale for the proposed NFA decision for the three sites (RW011, CD012 and TU014). The primary sources of information that were

used to derive and support the NFA decision include the following reports:

- Minneapolis-St. Paul International Airport Final RI/FS Work Plan Addendum (Amec Foster Wheeler, 2017)
- Minneapolis-St. Paul International Airport Final RI/FS Work Plan (Amec Foster Wheeler, 2016)
- One Clean Site Inspection Report, (AMEC, 2009)
- Preliminary Assessment/Site Investigation (PA/SI) Report for Compliance Restoration Program (Leidos, 2015)
- Rules Handbook: A Guide to the Rules Relating Minnesota Department of Health (MDH), 2011
- Human Health-Based Water Guidance Table. Accessed in 2016. (MDH, 2016)
- Draft Site Remediation Section Draft Guidelines Risk-Based Guidance for the Soil–Human Health Pathway. January. Accessed in 2016. (MPCA, 2016)

An overview of the Base along with a description of sites RW011, CD012 and TU014 surface and subsurface features and the surrounding areas are provided in **Section 1.1**. Site history and enforcement actions (if any) are discussed in **Section 1.2**. Community participation efforts conducted by the Base are presented in **Section 1.3**. **Section 1.4** discusses the scope of the proposed response action. The physiography, geologic setting, climatology, site soil and groundwater characteristics, and any potential site receptors, are presented in **Section 2.0**. An analysis of available site-related data, as well as an evaluation of any human health risks that may be potentially posed by the site, are presented in **Section 3.0**. **Section 4.0** presents the selected response action for sites RW011, CD012 and TU014 and the rationale for selection of this action.

1.1 Site Name, Location, and Description

This section presents an overview of the Base, information on Base topography, a discussion of critical environments, adjacent land uses, and nearby populations. Surface and subsurface features on RW011, CD012, and TU014 are also summarized.

1.1.1 Site Description

The facility is located on approximately 125 acres of the MSPIA property that the Base has an exclusive license for under a United States Air Force lease (**Figure 1**).

1.1.2 Topography

The Base is located on relatively flat terrain with a surface elevation of approximately 820 feet (ft) above mean sea level (amsl) (Weston, 1985). MSPIA is composed of two distinct topographic areas, flat to gently sloping upland and narrow lowland adjacent to the Mississippi and Minnesota Rivers. The two areas are separated by an approximately 60-ft to 80-ft high vertical escarpment. The upland area slopes gently downward to the east toward the Mississippi River from a maximum elevation of about 860 ft amsl in the northern and northwestern portions of the airport to an elevation of approximately 800 ft amsl along the top of the escarpment. The lowland is situated at an elevation of about 730 ft to 740 ft amsl at the Base of the escarpment and an elevation of about 690 ft amsl at the Mississippi River. The width of the lowland from the Base of the escarpment to the river varies from about 600 ft to 2,500 ft (EA Engineering, 2009).

1.1.3 Adjacent Land Uses

The main portion of the land occupied by the MNANG is bordered by airport runways and taxiways on the west and south, and by commercial and industrial developments to the north and east. Additionally, the Mississippi River runs near the north east corner of the property.

1.1.4 Nearby Populations

MSPIA has nearby residential and commercial populations. Bordering local parks, commercial areas and residential streets are located on the north, east and southeast sides of the Base. The Minneapolis-St. Paul metropolitan area has more than 3.4 million residents based on the 2010 Census.

1.1.5 General Surface Water and Groundwater Resources

The Base is located near the confluence of the Minnesota and Mississippi Rivers. More than 100 lakes are located within the Hennepin County borders. Lake Minnetonka is the largest (nearly 15,000 acres) lake and is located approximately 15 miles west of the MSPIA. All of the streams and rivers in Hennepin County eventually drain into either the Mississippi River or the Minnesota River, which are located along the southern and eastern boundaries of MSPIA, respectively. Surface water runoff from the Base generally flows to the south and east and is collected by a system of storm water sewers that ultimately discharge into the Minnesota River. The Base water supply is obtained from the City of Minneapolis water distribution system. The Mississippi River

is the sole water source for the City of Minneapolis Water Treatment and Distribution Services water system.

Within 1 mile of the Base property boundary, 36 wells were located as part of the MDH County Well Index online database (accessed by Leidos in December 2014). Twenty of the 36 wells have been previously abandoned and 8 are currently utilized for environmental purposes. Of the eight remaining wells: three are for commercial use (airport terminal boiler, the Naval Air Station, and the Veterans Administration medical center); four are for domestic use, and one is utilized for an elevator. The four domestic use potable wells were installed to depths ranging from 80 to 230 ft below ground surface (bgs) within the Prairie Du Chien Group and/or St. Peter aquifer. The commercial use wells were installed at depths ranging from 416 to 449 bgs. (Leidos, 2015)

1.1.6 Surface and Subsurface Features

RW011

The Former Vehicle Wash Rack (RW011) formerly consisted of a constructed concrete pad measuring approximately 150 ft by 60 ft (since removed) located in the southern portion of the Base (**Figure 3**). The area of concern (AOC) is surrounded by relatively flat, grassy terrain in all directions and is ringed by soil piles, consisting of CD012, the former contaminated soil piles AOC (discussed below).

CD012

The Former Contaminated Soil Piles (CD012) refers to the location(s) of stockpiled soils (**Figure 3**) generated from the removal of 35 Base underground storage tanks (USTs) between 1989 and 2001 in the southern portion of the Base. During the 2014 PA/SI, a review of the Base utility map indicated a storm drain traversing the northern portion of the Site (Leidos, 2015).

TU014

The Former Pump House Dry Well (TU014) is located in the northwestern portion of the Base west of the former pump house location (**Figure 4**). The AOC is presently surrounded by relatively flat grassy terrain to the north, an open vehicle and equipment shed (Building 664) to the east, and a vehicle parking shed (Building 665) to the south. According to an as-built drawing of the former pump house, an oil/water separator (OWS) installed at the pump house (near current Building 665) was connected directly to a dry well on the eastern side of the pump house.

1.1.7 Critical Environments

According to the United States Fish and Wildlife Service (USFWS), the following mammals, birds, insects, plants, and reptiles are federally endangered, threatened, proposed, and/or listed as candidate species in Hennepin County (USFWS, 2019):

- Northern long-eared bat (myotis septentrionalis) – Threatened
- Higgins eye pearlymussel (lampsilis higginsi) – Endangered
- Snuffbox mussel (epioblasma triquentra) – Endangered
- Rusty patched bumble bee (bombus affinis) - Endangered

1.2 Site History and Enforcement Activities

The following subsections present the site history for sites RW011, CD012 and TU014, and briefly discusses the enforcement activities, if any, which have occurred.

1.2.1 Site History

RW011

RW011 was a constructed concrete pad measuring approximately 150 ft by 60 ft located in the southern portion of the Base. The site is surrounded by relatively flat, grassy terrain in all directions and is ringed by the former contaminated soil piles (CD012). The area surrounding the Site is reportedly used as a Heavy Equipment Training Area. The Site is located west of Militia Drive and east of Airlift Drive. Additional information pertaining to the Vehicle Wash Rack, including dates of operation, etc., was not available in information reviewed by Wood.

CD012

CD012 site refers to the location(s) of stockpiled soils generated from the removal of 35 Base USTs between 1989 and 2001 in the southern portion of the Base (**Figure 3**). Of these 35 removals, 12 of the USTs had known petroleum-impacted soils and two other non-UST sites with petroleum-impacted soils were also included. The petroleum-contaminated soils were placed in three stockpile mounds within the area, including two piles north/northwest of the wash rack and one pile south of the wash rack. It should be noted, however, that based upon preliminary visual inspection during a site walk conducted by Amec Foster Wheeler on 18 November 2015, these

piles did not appear to be located in the same configuration/location(s) as noted in the PA/SI Report (Leidos, 2015). Soil berms were observed on the perimeter of RW011.

Additional non-contaminated soil was added to the stockpile(s) over the years during construction projects and the soils were moved around by operators during heavy equipment training. The Site is bounded by a parking lot to the north, Militia Drive to the west, Airlift Drive to the east, and an open area containing various large pieces of construction material to the south.

TU014

Site TU014 is a former pump house building near current Building 665. According to an as-built drawing, an OWS installed at the pump house was connected directly to a dry well on the eastern side of the pump house. Potential contaminant discharges to the OWS/drywell are unknown; therefore, the vicinity of the former dry well was identified for further investigation. Additional information pertaining to the dry well, including dates of operation, etc., was not available in information reviewed by Wood.

1.2.2 Regulatory Agency Involvement

The MPCA reviewed and approved the 2009 One Clean Site Inspection Report prepared by AMEC. Site inspection activities included soils and groundwater sampling from 5 AOCs: AOC – Former Pump House Dry Well (AOC-DW [TU014]), AOC – Former Underground Fuel Pipeline (AOC-UFP) and Pipeline Drain Boxes (AOC-PDB), AOC – Former UST Contaminated Soil Piles (AOC–UST [CD012]), AOC – Area Surrounding Geotechnical Boring (AOC–GB [ZZ013]), and AOC – Former Vehicle Wash Rack (AOC-VWR [RW011]). Based on site analytical data, the Site Inspection Report concluded that further screening was warranted at AOC-DW, AOC-UST, AOC-GB, and AOC-VWR.

The MPCA reviewed and approved the 2015 Final PA/SI Report by Leidos. The PA/SI activities including the investigation of five AOCs (RW011, CD012, ZZ013, TU014, and TU015). Investigation activities included soil and groundwater sampling at the AOCs. The PA/SI Report stated that historical activities at four of the five AOCs, including the Former Vehicle Wash Rack (RW011), Former Contaminated Soil Piles (CD012), Area Surrounding Geotechnical Boring (ZZ013), and Former Pump House Dry Well (TU014) may have contributed impacts to the environment. Therefore, additional investigation or remedial action was recommended at RW011,

CD012, ZZ013, and TU014. The report further stated that TU014 had contributed minimal impacts to the environment and NFA was recommended.

MPCA reviewed a Draft-Final Work Plan prepared by Wood (formerly Amec Foster Wheeler), dated 13 May 2016. The WP summarized investigative work proposed by Wood at each of the four sites recommended for further investigation and (RW011, CD012, ZZ013 and TU014). MPCA submitted comments to Wood upon completion of their review of the Draft-Final WP. MPCA's comments are summarized in **Section 3.0.**

1.3 Community Participation

No community relations actions have been taken with regards to sites RW011, CD012 or TU014. The complete Administrative Record for the Base can be viewed online at http://afcec.publicadmin-record.us.af.mil.

