Decision Document

SS047 (Nike Site Summit)
Joint Base Elmendorf-Richardson, Alaska

Final

Prepared By

United States Air Force

JOINT BASE ELMENDORF-RICHARDSON, ALASKA

September 2017

Table of Contents

List of Tables

List of Figures

Acronyms and Abbreviations

°F	degrees Fahrenheit
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
amsl	above mean sea level
Army	U.S. Army
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	chemical or contaminant of concern
COPC	chemical of potential concern
DRO	diesel range organics
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
FS	Feasibility Study
HHERA	human health and ecological risk assessment
HHRA	human health risk assessment
HI	Hazard Index
IC	institutional control
ILCR	incremental lifetime cancer risk
JBER	Joint Base Elmendorf-Richardson
JBER-R	JBER-Richardson
LSS	Lower Site Summit
LUC	land use control
mg/kg	milligram(s) per kilogram
NRHP	National Register of Historic Places
PAH	polynuclear aromatic hydrocarbon
PA/SI	Preliminary Assessment and Site Inspection
PHC	petroleum hydrocarbon
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
RRO	residual range organic
RRS	Radio Relay Station
SARA	Superfund Amendments and Reauthorization Act of 1986
SFS	Supplemental Feasibility Study
SVOC	semi-volatile organic compound
USAF	U.S. Air Force
USS	Upper Site Summit
UST	underground storage tank
VOC	volatile organic compound

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1.0 INTRODUCTION

This Decision Document presents the selected remedies for petroleum contamination at SS047 on Joint Base Elmendorf-Richardson (JBER), Alaska. The selected remedies were chosen in accordance with Alaska Administrative Code (AAC) Title 18, Chapter 75 (18 AAC 75), *Oil and Other Hazardous Substances Pollution Control* (as amended through July 1, 2017). The U.S. Air Force (USAF) is managing remediation of petroleum-related contamination at SS047 in accordance with State laws and regulations.

The Alaska Department of Environmental Conservation (ADEC) agrees that the selected remedies, when properly implemented, comply with State law. The USAF will be responsible for implementing, maintaining, monitoring, reporting, and enforcing the remedial actions identified for the duration of the remedies selected in this Decision Document.

1.1 SITE NAME AND LOCATION

Facility Name:	Fort Richardson, Alaska – U.S. Army (Army) (currently known as JBER-Richardson [JBER-R])
Site Name and Location:	SS047 – Nike Site Summit, JBER, Alaska
Global Positioning System Coordinates:	Latitude: 61.257919 Longitude: -149.528563
Contaminated Site Hazard ID:	2775
ADEC Regulatory Authority:	Oil and Other Hazardous Substances Pollution Control (18 AAC 75, Article 3)

1.2 SITE DESCRIPTION

Fort Richardson, currently known as JBER-R, is located in south-central Alaska, adjacent to the cities of Anchorage and Eagle River. The Knik Arm of Cook Inlet borders the north and west sides of the installation; Chugach State Park lies to the south and southeast; the community of Eagle River lies along the eastern border; and the Municipality of Anchorage forms the southwest boundary. JBER, which comprises the former Elmendorf Air Force Base (JBER-E) and JBER-R, encompasses 73,272 acres – with elevations ranging from sea level along the Knik Arm shoreline to 3,900 feet above mean sea level (amsl) in the Chugach Mountains.

SS047 is located approximately 12.5 miles east of Anchorage, Alaska, near the eastern boundary of JBER, where JBER borders with the Chugach State Park (**Figure 1-1**). SS047 is on a ridgeline in the Chugach Mountains, adjacent to Mount Gordon Lyon, and covers approximately 244 acres.

Access to SS047 is along an approximately 1.5-mile gated, gravel road beginning at Arctic Valley Road (**Figure 1-2**). Access to and use of SS047 requires coordination with JBER range control, because the access road and portions of SS047 itself are within an active firing range. The area is also used for military training that can take precedence over other activities.