1.4 Scope of Response Action

This section summarizes the previous investigations that were conducted for these sites.

RW011

SI activities were conducted in 2009, under the former One Clean Program. The purpose of the site investigation was to determine the presence or absence of environmental contamination, documented results, and provided recommendations for future activities. SI activities included soil boring advancement and soil sample collection. Four soil borings (SBs) (VWR-SB01 through VWR-SB04) were advanced to a depth of 10 ft bgs in the vicinity of the former Vehicle Wash Rack (VWR) using a truck mounted, direct push Geoprobe® rig. Two soil samples were collected from each boring. Groundwater was not encountered within the depths at the four soil borings; therefore, groundwater samples were not collected.

PA/SI activities were conducted in 2014, under the former Compliance Restoration Program. The PA/SI provided background information for RW011 including a description of past operations and historic investigations. PA activities identified possible contaminants used in past operations and the locations of possible soil and/or groundwater impacts from historic information. SI activities were conducted to determine possible contaminant locations at RW011. SI activities included soil groundwater sample collection. Two soil borings (RW011-SB01 and RW011-SB02) were advanced using a truck mounted, direct push Geoprobe® rig and one permanent monitoring well (RW011-MW01) was installed. RW011-SB01 was advanced to a depth of 18.5 ft bgs. One soil

and one groundwater sample was collected from this location. RW011-SB02 was advanced to a depth of 60 ft bgs and one soil sample was collected. Groundwater was not encountered; therefore no monitoring well was installed at this location and a groundwater sample was not collected (Leidos, 2015).

During the 2014 PA/SI activities, groundwater was encountered at 14.46 ft below top of casing (BTOC) of permanent flush mount monitoring well RW011-MW1. Estimated groundwater flow direction was reported as southeast. **Table 1** contains the historical soil analytical results summary, and **Table 2** contains the historical groundwater analytical results summary. **Figure 3** illustrates the locations of the soil borings and monitoring wells where historical soil samples and groundwater samples, respectively, were collected, and detection of contaminants of concern (COC) concentrations exceeded applicable MPCA Criteria at the Site.

CD012

The 2009 SI activities (former One Clean Program) included test pit (TP) excavations and soil sample collection. Six TPs (UST-TP01 through UST-TP06) were excavated in the areas of the soil stockpiles to depths of between 4 ft and 5 ft below the top of the soil piles. Groundwater was not encountered within this depth at the six TPs; therefore, groundwater samples were not collected. One soil sample was collected from each TP and submitted for analysis for total petroleum hydrocarbon (TPH)-diesel range organics (DRO), TPH-gasoline range organics (GRO), semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs).

The 2014 PA/SI activities (former Compliance Restoration Program) included soil sample and groundwater sample collection. A total of three soil borings (CD012-SB01, CD012-SB02, and CD012-SB03) were advanced to depths ranging from 20 ft to 21 ft bgs, and one soil sample was collected from each boring. Three permanent monitoring wells (CD012-MW01, CD012-MW02, and CD012-MW03) were installed, and one groundwater sample was collected from each permanent monitoring well.

During the 2014 PA/SI activities, groundwater was encountered ranging from 14.22 ft to 20.07 ft BTOC at permanent flush mount monitoring wells CD012-MW1, CD012-MW2, and CD012-MW3. Estimated groundwater flow direction was reported as southeast. **Table 1** contains the historical soil analytical results summary, and **Table 2** contains the historical groundwater analytical results summary. **Figure 3** illustrates the locations of the soil borings and monitoring wells where historical soil samples and groundwater samples, respectively, were collected, and detection of

COC concentrations exceeded MPCA criteria.

TU014

The 2009 SI activities (former One Clean Program) included soil boring advancement and soil sample collection. A total of four soil borings (SB01 through SB04) were advanced to depths from 10.5 ft to 17 ft bgs in the vicinity of the former pump house dry well using a truck mounted, direct push Geoprobe® rig. Two samples were collected from each boring with the exception of SB01, where three soil samples were collected. Groundwater was not encountered at the boring depths; therefore, groundwater samples were not collected. Soil samples were analyzed for TPH-DRO, TPH-GRO, SVOCs, and VOCs.

The 2014 PA/SI activities (former Compliance Restoration Program) included soil sample and groundwater sample collection. A total of three soil borings (TU014-SB01, TU014-SB02, and TU014-SB03) were advanced to a depth of 15 ft bgs, and one soil sample was collected from each boring. Three permanent monitoring wells were installed (TU014-MW01, TU014-MW02, and TU014-MW03), and one groundwater sample was collected from each permanent monitoring well.

During the 2014 PA/SI activities, groundwater was encountered at depths ranging from 4.85 ft to 8.87 ft BTOC at permanent flush mount monitoring wells TU014-MW1, TU014-MW2, and TU014-MW3. Estimated groundwater flow direction was reported as east-northeast. **Table 1** contains the historical soil analytical results summary, and **Table 2** contains the historical groundwater analytical results summary. **Figure 4** illustrates the locations of the soil borings and monitoring wells where historical soil samples and groundwater samples, respectively, were collected, and detections of COC concentrations exceeded applicable MPCA Criteria at TU014.

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2.0 SUMMARY OF SITE CHARACTERISTICS

This section provides a summary of the physiography, geologic setting and climatology of the Base. Analytical results obtained for sites RW011, CD012 and TU014 and potential receptors (if any) are also discussed in this section.

2.1 Physiography, Geologic Setting, and Climatology

The climate in Hennepin County, Minnesota is categorized as predominantly continental with average daily temperatures ranging from 29 degrees Fahrenheit (°F) in the winter to 72°F in the summer. The winters are cold with a maximum temperature remaining below freezing for an average of 112 days per year. The mean annual snowfall is 74.2 inches, with the greatest recorded snow at 121 inches in the winter of 1968-1969. The mean annual precipitation is 27.95 inches. Approximately 70% of the annual precipitation (19.51 inches) occurs during the growing season from May through September (National Climatic Data Center [NCDC], 2013).

The regional geology in the Minneapolis – St. Paul area is characterized by a thick sequence of sedimentary bedrock units overlain by unconsolidated glacial deposits and more recent alluvium (Mossier, 1972; Weston, 1985; Liesch, 1992; and CH2M Hill, 1993). Early Paleozoic marine sedimentary rocks form the uppermost bedrock in a unique local geologic structure referred to as the Twin Cities Basin (Mossier, 1972).

The Paleozoic bedrock is overlain by varying thicknesses of unconsolidated sediments deposited as a result of late Wisconsinan glaciation about 25,000 years to 10,000 years ago. Older Wisconsinan glacial sediments have been identified in the Minneapolis – St. Paul area, although these deposits are relatively minor and occur at greater depths. Deposition and meltwater erosion during the advance and retreat of the Superior and Des Moines glacial lobes produced a relatively flat landscape of glacial till, outwash plains, and ice-contact deposits with a simple drainage pattern with two large bedrock valleys. Underlying the present landscape is a buried bedrock surface exhibiting a well-developed dendritic steam pattern that may pre-date the late Wisconsinan glacial period. Boring logs at and near MSPIA indicate a large buried paleovalley immediately west of the airport, with several smaller valleys to the north and south (EA Engineering, 2009).

2.1.1 Soil Characteristics

The soil type at the Base has been mapped by the Natural Resource Conservation Service, United States Department of Agriculture (USDA) as Urban Land-Udipsamments (cut and fill land) (U4a).

However, soil in the immediate vicinity of the Base is classified as Dorset sandy loam (D4A, D4B). The Dorset sandy loam is described as well-drained soil on outwash plains. The depth to bedrock is generally greater than 6 ft. Boring logs from the 2009 and 2014 activities depict the site soil at the Sites as primarily silt and sand to an average depth of approximately 15 ft bgs. Bedrock (limestone) was generally encountered throughout the Base at depths ranging from approximately 9.5 ft to 19.5 ft bgs.

2.1.2 Soil Analytical Results

RW011

Soil samples collected during the 2009 activities were analyzed for TPH DRO, TPH-GRO, SVOCs, and VOCs. Soil analytical results indicated that SVOC and VOC constituents were detected at concentrations below MPCA Residential, MPCA Industrial, and MPCA Industrial Short-Term Worker Soil Reference Values (SRVs), and United States Environmental Protection Agency (USEPA) Residential Regional Screening Levels (RSLs). TPH-DRO were detected at concentrations exceeding laboratory method detection limits (MDLs). However, there are currently no MPCA or USEPA comparison criteria available for TPH-DRO. TPH-GRO were not detected at concentrations exceeding laboratory MDLs.

Soil and groundwater samples collected during 2014 activities were analyzed for low-level Polynuclear Aromatic Hydrocarbons (LLPAHs), TPH-DRO, TPH-GRO, SVOCs, and VOCs.

The following analytes were detected in the soil analytical results exceeding criteria:

- Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene PAHs were detected at concentrations exceeding the USEPA Residential RSLs in samples collected from RW011-SB02 (2.1 ft bgs); and,
- Benzo[a]pyrene (PAH) was detected at concentrations exceeding MPCA Residential SRVs in samples collected from RW011-SB02 (2.1 ft bgs).

Soil analytical results indicated that other LLPAHs, SVOCs, and VOCs constituents were detected at concentrations above laboratory MDLs, but below MPCA Residential, MPCA Industrial, MPCA Industrial Short-Term Worker SRVs, and USEPA Residential RSLs. TPH-DRO was detected at concentrations above laboratory MDLs. Currently MPCA and USEPA comparison criteria are not available for TPH-DRO. TPH-GRO were not detected at concentrations above laboratory MDLs.

CD012

Soil analytical results from 2009 activities indicated that SVOC and VOC constituents were detected at concentrations above laboratory MDLs, but below MPCA Residential, MPCA Industrial, and MPCA Industrial Short-Term Worker SRVs, and USEPA Residential RSLs. TPH-DRO were detected at concentrations above laboratory MDLs, and currently MPCA and USEPA comparison criteria are not available. TPH-GRO were not detected at concentrations above laboratory MDLs.

Soil samples collected during the 2014 activities were analyzed for LLPAHs, TPH-DRO, TPH-GRO, SVOCs, and VOCs.

The following analytes were detected in the soil analytical results exceeding criteria:

- Benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene (PAHs) were detected at concentrations exceeding the USEPA Residential RSL in samples collected from CD012-SB01 (2 ft bgs), CD012-SB02 (3 ft bgs) , and CD012-SB03 (5 ft bgs);
- Benzo(k)fluoranthene (PAH) was detected at concentrations exceeding the USEPA Residential RSL in samples collected from CD012-SB02 (2 ft bgs); and,
- Benzo(a)pyrene (PAH) was detected at concentrations exceeding MPCA Residential and Industrial SRVs from CD012-SB02 (2 ft bgs).