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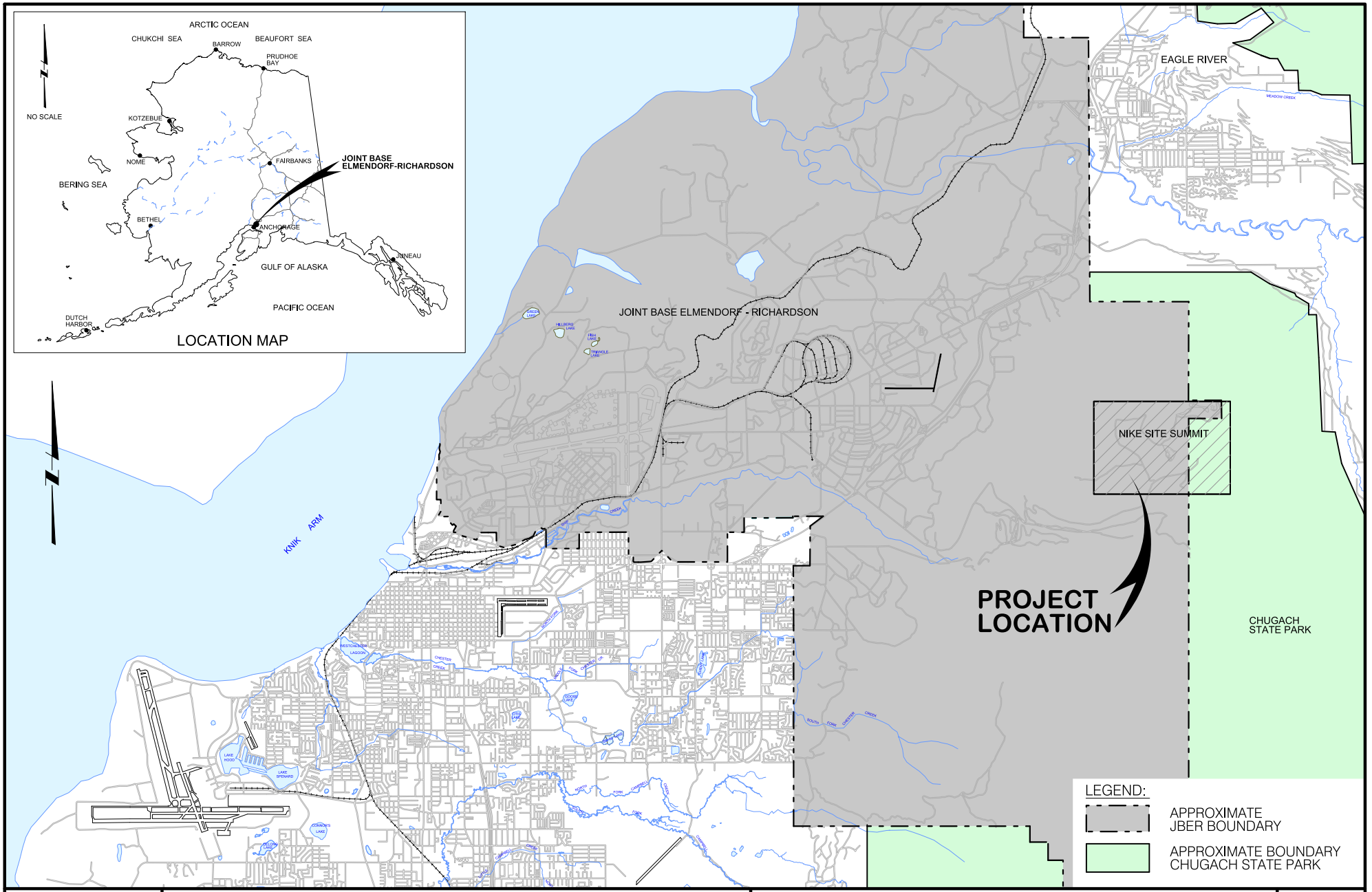
TIME: 26-APR-2017 11:34 FILE: C:\D\CAD\Proj\AFCEC\2016-2017 JBER-Nike Site Summit (10505394)_185750655\2017 SS047 Decision Document\draft - April 2017\FIG 1-1 - Location map.dgn