Soil analytical results indicated that other LLPAHs, SVOCs, and VOC constituents were detected at concentrations above laboratory MDLs, but below MPCA Residential, MPCA Industrial, and MPCA Industrial Short-Term Worker SRVs, and USEPA Residential RSLs. TPH-DRO were detected at concentrations above laboratory MDLs. Currently MPCA and USEPA comparison criteria are not available for TPH-DRO. TPH-GRO were not detected at concentrations above laboratory MDLs.

TU014

Analytical results from the soil samples collected during the 2009 activities indicated that SVOC and VOC constituents were detected at concentrations above laboratory MDLs; however, concentrations were below MPCA Residential, MPCA Industrial, and MPCA Industrial Short-Term Worker SRVs, and USEPA Residential RSLs. TPH-DRO and TPH-GRO were detected at concentrations above laboratory MDLs. Currently MPCA and USEPA comparison criteria are not

available.

Soil samples collected during 2014 activities were analyzed for LLPAHs, TPH-DRO, TPH-GRO, SVOCs, and VOCs.

The following analytes were detected in the 2014 soil analytical results exceeding criteria:

- Benzo(a)pyrene was detected at concentrations exceeding the USEPA Residential RSL in samples collected from TU014-SB02 (2.6 ft bgs) and TU014-SB03 (2.1 ft bgs).
- Other LLPAHs, SVOCs, and VOC constituents were detected at concentrations above MDLs; however, concentrations were below MPCA Residential, MPCA Industrial, and MPCA Industrial Short-Term Worker SRVs, and USEPA Residential RSLs. TPH-DRO and TPH-GRO were detected at concentrations above laboratory MDLs. Currently MPCA and USEPA comparison criteria are not available for TPH-DRO and TPH-GRO.

2.1.3 Hydrogeologic Setting

Hydrogeologic bedrock units of regional significance beneath MSPIA include the St. Peter Aquifer and the Prairie du Chien-Jordan Aquifer. Deeper aquifers of regional significance include the Franconia-Irontown-Galesville Aquifer and the Mt. Simon-Hinckley-Fond du Luc Aquifer. The St. Peter is the uppermost major Bedrock aquifer underlying the MSPIA complex. The St. Peter Aquifer Is confined by the Glenwood Shale although sections of the St. Peter near the Base occur under unconfined conditions. The top of the St. Peter Aquifer is approximately 50 ft bgs at the Base (Liesch, 1992). Recharge to this aquifer is by infiltration in outcrop areas, where the confining Glenwood Shale above the aquifer is absent, and through the till-filled paleo-valley, which trends in a north to south direction just west of the primary MSPIA runway.

Discharge is eastward and southeastward to the Minnesota River. Several small-yield domestic wells exist in this aquifer west and south of this area; however, the St. Peter Aquifer is generally not utilized as a water supply in the vicinity of the study area. Where utilized, the typical yield for individual wells ranges from 9 to 100 gallons per minute. Approximately 15% of the groundwater utilized in the Minneapolis – St. Paul metropolitan area comes from this aquifer.

In general, the groundwater quality of the aquifer is high with less than 500 parts per million total dissolved solids. Perched groundwater zones in the surficial aquifer occur within the glacial outwash deposits above the New Ulm Till deposits and in the Platteville Formation above the Glenwood Shale (EA Engineering, 2009).

2.1.4 Groundwater Analytical Results

RW011

Groundwater was not encountered within the depths at the four soil borings during the 2009 investigation; therefore, groundwater samples were not collected.

During the 2014 PA/SI activities, groundwater analytical results (RW011-MW1) indicated LLPAHs, SVOCs and VOCs constituents were not detected at concentrations above laboratory MDLs; therefore, the results were below MDH Health Risk Limits (HRLs), USEPA Tap water RSLs and USEPA maximum contaminant limits (MCLs). TPH-DRO and TPH-GRO were not detected at concentrations above laboratory MDLs and currently USEPA and MDH comparison criteria are not available.

CD012

During the 2009 investigation groundwater was not encountered within the six TPs; therefore, groundwater samples were not collected.

During the 2014 investigation the following analytes were detected in the groundwater analytical results exceeding criteria:

- Chloroform was detected at concentrations exceeding the USEPA Residential RSLs in samples collected from CD012-MW02 and CD012-MW03. Chloroform did not exceed the USEPA MCLs and HRLs. As chloroform was not considered a COC, it was determined the exceedance was likely a laboratory introduced analyte, and not representative of the groundwater contamination at the Site.

Groundwater analytical results indicated other LLPAHs, SVOCs and VOCs constituents were detected at concentrations above laboratory MDLs; however, detections were below MDH HRLs, USEPA Tapwater RSLs, and USEPA Groundwater MCLs. TPH-DRO and TPH-GRO were not detected at concentrations above laboratory MDLs.

TU014

During the 2009 investigation, groundwater was not encountered at the boring depths; therefore, groundwater samples were not collected.

The following analytes were detected in the 2014 groundwater analytical results exceeding criteria:

- Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected at concentrations exceeding the USEPA Tap water RSLs in samples collected from TU014-MW02;
- TPH-DRO were detected at concentrations exceeding the MDH HRL in samples collected from TU014-MW02 and TU014-MW03; and,
- TPH-GRO were detected at concentrations exceeding the MDH HRL in samples collected from TU014-MW02.

Groundwater analytical results indicated other LLPAHs, SVOCs and VOCs constituents were detected at concentrations above laboratory MDLs; however, concentrations were below MDH HRLs, USEPA Tapwater RSLs, USEPA Groundwater MCLs, and USEPA LHAs. TPH-GRO (TU014-MW3) was detected at concentrations above laboratory MDLs. Currently USEPA and MDH comparison criteria are not available for TPH-DRO and TPH-GRO.

2.2 Surface Water

Surface water is not present at sites RW011, CD012 and TU014. Therefore, no surface water sampling has been completed at the sites.

2.3 Soil Vapor Activities

No soil vapor sampling was conducted based on the recommendation from the MPCA in a letter (**Appendix A**) dated 23 August 2016. Additionally, no occupied buildings are present at Sites RW011, CD012 or TU014.

2.4 Receptors

Ecological receptors could potentially be exposed to chemicals at the site through several major biological exposure mechanisms:

- Uptake of chemicals from soil through roots (terrestrial plants);
- Incidental ingestion of chemicals bound to soil (terrestrial invertebrates, terrestrial wildlife [birds and mammals]);
- Dietary ingestion of chemicals through consumption of contaminated plants (herbivores, omnivores); and
- Dietary ingestion of chemicals through consumption of contaminated prey (all predators).

Although dermal absorption pathways are possibly complete for some receptors, these pathways are considered to be minor compared to dietary ingestion and are not evaluated.

Human receptors are not considered a risk at the three AOCs as they are located within a controlled area, there are no drinking water wells, and the concentrations of COCs do not present a risk to surface water.

As stated in the MPCA letter (**Appendix A**):

"It should be noted that these AOC are within the MSP airport controlled access area therefore there would be no exposure risk to the public. There are no drinking water receptors in the area that would pose a risk. The groundwater receptor for contamination would be the Minnesota/Mississippi Rivers. However, the level of contamination at 3 of the 4 AOCs recommended for closure does not suggest a risk."

The fourth AOC referenced in the MPCA letter is referring to AOC ZZ013, which was carried forward into an RI/FS investigation.

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3.0 DATA ANALYSIS/RISK ASSESSMENT

AOCs RW011, CD012, and TU014 are located within the controlled access area of the Base, therefore, there is no exposure risk to the general public. The Base and the surrounding areas are served by municipal drinking water, eliminating the drinking water receptors for the AOCs.

3.1 RW011

Soil

Previous investigations in 2009 and 2014 did not encounter soils in exceedance of Industrial SRVs for VOCs or SVOCs. The 2014 investigation indicated minor PAH concentrations below Industrial SRVs. Therefore, there is no risk from soil exposure.

Groundwater

Groundwater analytical data collected from RW011-MW1 (2014) were non-detect for all analytes. Therefore, there is no exposure risk from groundwater.

Surface water and Sediment

Surface water and/or sediment is not present at site RW011. Surface water impacts were not identified in previous activities. Therefore, there are no exposure risks associated with surface water and/or sediment at the Site.

Air

The site is not located near any structures that would present a vapor intrusion risk. MPCA submitted comments on the Draft-Final RI/FS Work Plan (Amec Foster Wheeler, 2016) in a letter dated 23 August 2016 (**Appendix A**). MPCA comments read as follows:

RW011 Former Wash rack - Previous investigations in 2009 did not encounter exceedances of SRVs for SVOCs and VOCs. Additional investigation in 2014 only found minor PAH contamination below industrial SRVs. Groundwater samples from MW-1 did not detect PAHs, SVOCs or VOCs. The site location is not near any structure that would present a vapor intrusion risk. This meets current closure criteria so the additional work proposed is unnecessary. I recommend we close this Site.

3.2 CD012

Soil

Previous investigations in 2009 did not encounter soils in exceedance of SRVs or RSLs for VOCs, SVOCs, or PAHs. The additional 2014 investigation indicated minor PAH soil contamination above Industrial SRVs. However, the location of the soil piles does not present an exposure risk.

Groundwater

Groundwater analytical data collected from monitoring wells CD012-MW1, CD012-MW2, and CD012-MW3 (2014) were non-detect for all analytes. Therefore, there is no exposure risk from groundwater.

Surface water and Sediment

Surface water and/or sediment is not present at site CD012. Surface water impacts were not identified in previous activities. Therefore, there are no exposure risks associated with surface water and/or sediment at the Site.

Air

The site is not located near any structures that would present a vapor intrusion risk. MPCA submitted comments on the Draft-Final RI/FS Work Plan (Amec Foster Wheeler, 2016) in a letter dated 23 August 2016 (**Appendix A**). MPCA comments read as follows:

CD012 Former Contaminates piles - This Site was the location of staging for the excavation of 35 base USTs between 1989 and 2001. Site work done in 2009 and 2014 did not encounter contamination exceeding SRVs or RSLs. Additional investigation in 2014 encountered low level PAH contamination. The location of this contamination does not present an exposure risk. Groundwater samples collected from 3 monitoring wells did not detect PAHs, SVOCs or VOCs. This meets current closure criteria so the additional work proposed is unnecessary. I recommend we close this Site.

3.3 TU014

Soil

Previous investigations in 2009 and 2014 did not encounter soils in exceedance of SRVs or RSLs for VOCs, SVOCs, or PAHs except for benzo(a)pyrene (TU014-SB2 and TU014-SB3) that exceeded the RSLs. However, the location of the soil borings do not present an exposure risk.

Groundwater

Groundwater analytical data collected from monitoring wells TU014-MW1, TU014-MW2, and TU014-MW3 (2014) were below HRLS, RSLs, and/or MCLs for VOCs, SVOCs, and PAHs except for three PAHs above the RSLs at TU014-MW2. Therefore, there is no exposure risk from groundwater.

Surface water and Sediment

Surface water and/or sediment is not present at site TU014. Surface water impacts were not identified in previous activities. Therefore, there are no exposure risks associated with surface water and/or sediment at the Site.

Air

The site is not located near any occupied structures that would present a vapor intrusion risk.

MPCA submitted comments on the Draft-Final RI/FS Work Plan (Amec Foster Wheeler, 2016) in a letter dated 23 August 2016 (**Appendix A**). MPCA comments read as follows:

TU014 Former Pump House Dry Well - Investigations completed in 2009 and 2014 detected low levels of PAH contamination which were all below SRV and RSL levels with the exception of Benzo(a)pyrene which exceeded RSLs. The location of this contamination does not present an exposure risk. Groundwater samples from 3 monitoring wells did not detect PAH, SVOC or VOC contamination above HRLs, RSLs or MCLs except for 3 PAHs which exceeded the RSLs. This meets current closure criteria so the additional work proposed is unnecessary. I recommend we close this Site.

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4.0 SELECTED ACTION: NO FURTHER ACTION

RW011

Based on Site analytical data, ecological and human exposure risks, and recommendations from the MPCA, the recommended selected action is NFA allowing for unlimited use and unrestricted exposure (UU/UE) for soil and groundwater at RW011. Upon final approval of the recommended UU/UE NFA, site close-out activities will be performed, including the proper removal/abandonment of all on-site monitoring wells.

CD012

Based on Site analytical data, ecological and human exposure risks, and recommendations from the MPCA, the recommended selected action is NFA allowing for UU/UE for soil and groundwater at CD012. Upon final approval of the recommended UU/UE NFA, site close-out activities will be performed, including the proper removal/abandonment of all on-site monitoring wells.

TU014

Based on Site analytical data, ecological and human exposure risks, and recommendations from the MPCA, the recommended selected action is NFA allowing for UU/UE for soil and groundwater at TU014. Upon final approval of the recommended UU/UE NFA, site close-out activities will be performed, including the proper removal/abandonment of all on-site monitoring wells.

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5.0 REFERENCES AND ADMINISTRATIVE RECORD INDEX

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FIGURES

Figure 1:
Site Map
Great Lakes Region
Minneapolis - St. Paul
International Airport

Client: Air National Guard

Amec Foster Wheeler
Environment & Infrastructure, Inc
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Novi, MI 48377
248 926 4008

PROJ: 2-9133-0002 | **Date: December 2019**

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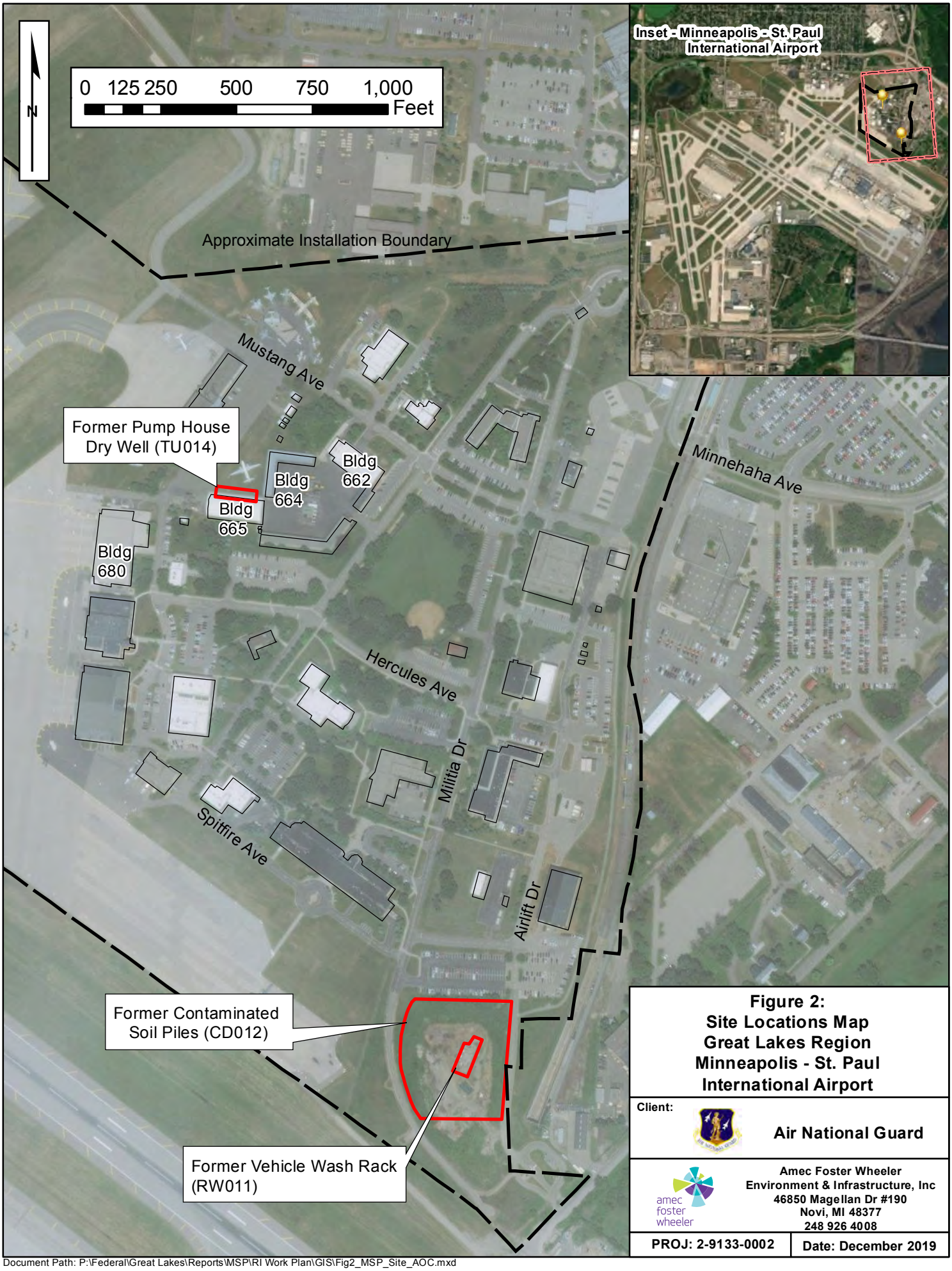

Figure 2:
Site Locations Map
Great Lakes Region
Minneapolis - St. Paul International Airport

Client: Air National Guard

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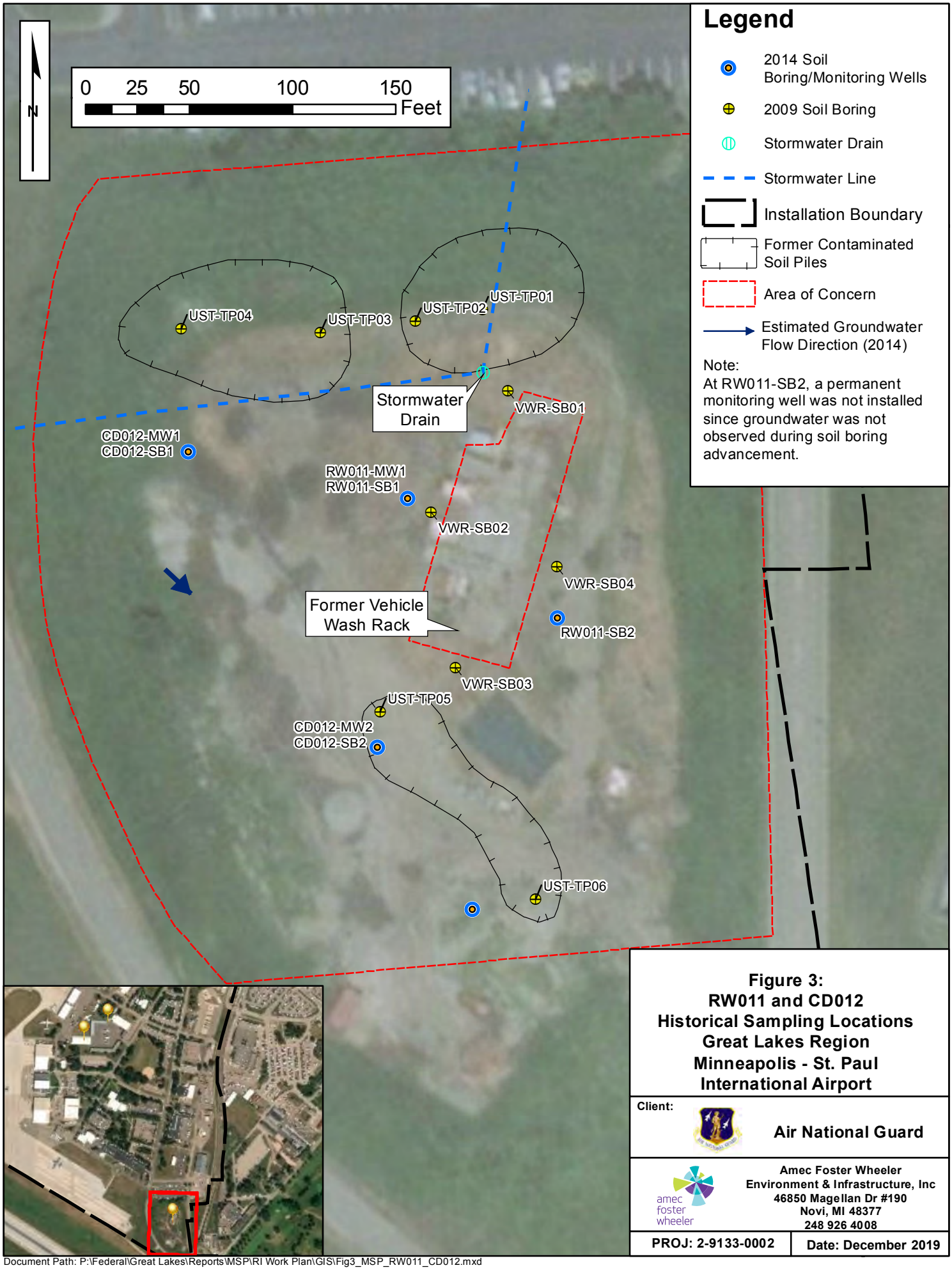