SCALE IN MILES
0 1

JOINT BASE ELMENDORF-RICHARDSON, ALASKA
NIKE SITE SUMMIT

SS047 DECISION DOCUMENT

LOCATION AND VICINITY MAP

FIGURE
1-1

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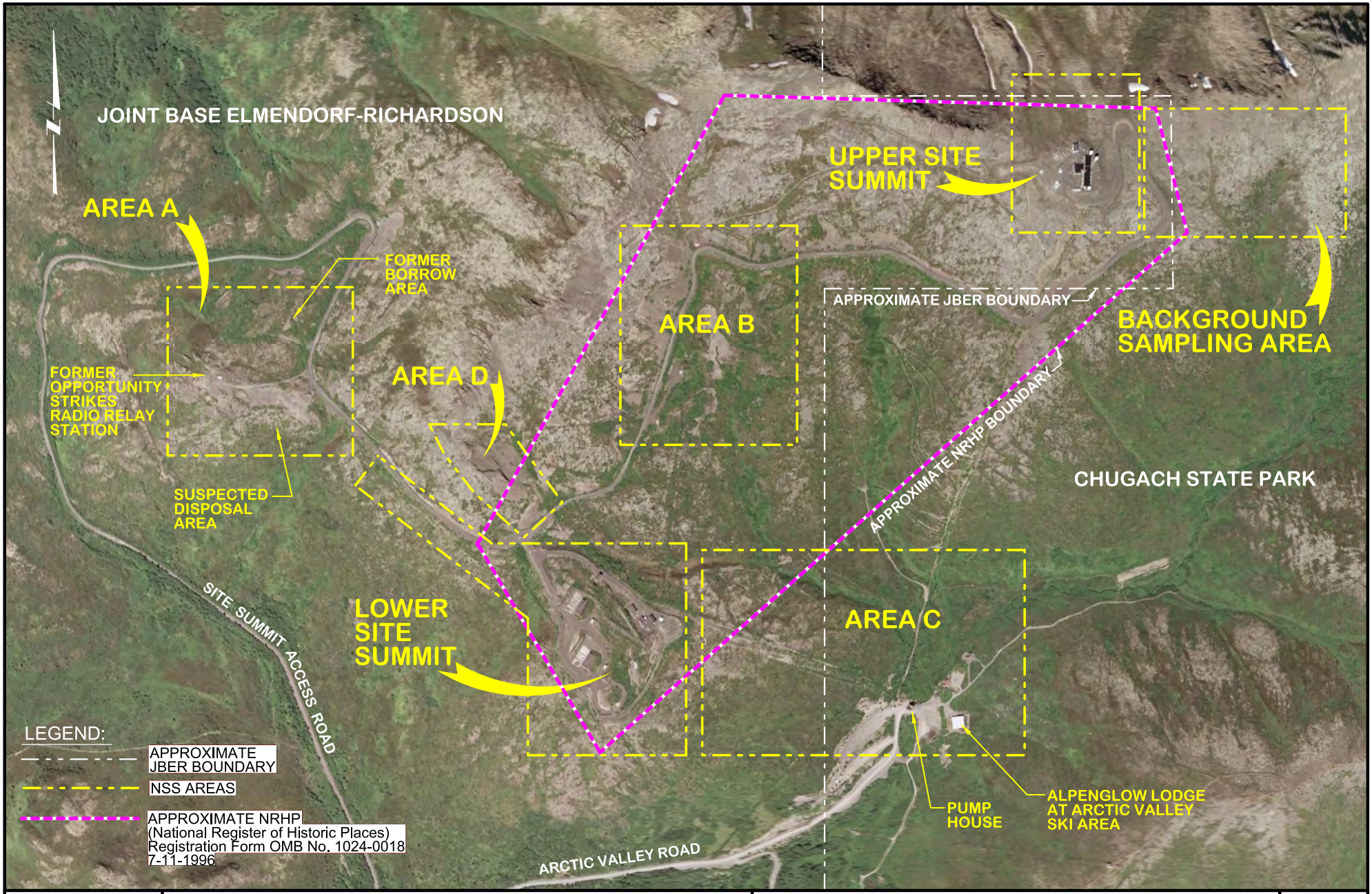
TIME: 26-APR-2017 11:36 FILE: C:\D\CAD\Proj\AFCEC\2016-2017 JBER-Nike Site Summit (10505394)_185750655\2017 SS047 Decision Document\draft - April 2017\FIG 1-2 - Area map.dgn



APPROXIMATE SCALE IN FEET
0 500

JOINT BASE ELMENDORF-RICHARDSON, ALASKA
NIKE SITE SUMMIT

SS047 DECISION DOCUMENT

SS047 AREA MAP

FIGURE
1-2

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2.0 SITE BACKGROUND

SS047 is also known as Nike Site Summit, which was used as a Nike Hercules missile site and was in operation from 1959 to 1979. This ground-based defensive system provided protection to Fort Richardson, Elmendorf Air Force Base, and the City of Anchorage against aerial attack during the Cold War. In the event of an aerial attack, guided missiles would be fired to destroy incoming aircraft.

Multiple Nike sites were built in rings around areas in need of defense and would have deployed armed missiles to destroy attacking aircraft formations. Army soldiers under the Army Air Defense Command operated Nike Hercules batteries around the clock. Each battery required a minimum of 125 soldiers to operate the system, provide security, and support those living on site.

Alaska had eight Nike sites, with five batteries in Fairbanks and three in Anchorage. Several unique design features were employed in Alaska to accommodate the severe weather. Retractable clamshell covers were built over the radar for sheltered maintenance and periodic deicing. The launch buildings were built above ground, and the housing complex and integrated fire control functions were combined in one building.

Nike Site Summit was built atop a mountain, which required blasting of the mountain to build level areas that were used for barracks and maintenance shops at Upper Site Summit (USS) and for the missile launch pads and facilities at Lower Site Summit (LSS). Crushed bedrock was used as a road bed. Blasting was also required to install underground storage tanks (USTs).

Alaska was one of the few states in the country that practiced live missile firings. Nike Site Summit hosted the Annual Service Practice for Anchorage area batteries from 1960 to 1964, when population growth rendered the exercise unsafe. In 1979, the Army deactivated this site and removed all sensitive equipment.

In 1994, the Alaska State Historic Preservation Office (SHPO) nominated Nike Site Summit for listing on the National Register of Historic Places (NRHP) due to its significance during the Cold War Era. Nike Site Summit was placed on the NRHP in 1995 (NRHP, 1996).

In 2007, the Army conducted an Environmental Assessment to determine the best management of the historic facilities at Nike Site Summit in relation to demolition and preservation with respect to its NRHP status (U.S. Army, 2007). Approximately 244 acres, of which approximately 180 acres are located within JBER, are a part of the NRHP Historical Area (U.S. Army, 2007).

2.1 ENVIRONMENTAL SETTING

2.1.1 Physiography and Climate

SS047 is located on a ridgeline in the Chugach Mountains at the 2,500- to 3,900-foot elevations. SS047 has a subarctic climate with strong maritime influences. Site temperatures vary from minus 13 degrees Fahrenheit (ºF) in the winter to 80ºF in the summer. The average annual total precipitation in the Anchorage Bowl is 16.08 inches of rainfall and 70.5 inches of snowfall.

Average annual snowfall at the Arctic Valley Ski Area, adjacent to SS047, is approximately 250 inches. Conditions at SS047 include high wind velocity, high levels of snowfall, and low annual temperatures.

2.1.2 Geology

SS047 lies atop the western edge of the Front Range of the Chugach Mountains, Anchorage, Alaska. Surface materials are dense, with outcroppings of bedrock, hornfels, talus, and rocky gravelly soil. Surficial materials are dense in areas that have been undisturbed. Many areas at SS047 contain gravel building pads that were constructed by leveling and spreading local terrain, as well as using materials obtained from borrow sources at Areas A and D.

2.1.3 Hydrogeology and Groundwater Use

Subsurface hydrology at SS047 is limited to information gathered during the remedial investigation (RI) performed in the summer and fall of 2010 and 2011. The results of the RI are summarized in the *RI Report, Remedial Field Investigation, Volume 2 of 3* (USAF, 2012b). Groundwater conditions at SS047 were also evaluated as part of the Supplemental Feasibility Study (SFS; USAF, 2015).