Figure 3:
RW011 and CD012
Historical Sampling Locations
Great Lakes Region
Minneapolis - St. Paul International Airport

Client: Air National Guard

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Figure 4:
TU014 Historical Sampling Locations
Great Lakes Region
Minneapolis - St. Paul International Airport

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TABLES

Table 1
Historical Soil Analytical Results Summary
RW011, CD012 and TU014 AOCs
133rd Airlift Wing, Minnesota Air National Guard
Minneapolis - St. Paul International Airport
Minneapolis, Minnesota

Parameter / Location ID / Location AOC / Depth (ft BGS) / Sample Date	MPCA Residential SRV (Tier 1)	MPCA Industrial SRV (Tier II)	MPCA Industrial Short-Term Worker SRV (Tier II)	USEPA RSL	VWR-SB01 RW011 0-2 06/23/2009		VWR-SB01 RW011 8-10 06/23/2009		VWR-SB02 RW011 0-2 06/23/2009		VWR-SB02 RW011 8-10 06/23/2009		VWR-SB03 RW011 0-2 06/23/2009		VWR-SB03 RW011 8-10 06/23/2009		VWR-SB04 RW011 0-2 06/23/2009		VWR-SB04 RW011 8-10 06/23/2009		RW011-SB1 RW011 6.6 07/16/2014		RW011-SB2 RW011 2.1 07/17/2014		UST-TP01 CD012 0-4.5 01/07/2009		UST-TP02 CD012 0-4.5 01/07/2009		UST-TP03 CD012 0-5 01/07/2009		UST-TP04 CD012 0-4 01/07/2009		UST-TP05 CD012 0-4 01/07/2009		UST-TP06 CD012 0-4 01/07/2009		CD012-SB1 CD012 2 07/16/2014	
Polynuclear Aromatic Hydrocarbons by USEPA SW-846 Method 8270 (µg/kg)																																								
2-Methylnaphthalene	100,000	369,000	N/A	24,000	<14	U	<15	U	<14	U	<14	U	<14	U	<14	U	<14	U	<14	U	<0.73	U	**8.60**	J	<14	UJ	<14	UJ	<13	UJ	<14	UJ	<14	UJ	<16	UJ	**12.0**	
Acenaphthene	1,200,000	5,260,000	19,000,000	360,000	<17	U	<17	U	<17	U	<16	U	<17	U	<16	U	<17	U	<16	U	<0.29	U	**62.0**		<16	UJ	<16	UJ	**27.4**	J	**16.4**	J	**35**	J	<19	UJ	N/A	
Acenaphthylene	N/A	N/A	N/A	N/A	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		**0.54**	J	**510**		N/A		N/A		N/A		N/A		N/A		N/A		**19.0**	
Anthracene	7,880,000	45,400,000	100,000,000	1,800,000	<14	U	<15	U	**157**		<14	U	<14	U	<14	U	<14	U	<14	U	<2.7	U	**590**		**17.5**	J	**28.4**	J	**63.6**	J	**35.3**	J	**239**	J	<16	UJ	**53.0**	
Benzo(a)anthracene	N/A	N/A	N/A	160	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**2,200**		N/A		N/A		N/A		N/A		N/A		N/A		**140**	
Benzo(a)pyrene	2,000	3,000	14,000	16	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**2,300**		N/A		N/A		N/A		N/A		N/A		N/A		**130**	
Benzo(a)pyrene Equivalent	2,000	3,000	14,000	16	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7		**3,395**		N/A		N/A		N/A		N/A		N/A		N/A		**199**	
Benzo(b)fluoranthene	N/A	N/A	N/A	160	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**3,200**		N/A		N/A		N/A		N/A		N/A		N/A		**190**	
Benzo(g,h,i)perylene	N/A	N/A	N/A	N/A	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**1,500**		N/A		N/A		N/A		N/A		N/A		N/A		**66.0**	
Benzo(k)fluoranthene	N/A	N/A	N/A	1,600	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**1,200**		N/A		N/A		N/A		N/A		N/A		N/A		**75.0**	
Chrysene	N/A	N/A	N/A	16,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**2,300**		N/A		N/A		N/A		N/A		N/A		N/A		**180**	
Dibenzo(a,h)anthracene	N/A	N/A	N/A	16	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**430**		N/A		N/A		N/A		N/A		N/A		N/A		**22.0**	
Fluoranthene	1,080,000	6,800,000	48,600,000	240,000	<15	U	<15	U	**1,080**		<14	U	**41.8**		<14	U	<14	U	<14	U	**2.00**	J	**4,100**		**115**	J	**109**	J	**264**	J	**314**	J	**1,220**	J	**107**	J	**330**	
Fluorene	850,000	6,800,000	17,240,000	240,000	<15	U	<15	U	<15	U	<14	U	<15	U	<14	U	<15	U	<14	U	<0.73	U	**70.0**		<15	UJ	**15**	UJ	**30.4**	J	<14	UJ	**50.8**	J	<17	UJ	**22.0**	
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	160	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.7	U	**1,700**		N/A		N/A		N/A		N/A		N/A		N/A		**140**	J
Naphthalene	10,000	28,000	78,000	3,800	<14	U	<14	U	<14	U	<13	U	<14	U	<13	U	<14	U	<13	U	<0.73	U	**18.0**	J	<14	UJ	<13	UJ	<13	UJ	<13	UJ	<13	UJ	<16	UJ	**16.0**	J
Phenanthrene	N/A	N/A	N/A	N/A	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		**1.30**	J	**780**		N/A		N/A		N/A		N/A		N/A		N/A		**180**	
Pyrene	890,000	5,800,000	43,000,000	180,000	<14	U	<14	U	**958**		<14	U	**36.8**		<14	U	<14	U	<14	U	**1.40**	J	**3,900**		**103**	J	**93.4**	J	**214**	J	**258**	J	**968**	J	**93.1**	J	**180**	J
All Other Analytes	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semi-Volatile Organic Compounds by USEPA SW-846 Method 8270 (µg/kg)																																								
1,2-Dichlorobenzene	26,000	75,000	1,390,000	180,000	<17	U	<18	U	<17	U	<17	U	<17	U	<17	U	<17	U	<17	U	<37	U	<34	U	<17	UJ	<17	UJ	<16	UJ	<16	UJ	<16	UJ	<20	UJ	<40	U
2,4,6-Trichlorophenol	595,000	1,060,000	1,495,000	6,300	<43	U	<43	U	<42	U	<41	U	<43	U	<41	UJ	<42	UJ	**41**	J	<73	U	<67	U	<41	UJ	<41	UJ	<40	UJ	<40	UJ	<40	UJ	<49	UJ	<81	U
Benzyl Alcohol	8,700,000	56,000,000	N/A	630,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<37	U	<34	U	N/A		N/A		N/A		N/A		N/A		N/A		<40	U
bis(2-Ethylhexyl)phthalate	570,000	2,100,000	5,000,000	39,000	<17	U	<17	U	<17	U	<16	U	<17	U	<16	U	<16	U	<16	U	<73	U	**110**	J	<16	UJ	<16	UJ	<16	UJ	<16	UJ	<16	UJ	<19	UJ	<81	U
Butyl benzyl phthalate	580,000	3,700,000	31,450,000	290,000	<16	U	<16	U	<16	U	<15	U	<16	U	<15	U	<16	U	<15	U	<73	U	<67	U	<15	UJ	<15	UJ	<15	UJ	<15	UJ	<15	UJ	<18	UJ	<81	U
Carbazole	700,000	1,310,000	3,300,000	N/A	<14	U	<14	U	**15.1**	J	<13	U	<14	U	<13	U	<13	U	<13	U	<74	U	**52.0**	J	<13	UJ	<13	UJ	**20.6**	J	**21.7**	J	**25.9**	J	<16	UJ	<82	U
Dibenzofuran	104,000	810,000	N/A	7,300	<15	U	<15	U	<15	U	<14	U	<15	U	<14	U	<15	U	<14	U	<37	U	<34	U	<15	UJ	<14	UJ	<14	UJ	<14	UJ	**23.4**	J	<17	UJ	<40	U
Hexachlorocyclopentadiene	2,000	6,000	900,000	180	<30	U	<31	U	<30	U	<29	U	<30	U	<29	U	<30	U	<29	U	N/A		N/A		<29	UJ	<29	UJ	<28	UJ	<29	UJ	<28	UJ	<35	UJ	N/A	
N-Nitrosodiphenylamine	1,950,000	3,720,000	5,900,000	110,000	<22	U	<22	U	<21	U	<21	U	<22	U	<21	U	<21	U	<21	U	<37	U	<34	U	<21	UJ	<21	UJ	<20	UJ	<21	UJ	<20	UJ	<25	UJ	<40	U
Phenol	1,500,000	20,203,000	20,203,000	1,900,000	<24	U	<25	U	<24	U	<23	U	<24	U	<23	UJ	<24	UJ	<23	UJ	<37	U	<34	U	<24	UJ	**23**	UJ	<22	UJ	<23	UJ	<23	UJ	<28	UJ	<40	U
All Other Analytes	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Volatile Organic Compounds by USEPA SW-846 Method 8260 (µg/kg)																																								
1,2 - Dichloroethylene (mixed isomers)	8,000	60,000	62,000	N/A	<0.28	U	<0.21	U	<0.31	U	<0.3	U	<0.26	U	<0.25	U	<0.23	U	**0.26**	U	N/A		N/A		<0.31	U	<0.31	U	<0.24	U	<0.31	U	<0.37	U	<0.33	U	N/A	
1,2,4-Trimethylbenzene	8,000	25,000	70,000	5,800	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.79	U	<0.95	U	N/A		N/A		N/A		N/A		N/A		N/A		<1.2	U
1,3,5-Trimethylbenzene	3,000	10,000	30,000	78,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.79	U	<0.95	U	N/A		N/A		N/A		N/A		N/A		N/A		<1.2	U
Acetone	340,000	1,000,000	100,000,000	6,100,000	<2.6	UJ	<2	U	<2.9	UJ	<2.8	UJ	<2.4	UJ	<2.3	UJ	<2.1	UJ	<2.4	UJ	<7.9	U	<9.5	U	<2.9	U	<2.9	U	<2.2	U	<2.9	U	<3.5	U	<3.1	U	<12	U
Benzene	6,000	10,000	2,000	1,200	<0.4	U	<0.3	U	<0.45	U	<0.43	U	<0.37	U	<0.35	U	<0.33	U	<0.37	U	<0.79	UJ	<0.95	U	<0.44	U	<0.45	U	<0.34	U	<0.44	U	<0.53	U	<0.47	U	**0.69**	J
Bromodichloromethane	10,000	17,000	17,000	290	<0.3	U	<0.23	U	<0.34	U	<0.32	U	<0.28	U	<0.27	U	<0.25	U	<0.28	U	<0.63	UJ	<0.76	U	<0.33	U	<0.34	U	<0.26	U	<0.33	U	<0.4	U	<0.35	U	<0.94	U
Carbon disulfide	65,000	190,000	55,000	77,000	<0.35	U	<0.27	U	<0.4	U	<0.38	U	<0.33	U	<0.32	U	<0.29	U	<0.33	U	<0.79	U	<0.95	U	<0.39	U	<0.4	U	<0.31	U	<0.39	U	<0.47	U	<0.42	U	<1.2	U
Ethylbenzene	200,000	200,000	200,000	5,800	<0.43	U	<0.33	U	<0.48	U	<0.47	U	<0.4	U	<0.39	U	<0.36	U	<0.4	U	<0.79	UJ	**0.94**	J	<0.48	U	<0.49	U	<0.37	U	<0.48	U	<0.58	U	<0.51	U	<1.2	U
Isopropylbenzene (Cumene)	30,000	87,000	240,000	190,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.79	UJ	<0.95	U	N/A		N/A		N/A		N/A		N/A		N/A		<1.2	U
m-Xylene	N/A	N/A	N/A	55,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<1.6	UJ	<1.9	U	N/A		N/A		N/A		N/A		N/A		N/A		<2.4	U
Methyl ethyl ketone (2-Butanone)	5,500,000	19,000,000	6,000,000	2,700,000	<2.3	U	<1.7	U	<2.6	U	<2.5	U	<2.1	U	<2.1	U	<1.9	U	<2.1	U	<5.1	U	<6.1	U	<2.5	U	<2.6	U	<2	U	<2.5	U	<3.1	U	<2.7	U	<7.6	U
Methyl isobutyl ketone (4-methyl-2-pentanone)	1,700,000	9,000,000	4,500,000	3,300,000	<0.94	U	<0.72	U	<1.1	U	<1	U	<0.88	U	<0.84	U	<0.78	U	<0.88	U	<7.9	U	<9.5	U	<1	U	<1.1	U	<0.81	U	<1	U	<1.3	U	<1.1	U	<12	U
Methylene Chloride (Dichloromethane)	97,000	158,000	158,000	35,000	<0.26	U	<0.2	U	<0.29	U	<0.28	U	<0.24	U	<0.23	U	<0.21	U	<0.24	U	<2.5	U	<3	U	<0.29	U	<0.29	U	<0.22	U	<0.29	U	<0.35	U	<0.31	U	<3.8	U
n-Butylbenzene	30,000	92,000	N/A	390,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.79	U	<0.95	U	N/A		N/A		N/A		N/A		N/A		N/A		<1.2	U
p-Isopropyl Toluene	N/A	N/A	N/A	N/A	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.79	UJ	<0.95	U	N/A		N/A		N/A		N/A		N/A		N/A		<1.2	U
Propylbenzene (n-propylbenzene)	30,000	93,000	200,000	380,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.79	U	<0.95	U	N/A		N/A		N/A		N/A		N/A		N/A		<1.2	U
sec-Butylbenzene	25,000	70,000	N/A	780,000	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.79	U	<0.95	U	N/A		N/A		N/A		N/A		N/A		N/A		<1.2	U
Tetrachloroethene	72,000	131,000	131,000	8,100	<0.17	U	<0.13	U	<0.19	U	<0.18	U	<0.16	U	<0.15	U	<0.14	U	<0.16	U	<0.79	U	<0.95	U	<0.19	U	<0.19	U	<0.15	U	<0.19	U	<0.23	U	<0.2	U	<1.2	U
Toluene	107,000	305,000	215,000	490,000	<0.34	U	<0.26	U	<0.38	U	<0.37	U	<0.32	U	<0.3	U	<0.28	U	<0.32	U	<0.79	U	<1.5	UJ	<0.38	U	<0.38	U	<0.29	U	<0.38	U	<0.45	U	<0.4	U	<1.2	U
Xylene, Total	45,000	130,000	353,000	58,000	<0.55	U	**0.64**	J	<0.61	U	<0.59	U	<0.51	U	<0.49	U	<0.45	U	<0.51	U	<0.79	UJ	<0.95	U	<0.6	U	<0.62	U	<0.47	U	<0.61	U	<0.73	U	<0.64	U	<1.2	U
All Other Analytes	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Total Petroleum Hydrocarbons-Diesel Range Organics by WI95 (mg/kg)																																								
TPH - Diesel Range Organics (C10-C28)	N/A	N/A	N/A	N/A	<3.2		<3.3		**40.5**		<3.1		**7.16**		<3.1		<3.1		<3.1		<1.1	U	**16**	J	**11.4**		**3.63**		**16.1**		**18.7**		**39.2**		**7.15**		<1.2	U
TPH - Diesel Range Organics (>C28)	N/A	N/A	N/A	N/A	N/A		N/A		**19.7**		N/A		**14.8**		N/A		N/A		N/A		<1.1	U	**16**	J	**14.0**		**16.1**		**29.9**		**28.4**		**29.0**		**10.8**		<1.2	U
Total Petroleum Hydrocarbons-Gasoline Range Organics by WI95 (mg/kg)																																								
TPH - Gasoline Range Organics (C6-C10)	N/A	N/A	N/A	N/A	<12		<20		<12		<11		<15		<11		<14		<11		<1.4	U	<1.3	U	<6.5		<6.5		<6.0		<5.7		<5.6		<7.9		<1.7	U

Table 1
Historical Soil Analytical Results Summary
RW011, CD012 and TU014 AOCs
133rd Airlift Wing, Minnesota Air National Guard
Minneapolis - St. Paul International Airport
Minneapolis, Minnesota
2 of 3

Location ID / Location AOC / Depth (ft BGS) / Sample Date / Parameter	MPCA Residential SRV (Tier 1)	MPCA Industrial SRV (Tier II)	MPCA Industrial Short-Term Worker SRV (Tier II)	USEPA RSL	CD012-SB1-DUP CD012 2 07/16/2014		CD012-SB2 CD012 3 07/16/2014		CD012-SB3 CD012 5 07/16/2014		DW-SB01 TU014 0-2 06/22/2009		DW-SB01-DUP TU014 0-2 06/22/2009		DW-SB01 TU014 7-9 06/22/2009		DW-SB01 TU014 8-10.5 06/22/2009		DW-SB02 TU014 0-2 06/22/2009		DW-SB02 TU014 8-11.5 06/22/2009		DW-SB03 TU014 0-2 06/22/2009		DW-SB03 TU014 12-14 06/22/2009		DW-SB04 TU014 0-2 06/25/2009		DW-SB04 TU014 15-17 06/25/2009		TU014-SB1 TU014 5.5 07/21/2014		TU014-SB2 TU014 2.6 07/22/2014		TU014-SB3 TU014 2.1 07/22/2014		TU014-SB3-DUP TU014 2.1 07/22/2014	
Polynuclear Aromatic Hydrocarbons by USEPA SW-846 Method 8270 (µg/kg)																																						
2-Methylnaphthalene	100,000	369,000	N/A	24,000	**9.70**		**64.0**		**30.0**		<17	U	<14	U	<19	U	<18	U	<16	U	<17	U	<17	U	**114**		<14	U	**132**		<0.7	U	**0.76**	J	**33.0**		**11.0**	
Acenaphthene	1,200,000	5,260,000	19,000,000	360,000	**95.0**	J	**150**		**20.0**		<20	U	**30.1**	J	<22	U	<21	U	<19	U	<20	U	<19	U	**63.5**		<17	U	<33.8		<0.28	U	<0.28	U	**7.30**		**4.50**	J
Acenaphthylene	N/A	N/A	N/A	N/A	**20.0**		**2,000**		**200**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		**0.56**	J	**0.89**	J	**0.74**	J	**1.10**	J
Anthracene	7,880,000	45,400,000	100,000,000	1,800,000	**210**	J	**1,300**		**130**		<17	U	**77.6**		<19	U	<18	U	<16	U	**36.9**	J	<17	U	**141**		<14	U	**31**	J	<2.6	U	**2.10**	J	**8.70**		**8.80**	
Benzo(a)anthracene	N/A	N/A	N/A	160	**400**		**5,500**		**450**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**12.0**		**22**	J	**35.0**	
Benzo(a)pyrene	2,000	3,000	14,000	16	**340**	J	**7,400**		**620**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**17.0**		**22**	J	**44.0**	
Benzo(a)pyrene Equivalent	2,000	3,000	14,000	16	**507**		**10,648**		**876**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6		**24.1**		**32**		**61.4**	
Benzo(b)fluoranthene	N/A	N/A	N/A	160	**510**		**10,000**		**840**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**24.0**		**36**	J	**59.0**	
Benzo(g,h,i)perylene	N/A	N/A	N/A	N/A	**190**	J	**5,400**		**460**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**10.0**		**12.0**		**24.0**	
Benzo(k)fluoranthene	N/A	N/A	N/A	1,600	**170**	J	**3,600**		**280**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**7.70**		**10.0**		**19.0**	
Chrysene	N/A	N/A	N/A	16,000	**450**		**5,800**		**530**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**16.0**		**21.0**		**39.0**	
Dibenzo(a,h)anthracene	N/A	N/A	N/A	16	**47.0**	J	**1,300**		**97.0**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**3.00**	J	**3.00**	J	**6.30**	
Fluoranthene	1,080,000	6,800,000	48,600,000	240,000	**1200**		**9,900**		**1,500**		**31.9**	J	**704**		**27.3**	J	**22.3**	J	**34.7**	J	**93.6**		**18**	J	**687**		**39.4**		**107**		<2.6	U	**17.0**		**45.0**		**65.0**	
Fluorene	850,000	6,800,000	17,240,000	240,000	**110**	J	**170**		**26.0**		<18	U	**28.5**	J	<20	U	<19	U	<17	U	<18	U	<17	U	**59.9**		<15	U	**29.3**	J	<0.7	U	<0.7	U	**5.70**		**4.20**	J
Indeno(1,2,3-cd)pyrene	N/A	N/A	N/A	160	**280**	J	**5,500**		**390**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**9.00**		**11.0**		**22.0**	
Naphthalene	10,000	28,000	78,000	3,800	**12.0**	J	**130**	J	**25.0**	J	<16	U	<13	U	<19	U	<17	U	<	U	<17	U	<16	U	**24.3**	J	<14	U	**69.1**		<0.7	U	**0.68**	J	**13.0**		**5.60**	
Phenanthrene	N/A	N/A	N/A	N/A	**1000**		**1,800**		**530**		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<2.6	U	**6.20**		**34.0**		**31.0**	
Pyrene	890,000	5,800,000	43,000,000	180,000	**940**		**8,800**		**1,300**		**27**	J	**472**		**25.6**	J	**19.4**	J	**31**	J	**88.0**		**16.2**	J	**607**		**36.6**		**92.8**		<2.6	U	**17.0**	J	**36.0**		**54.0**	
All Other Analytes	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semi-Volatile Organic Compounds by USEPA SW-846 Method 8270 (µg/kg)																																						
1,2-Dichlorobenzene	26,000	75,000	1,390,000	180,000	<38	U	<35	U	<36	U	<20	U	<17	U	<23	U	<21	U	<19	U	<21	U	<20	U	<21	U	<17	U	<18	U	<34	U	<33	U	<36	U	<36	U
2,4,6-Trichlorophenol	595,000	1,060,000	1,495,000	6,300	<76	U	<70	U	<72	U	<50	U	<41	UJ	<57	U	<53	U	<48	U	<51	U	<49	U	<52	U	<42	U	<44	U	<69	U	<65	U	<73	U	<72	U
Benzyl Alcohol	8,700,000	56,000,000	N/A	630,000	<38	U	<35	U	<36	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<34	U	<33	U	<36	U	<36	U
bis(2-Ethylhexyl)phthalate	570,000	2,100,000	5,000,000	39,000	**97.0**	J	<70	U	<72	U	<20	U	**42.7**	J	<22	U	<21	U	<19	U	<20	U	<19	U	<21	U	<16	U	<17	U	**94.0**	J	<65	U	<73	U	<72	U
Butyl benzyl phthalate	580,000	3,700,000	31,450,000	290,000	<76	U	<70	U	<72	U	<19	U	**65.9**		<21	U	<20	U	<18	U	<19	U	<18	U	<20	U	<16	U	<17	U	<69	U	<65	U	<73	U	<72	U
Carbazole	700,000	1,310,000	3,300,000	N/A	**130**	J	**120**	J	<74	U	<16	U	**52.5**	J	<18	U	<17	U	<15	U	**89.6**		<16	U	<17	U	<13	U	**62.5**	J	<70	U	<66	U	<74	U	<73	U
Dibenzofuran	104,000	810,000	N/A	7,300	**63.0**	J	**40.0**	J	<36	U	<18	U	<14	U	<20	U	<19	U	<17	U	<18	U	<17	U	**28.3**	J	<15	U	**19.3**	J	<34	U	<33	U	<36	U	<36	U
Hexachlorocyclopentadiene	2,000	6,000	900,000	180	N/A		N/A		N/A		<35	U	<29	U	<40	U	<38	U	<34	U	<36	U	<35	U	<37	U	<30	U	<31	U	N/A		N/A		N/A		N/A	