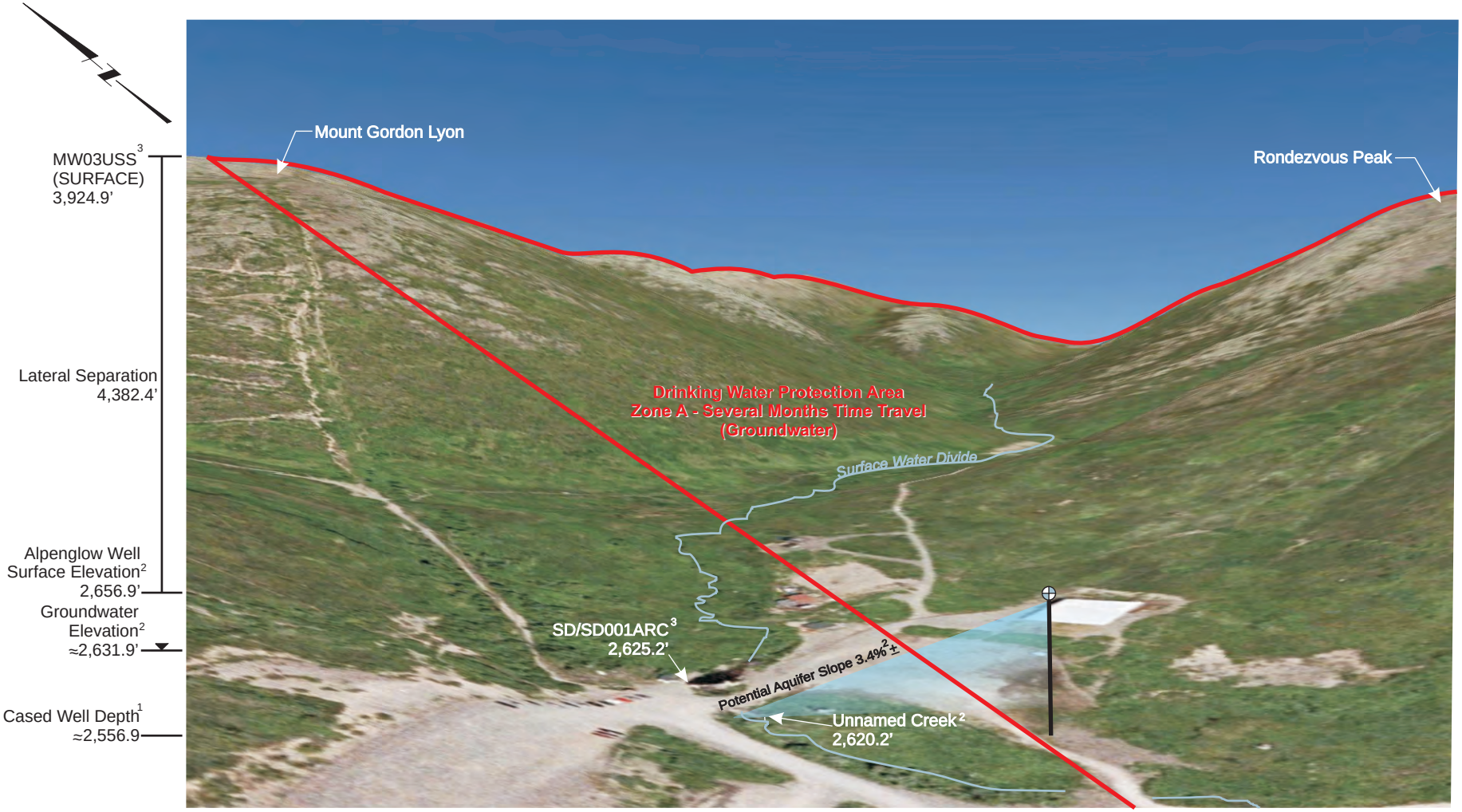
Small quantities of perched water were identified in bedrock excavations at USS and were classified as groundwater in the RI. However, this water was later reclassified as "pit water," which is a direct result of precipitation, either rainfall or snowmelt, at USS. Groundwater at LSS was considered a drinking water source in the RI; however, due to "insufficient yield" it has been reclassified and is no longer considered a drinking water source. Based on an informal dispute resolution (USAF et al., 2014), the *Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy, June 1998*, were used to reclassify groundwater at LSS as Class IIIA – insufficient yield.

A public well located approximately 15 feet north-northwest of the Alpenglow Lodge at Arctic Valley Ski Area, shown on **Figure 2-1**, is upslope from the lodge and known to have water present at 20 feet below ground surface (bgs). The Alpenglow Well, by the nature of its location, cannot be in contact with runoff or groundwater originating from SS047. Water originating from SS047 is hydraulically separate from the shallow aquifer in which the Alpenglow Well is situated. Additionally, the Alpenglow Well is both upslope and upgradient of the surface water/ groundwater divide created by the valley between SS047 and Alpenglow Lodge; therefore, there is no potential for hydraulic connectivity between water originating from SS047. The Alpenglow Well is not indicative of groundwater conditions at SS047, because the well lies just above the toe of the valley floor rather than atop bedrock mountain peaks. No other drinking water wells are known to exist in the vicinity of SS047.

2.1.4 Surface Water Hydrology

Surface drainage from SS047 leads directly downslope and predominately towards an unnamed tributary of Ship Creek, which lies between SS047 and the Arctic Valley Ski Area ridgeline. The

FILE: S:\CAD\Proj\AFCEC\2016-2017 JBER-Nike Site Summit (10505394)_185750655\2017 SS047 Decision Document\draft-April 2017\Fig 2-1.cdr



NOTES:

1 PUBLIC WATER SYSTEM # 217908
WELL LOG INFORMATION FROM
PENN JERSEY DRILLING COMPANY
SEPTEMBER 1972.

2 GROUNDWATER AQUIFER PLAN AND PROFILE
FROM HAWTHORNE ENGINEERING, 7/9/1992.

3 NIKE SITE SUMMIT SAMPLE ELEVATIONS
2010 REMEDIAL FIELD INVESTIGATION
9/13-14/2010

4 ZONE A - DRINKING WATER PROTECTION AREA - Alaska Department of Environmental Conservation
http://map.dec.state.ak.us/ArcGIS/rest/services/EH/DWP_Drinking_Water_Protection_Area_ArcGISOnline/MapServer

NO SCALE	JOINT BASE ELMENDORF-RICHARDSON, ALASKA NIKE SITE SUMMIT SS047 DECISION DOCUMENT	ALPENGLOW WELL - RELATIVE DISTANCES FROM UPPER SITE SUMMIT	FIGURE 2-1 10505394.64010404

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only known surface water body at SS047 consists of a ponded area at Area C. The pond forms behind a weir that was installed in an unnamed tributary of Ship Creek to provide water for SS047 during its operative years. The tributary and pond collect seasonal surface snowmelt and precipitation runoff from the watershed between Mount Gordon Lyon and Rendezvous Peak.

2.1.5 Ecological Setting

The predominant vegetation at SS047 includes lichens, mosses, low shrubs and berries (including blueberry, crowberry, bearberry, and lingon berry), and herbaceous plants. In the deeper swales and gullies, there are likely to be low, dense-forming willows and small trees. No special status plants are known to exist at SS047.

A variety of herbivorous, carnivorous, or omnivorous birds and mammals occur in the vicinity of SS047. Ecological species present at SS047 include, but are not limited to, the following: ptarmigan (*Lagopus* sp.), water pipit (*Anthus spinoletta*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), Dall sheep (*Ovis dalli*), brown bear (*Ursus arctos*), black bear (*Ursus americanus*), coyote (*Canis latrans*), wolf (*Canis lupus*), shrews (*Sorex* sp.), and voles (*Microtus* sp.). A more detailed appraisal of SS047 ecology is provided in the *Nike Site Summit RI Report, Human Health and Ecological Risk Assessment Report, Volume 3 of 3* (USAF, 2012c).

2.2 SOURCES OF CONTAMINATION

Contamination at SS047 is the result of past military operations and formerly acceptable disposal practices. Activities that may have resulted in releases at SS047 include the following: fuel and solvent disposal practices associated with vehicle and missile maintenance, missile storage, uncontrolled spills and leaks emanating from maintenance of missiles, explosives storage, septic systems, and spills and leaks from USTs (gasoline and diesel) and aboveground heating oil tanks.

SS047 consists of the following six source areas, as shown on Figure 1-2:

- USS – Former Battery Control Area, currently housing several active commercial antennas.
- LSS – Former Missile Launch Area.
- Area A – Former Opportunity Strikes Radio Relay Station (RRS), a Former Borrow Area, and a Suspected Disposal Area.
- Area B – High Explosive and Guided Missile Magazines.
- Area C – Pump House.
- Area D – Former Borrow Area.