N-Nitrosodiphenylamine	1,950,000	3,720,000	5,900,000	110,000	<38	U	<35	U	<36	U	<25	U	<21	U	<29	U	<27	U	<25	U	<26	U	<25	U	<27	U	<21	U	<22	U	<34	U	<33	U	<36	U	<36	U
Phenol	1,500,000	20,203,000	20,203,000	1,900,000	<38	U	<35	U	<36	U	<28	U	<23	UJ	<32	U	<30	U	<27	U	<29	U	<28	U	<30	U	<24	U	<25	U	<34	U	<33	U	<36	U	<36	U
All Other Analytes	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Volatile Organic Compounds by USEPA SW-846 Method 8260 (µg/kg)																																						
1,2 - Dichloroethylene (mixed isomers)	8,000	60,000	62,000	N/A	N/A		N/A		N/A		<0.23	U	<0.22	U	<0.31	U	<0.29	UJ	<0.19	U	<23	U	<0.21	U	<14	U	<0.21	U	<24	U	N/A		N/A		N/A		N/A	
1,2,4-Trimethylbenzene	8,000	25,000	70,000	5,800	<1.1	U	<1.3	U	<1.1	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.82	U	<0.97	U	**3.70**	J	<0.98	U
1,3,5-Trimethylbenzene	3,000	10,000	30,000	78,000	<1.1	U	<1.3	U	<1.1	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.82	U	<0.97	U	<0.81	U	**2.20**	J
Acetone	340,000	1,000,000	100,000,000	6,100,000	<11	U	<13	U	<11	U	<2.2	U	**25.1**		<2.9	U	**7.1**	J	<1.8	U	<210	U	<2	U	**154**	J	<1.9	U	<220	U	<8.2	U	<53	U	<8.1	U	<9.8	U
Benzene	6,000	10,000	2,000	1,200	<1.1	U	<1.3	U	**0.98**	J	<0.33	U	<0.31	U	<0.44	U	**2.2**	J	<0.27	U	<33	U	<0.3	U	<19	U	<0.29	U	<34	U	<0.82	U	**0.57**	J	**0.78**	J	**0.92**	J
Bromodichloromethane	10,000	17,000	17,000	290	<0.9	U	<1	U	<0.87	U	<0.25	U	<0.23	U	<0.33	U	<0.31	UJ	<0.21	U	<25	U	<0.23	U	<15	U	<0.22	U	<26	U	<0.65	U	<0.77	U	<0.65	U	<0.78	U
Carbon disulfide	65,000	190,000	55,000	77,000	<1.1	U	<1.3	U	<1.1	U	<0.3	U	<0.28	U	<0.39	U	**2.9**	J	<0.24	U	<29	U	<0.27	U	<17	U	<0.26	U	<30	U	<0.82	U	<0.97	U	<0.81	U	<0.98	U
Ethylbenzene	200,000	200,000	200,000	5,800	<1.1	U	**1.00**	J	<1.1	U	<0.36	U	<0.34	U	<0.48	U	<0.45	UJ	<0.3	UJ	<35	U	<0.33	U	<21	U	<0.32	U	<37	U	**0.70**	J	**1.50**	J	**3.80**	J	**3.00**	J
Isopropylbenzene (Cumene)	30,000	87,000	240,000	190,000	<1.1	U	<1.3	U	<1.1	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.82	U	<0.97	U	**3.00**	J	<0.98	U
m-Xylene	N/A	N/A	N/A	55,000	<2.3	U	<2.5	U	<2.2	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<1.6	U	<1.9	U	**1.70**	J	**1.20**	J
Methyl ethyl ketone (2-Butanone)	5,500,000	19,000,000	6,000,000	2,700,000	<7.2	U	<8.1	U	<7	U	<1.9	U	<1.8	U	<2.5	U	<2.4	UJ	<1.6	U	<190	U	<1.7	U	<110	U	<1.7	U	<200	U	<5.2	U	**11.00**	J	<5.2	U	<6.3	U
Methyl isobutyl ketone (4-methyl-2-pentanone)	1,700,000	9,000,000	4,500,000	3,300,000	<11	U	<13	U	<11	U	<0.79	U	<0.73	U	<1	U	<0.98	UJ	<0.65	U	<77	U	<0.71	U	<46	U	<0.7	U	<81	U	<8.2	U	<9.7	U	<8.1	U	<9.8	U
Methylene Chloride (Dichloromethane)	97,000	158,000	158,000	35,000	<3.6	U	<4	U	<3.5	U	<0.22	U	<0.2	U	<0.29	U	<0.27	UJ	**4**	J	<21	U	<0.2	U	<13	U	<0.19	U	<22	U	<2.6	U	<3.1	U	<2.6	U	<3.1	U
n-Butylbenzene	30,000	92,000	N/A	390,000	<1.1	U	<1.3	U	<1.1	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.82	U	<0.97	U	<0.81	U	**1.50**	J
p-Isopropyl Toluene	N/A	N/A	N/A	N/A	<1.1	U	<1.3	U	<1.1	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.82	U	<0.97	U	<0.81	U	<0.98	U
Propylbenzene (n-propylbenzene)	30,000	93,000	200,000	380,000	<1.1	U	<1.3	U	<1.1	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.82	U	<0.97	U	**4.60**	J	**3.70**	J
sec-Butylbenzene	25,000	70,000	N/A	780,000	<1.1	U	<1.3	U	<1.1	U	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		<0.82	U	<0.97	U	<0.81	U	<0.98	U
Tetrachloroethene	72,000	131,000	131,000	8,100	<1.1	U	<1.3	U	<1.1	U	<0.14	U	**0.6**	J	<0.19	U	<0.18	UJ	<0.12	UJ	<14	U	<0.13	U	<8.2	U	<0.13	U	<14	U	<0.82	U	<0.97	U	<0.81	U	<0.98	U
Toluene	107,000	305,000	215,000	490,000	<1.3	UJ	<1.3	U	<1.6	UJ	<0.28	U	<0.26	U	<0.37	U	<0.35	UJ	<0.23	U	<28	U	<0.26	U	<17	U	<0.25	U	<29	U	<0.82	U	<1.5	U	<2.1	UJ	<1.9	UJ
Xylene, Total	45,000	130,000	353,000	58,000	<1.1	U	<1.3	U	**0.71**	J	<0.46	U	<0.42	U	**0.64**	J	<0.57	UJ	<0.38	UJ	<45	U	<0.41	U	<27	U	<0.4	U	<47	U	<0.82	U	<0.97	U	**1.70**	J	**1.20**	J
All Other Analytes	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Total Petroleum Hydrocarbons-Diesel Range Organics by WI95 (mg/kg)																																						
TPH - Diesel Range Organics (C10-C28)	N/A	N/A	N/A	N/A	<1.3	U	**260**	J	**66**		**18.9**		**20.0**		<1.8		<3.5		**9.59**		**143**	J	<3.2		**6.30**		<1.6		**1050**	J	**0.68**	J	**2.00**	J	**2.10**	J	**1.50**	J
TPH - Diesel Range Organics (>C28)	N/A	N/A	N/A	N/A	<1.3	U	**260**	J	**66**		**16.7**		**22.4**		N/A		N/A		**3.55**		N/A		N/A		N/A		N/A		**10.3**	J	**0.68**	J	**2.00**	J	**2.10**	J	**1.50**	J
Total Petroleum Hydrocarbons-Gasoline Range Organics by WI95 (mg/kg)																																						
TPH - Gasoline Range Organics (C6-C10)	N/A	N/A	N/A	N/A	<1.7	U	<1.4	U	<1.4	U	<5		<5.6		<7.1		<11		<11		**367**		<8.4		**78.9**		<4.9		**48.9**		<1.4	U	<1.3	U	**5.10**		**7.60**	

Table 1
Historical Soil Analytical Results Summary
RW011, CD012 and TU014 AOCs
133rd Airlift Wing, Minnesota Air National Guard
Minneapolis - St. Paul International Airport
Minneapolis, Minnesota
3 of 3

Notes:

AOC - Area of Concern
bgs - below ground surface
µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
MPCA - Minnesota Pollution Control Agency
N/A - not available
ND - non-detect
RSL - Regional Screening Level
SRV - Soil Reference Value
SW - Solid Waste
TPH - Total Petroleum Hydrocarbons
USEPA - United Stated Environmental Protection Agency

Data Qualifier Symbols:

U - Compound was analyzed for but not detected
J - Estimated value

Bolded numbers represent detections above the minimum detection limit.
Represents a criteria exceedance
Benzo(a)pyrene Equivalent calculated per MPCA method (Including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene).

Table 2
Historical Groundwater Analytical Results Summary
RW011, CD012 and TU014 AOCs
133rd Airlift Wing, Minnesota Air National Guard
Minneapolis - St. Paul International Airport
Minneapolis, Minnesota
1 of 1

Parameter / Boring ID / Location AOC / Depth (ft BTOC) / Sample Date	MDH HRL	USEPA Tapwater RSL	USEPA Ground-water MCL	USEPA Lifetime Health Advisory	USEPA Lifetime Health Advisory (Noncancer)	RW011-MW1 RW-011 19.0 07/30/2014		RW011-MW1 RW-011 19.0 07/30/2014		CD012-MW1 CD-012 19.0 07/30/2014		CD012-MW2 CD-012 21.0 07/31/2014		CD012-MW2 CD-012 21.0 07/31/2014		CD012-MW3 CD-012 21.0 07/31/2014		TU014-MW1 TU014 10.0 07/31/2014		TU014-MW2 TU014 10.0 07/31/2014		TU014-MW3 TU014 11.0 01/08/2014	
Polynuclear Aromatic Hydrocarbons by USEPA SW-846 Method 8270 (µg/L)																							
2-Methylnaphthalene	N/A	3.6	N/A	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	<0.011	U	<0.01	U
Acenaphthene	400	53	N/A	N/A	N/A	<0.02	U	<0.02	U	<0.02	U	<0.019	U	<0.02	U	<0.019	U	<0.02	U	<0.022	U	**0.43**	J
Anthracene	2,000	180	N/A	N/A	N/A	<0.02	U	<0.02	U	<0.02	U	<0.019	U	<0.02	U	<0.019	U	<0.02	U	<0.022	U	<0.021	U
Benzo(a)anthracene	N/A	0.012	N/A	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	**0.041**	J	<0.01	U
Benzo(a)pyrene	N/A	0.0034	N/A	0.2	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	**0.032**	J	<0.01	U
Benzo(a)pyrene Equivalent	N/A	N/A	N/A	0.2	N/A	<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		**0.045**		**0.000**	
Benzo(b)fluoranthene	N/A	0.034	0.2	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	**0.049**	J	<0.01	U
Benzo(g,h,i)perylene	N/A	N/A	N/A	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	**0.021**	J	<0.01	U
Benzo(k)fluoranthene	N/A	0.34	N/A	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	**0.019**	J	<0.01	U
Chrysene	N/A	3.4	N/A	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	**0.055**	J	**0.0081**	J
Fluoranthene	300	80	N/A	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	**0.0072**	J	<0.0099	U	<0.0095	U	**0.011**	J	**0.095**	J	**0.110**	
Fluorene	300	29	N/A	N/A	N/A	<0.02	U	<0.02	U	<0.02	U	<0.019	U	<0.02	U	<0.019	U	<0.02	U	<0.022	U	**0.32**	J
Indeno(1,2,3-cd)pyrene	N/A	0.034	N/A	N/A	N/A	<0.02	U	<0.02	U	<0.02	U	<0.019	U	<0.02	U	<0.019	U	<0.02	U	**0.017**	J	<0.021	U
Naphthalene	300	0.17	N/A	N/A	100	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	<0.01	U	<0.011	U	<0.01	U
Phenanthrene	N/A	N/A	N/A	N/A	N/A	<0.012	U	<0.012	U	<0.012	U	**0.011**	J	**0.011**	J	<0.011	U	**0.017**	J	**0.016**	J	<0.012	U
Pyrene	200	12	N/A	N/A	N/A	<0.0099	U	<0.0098	U	<0.0098	U	<0.0097	U	<0.0099	U	<0.0095	U	**0.0087**	J	**0.093**	J	**0.160**	
All Other Analytes	Various	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Semi-Volatile Organic Compounds by USEPA SW-846 Method 8270 (µg/L)																							
3 & 4-Methylphenol	30	93	N/A	N/A	N/A	<1.1	U	<0.98	U	<1.1	U	<0.99	U	<0.95	U	<1	U	<1.1	U	<1.1	U	<1	U
4-Methylphenyl	3	190	N/A	N/A	N/A	<1.1	U	<0.98	U	<1.1	U	<0.99	U	<0.95	U	<1	U	<1.1	U	<1.1	U	<1	U
Benzyl Alcohol	N/A	200	N/A	N/A	N/A	<1.1	U	<0.98	U	<1.1	U	**0.42**	J	**0.30**	J	**0.69**	J	<1.1	U	<1.1	U	<1	U
Dibenzofuran	20	0.79	N/A	N/A	N/A	<1.1	U	<0.98	U	<1.1	U	<0.99	U	<0.95	U	<1	U	<1.1	U	<1.1	U	<1	U
Isophorone	100	78	N/A	400	100	<1.1	U	<0.98	U	<1.1	U	<0.99	U	<0.95	U	<1	U	<1.1	U	**0.37**	J	<1	U
All Other Analytes	Various	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Volatile Organic Compounds by USEPA SW-846 Method 8260 (µg/L)																							
1,2,4-Trimethylbenzene	100	1.5	N/A	N/A	N/A	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	**0.460**	J
1,3,5-Trimethylbenzene	100	12	N/A	N/A	N/A	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	**0.230**	J
Chloroform	30	0.22	80	N/A	70	<0.2	U	<0.2	U	**0.210**	J	**0.210**	J	**0.290**	J	**0.230**	J	<0.2	U	<0.2	U	<0.2	U
Ethylbenzene	50	1.5	700	N/A	700	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	**0.160**	J
Isopropylbenzene	300	45	N/A	N/A	N/A	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	**0.210**	J
m-and/or p-Xylene	300	19	N/A	N/A	N/A	<0.8	U	<0.8	U	<0.8	U	<0.8	U	<0.8	U	<0.8	U	<0.8	U	<0.8	U	<0.8	U
n-Butylbenzene	N/A	100	N/A	N/A	N/A	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U
p-Isopropyl Toluene	N/A	N/A	N/A	N/A	N/A	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U
Propylbenzene	N/A	66	N/A	N/A	N/A	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U	<0.2	U
sec-Butylbenzene	N/A	200	N/A	N/A	N/A	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	<0.4	U	**0.170**	J
Xylene, Total	300	19	10,000	N/A	N/A	<1.6	U	<1.6	U	<1.6	U	<1.6	U	<1.6	U	<1.6	U	<1.6	U	<1.6	U	**0.220**	J
All Other Analytes	Various	Various	Various	Various	Various	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Total Petroleum Hydrocarbons-Diesel Range Organics by WI95 (mg/L)																							
TPH - Diesel Range Organics	N/A	N/A	N/A	N/A	N/A	<60	U	<64	U	<61	U	<78	U	<85	U	<91	U	<170	U	**1100**		**490**	
Total Petroleum Hydrocarbons-Gasoline Range Organics by WI95 (mg/L)																							
TPH - Gasoline Range Organics	N/A	N/A	N/A	N/A	N/A	<100	U	<100	U	<100	U	<100	U	<100	U	<100	U	<100	U	**4500**		**150**	

Notes

AOC - Area of Concern
BTOC - Below top of casing
ft - Feet
HRL - Health Risk Limits
ID - Identification
MCL - Maximum Contaminant Level
MDH - Minnesota Department of Health
TPH - Total Petroleum Hydrocarbons
µg/L - microgram per liter
mg/L - milligram per liter
N/A - Not available
ND - non-detect
RSL - Regional Screening Levels
USEPA United States Environmental Protection Agency

Data Qualifier Symbols:

J Estimated value
U Compound was analyzed for but not detected

Bolded numbers represent detections above the minimum detection limit.
Represents a criteria exceedance

Benzo(a)pyrene Equivalent calculated per MPCA method (Including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene).
All original laboratory qualifiers can be found in the laboratory-generated data report found in Appendix C.
All data validation qualifiers can be found in the validation data report found in Appendix C.

APPENDIX A

MPCA APPROVAL LETTER

James H. King, Jr.
Environmental Restoration Program Manager
Air National Guard Readiness Center/National Guard Bureau - NGB/
james.h.king34.civ@mail.mil

RE: Report Approval - Final Remedial Investigation/Feasibility Studies Report – Minneapolis-St. Paul International Airport, Minneapolis, Minnesota July 2020
Report Approval – No Further Response Action Planned Decision Document December 2019
Site: Air National Guard – Minneapolis-St. Paul International Airport,
Site ID#: IR0000001

Dear Mr. King:

Minnesota Pollution Control Agency staff has reviewed and approved the reports listed above. The following comments are provided to clarify the path forward:

1. The current contract is ending and ANG intends to hire a new consultant. The revised recommendations listed in the Final Remedial Investigation report will be subject to review by the new consultant.
2. Upon selection of a new consultant provide contact information to MPCA staff.
3. After review the new consultant can notify MPCA if they intend to proceed with Groundwater and Free Product Extraction via Vacuum Truck plus MNA.
4. If they proceed with Groundwater and Free Product Extraction via Vacuum Truck plus MNA then the new consultant can review MPCA Guidance document 2-02 “Light Non-Aqueous Phase Liquid Management Strategy (7/2010)” and submit MPCA Guidance Document 2-03 “Light Non-Aqueous Phase Liquid Recovery Report” within 60 days.
5. No further action is required at sites RW011, CD012 and TU014.

Thank you for your cooperation with the MPCA to protect public health and the environment. If you have any questions regarding this letter, please contact me at jim.mccann@state.mn.us.

Sincerely,

James McCann
Project Manager
Petroleum Remediation & Redevelopment Section
Remediation Division

ec: saamih.bashir@woodplc.com