2.3 AFFECTED MEDIA

The only contaminated medium identified at SS047 is soil. Contaminants at SS047 include those regulated under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), as well as petroleum hydrocarbons (PHCs) that are excluded from the CERCLA regulation. This Decision Document addresses only the non-CERCLA contaminants identified at SS047. CERCLA Section 101(14) excludes petroleum, meaning "crude oil or any fraction

thereof," from the definition of hazardous substance. The U.S. Environmental Protection Agency (EPA) interprets this to include hazardous substances that are normally mixed with or added to crude oil or crude oil fractions during the refining process. Although excluded from the CERCLA regulation, contamination caused by PHCs (oil) is regulated under 18 AAC 75, *Oil and Other Hazardous Substances Pollution Control* (ADEC, 2017).

At SS047, CERCLA and non-CERCLA contaminants were identified in soil at Areas USS and LSS; non-CERCLA contaminants only were identified at Areas A and C; and no contamination was identified at Areas B and D. The remedies under CERCLA documented in the Record of Decision (ROD) for each area are as follows: No Further Action for Areas B and D; No Action under CERCLA for Areas A and C; and remedial actions at USS and LSS to address CERCLA contamination.

This Decision Document addresses the four areas within SS047 where non-CERCLA contaminants have been identified. A summary of the non-CERCLA contaminants of concern (COCs) and the affected media at these four areas is:

- USS: Polynuclear aromatic hydrocarbons (PAHs) are present at concentrations above cleanup levels in surface and subsurface soil.
- LSS: PAHs and residual range organics (RRO) are present at concentrations above cleanup levels in surface and subsurface soil.
- Area A: Diesel range organics (DRO) and RRO are present at concentrations above cleanup levels in surface and subsurface soil.
- Area C: Benzo(a)pyrene is present at concentrations above cleanup levels in surface soil only.

Therefore, a remedy for cleanup at SS047 is required under 18 AAC 75 to address contaminants in surface and subsurface soil at SS047 that pose a potential risk to human health and the environment.

2.4 PREVIOUS SITE CHARACTERIZATION ACTIVITIES

The following sections briefly summarize the scope and results of two investigations that were completed at SS047 to determine the nature and extent of contamination. Additional, area-specific characterization results for the impacted areas of SS047, as well as descriptions of past remedial actions (i.e., UST removals) were presented in area-specific sections of the Feasibility Study (FS; USAF, 2013). The results of these two investigations were used as a preliminary framework for the FS completed in 2013, which included a baseline human health and ecological risk assessment (HHERA), and the SFS completed in 2015, which included a reassessment of the baseline HHERA included in the 2013 FS.

2.4.1 Preliminary Assessment/Site Investigation

In 1995 and 1996, a limited preliminary assessment and site inspection (PA/SI) was conducted at the six following areas within SS047 (U.S. Army, 1996a, b):

- USS – Former Battery Control Area
- LSS – Former Missile Launch Area
- Area A – Former Opportunity Strikes RRS, a Former Borrow Area, and a Suspected Disposal Area
- Area B – High Explosive and Guided Missile Magazines
- Area C – Pump House
- Area D – Former Borrow Area

The PA/SI was conducted to identify and characterize environmental contamination at SS047 and to evaluate possible environmental impacts from past operations and disposal practices.

Surface soil and surface water samples were collected and analyzed for: DRO, gasoline-range organics (GRO), metals, total petroleum hydrocarbons (TPHs), and volatile organic compounds (VOCs). Based on the analytical results of the soil samples, the PA/SI identified four areas (USS, LSS, Area A, and Area C) for further investigation and two areas (Areas B and D) for No Further Action. Surface water samples collected downgradient from SS047 did not identify potential impacts to the adjacent Ship Creek watershed.

A radiological survey was performed at SS047 with a beta count meter as part of the PA/SI and no radiological materials were detected above background levels (25 to 90 counts per minute). The Guided Missile Magazine was not surveyed due to lack of access to the building (U.S. Army, 1996). Additionally, an explosive wipe sample was collected at SS047 and no explosives were detected (U.S. Army, 2007).

2.4.2 Remedial Investigation

An RI was conducted at SS047 in 2010 and 2011 (U.S. Army, 2010; USAF, 2012a, b). The RI utilized the Triad process and focused on determining the type and scope of contamination at each area of SS047 in accordance with CERCLA, as amended by SARA. The Triad approach emphasizes better investigation preparation (systematic project planning), greater flexibility while performing field work (dynamic work strategies), and real-time measurement technologies, including field-generated data, and provides a framework for the integrated involvement of regulators and stakeholders.

During the RI, field investigations were conducted at USS, LSS, Area A, Area B, Area C, and Area D, as well as one background area. Site histories, known and potential contaminant sources, PA/SI results, and physical characteristics were used to determine sampling locations and analytes at each area. Complete details of these sampling activities and analytical results are provided in the *Nike Site Summit Remedial Investigation Report, Analytical Data* (Volume 1 of 3) and *Nike Site Summit Remedial Investigation Report, Remedial Field Investigation* (Volume 2 of 3) (USAF, 2012a and 2012b, respectively).

The results of the surface (0 to 2 feet bgs) and subsurface soil (greater than 2 feet bgs) samples, subsurface water samples (USS and LSS only), and surface water samples (Area C only) confirmed the results of the PA/SI and provided additional information on the nature and extent of

contamination at SS047. The RI identified CERCLA COCs in soil at USS and LSS and non-CERCLA COCs in soil at USS, LSS, Area A, and Area C. The CERCLA COCs and the non-CERCLA COCs were identified in discrete locations from each other at USS and LSS.

2.5 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USE

JBER is part of the U.S. Department of Defense and is jointly administered by the USAF and Army. There are currently no manned operations at SS047 facilities; however, the area is used by military personnel for various aspects of military training. Access to SS047 is controlled, but trespass onto the property has been known to occur. There is also recreational use near SS047, as the boundary of JBER in the vicinity of SS047 is adjacent to Chugach State Park.

Arctic Valley Ski Area is located near Area C and access is not restricted to the public. The ski area is utilized by non-military personnel visiting the area recreationally. The Friends of Nike Site Summit maintain structures at both USS and LSS and organize guided tours to the facilities. Several modern commercial communication structures and antennas are located at USS.

As the lead agency, the USAF has the authority to determine the future anticipated land use of SS047. The USAF has determined that the most likely indefinite future land use at these areas is consistent with current land uses. The USAF plans to retain ownership and/or provisional use of all property at SS047 for the foreseeable future.

Land at SS047 is designated in the Base General Plan as training use only, for both current and future use; however, to assess the need for land use controls (LUCs), contamination present at SS047 was assessed for unlimited use/unrestricted exposure (UU/UE) – in particular, residential use.

There is no groundwater at USS and a groundwater assessment conducted as part of the SFS concluded that LSS groundwater does not meet the EPA's classification of a drinking water source due to low yield (USAF, 2015).

3.0 STATEMENT OF BASIS AND PURPOSE

The focus of this Decision Document is on contaminants that are regulated under State law, but are excluded from regulation under CERCLA. CERCLA Section 101(14)) excludes certain substances from the definition of hazardous substance. The CERCLA Petroleum Exclusion Rule substances include petroleum, meaning "crude oil or any fraction thereof." The EPA interprets this to include hazardous substances that are normally mixed with or added to crude oil or crude oil fractions during the refining process. Contamination resulting from spills of heating oil, diesel fuel, jet fuel, and gasoline are excluded from CERCLA, but the State of Alaska has jurisdiction over PHC-contaminated sites. This Decision Document addresses only the action areas within SS047 where non-CERCLA contaminants have been identified as COCs at USS, LSS, Area A, and Area C.

The decisions presented herein are based on the Administrative Record for SS047, a copy of which can be found online (http://afcec.publicadmin-record.us.af.mil/), or at the Alaska Resources Library and Information Services (ARLIS), located at 3211 Providence Drive, Anchorage, Alaska 99508.

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4.0 ASSESSMENT OF THE SITE

This section provides a summary of the risk assessment that was used to evaluate contaminants detected at SS047. This section also identifies the non-CERCLA COCs and establishes cleanup levels for each of them.

4.1 RISK ASSESSMENT

This section summarizes the baseline HHERA, focusing on the chemicals of potential concern (COPCs) at USS, LSS, Area A, and Area C listed in **Table 4-1**, and issues that are the basis for the response actions at SS047. This section does not provide a complete summary of the baseline risk assessment conducted for SS047, but focuses on the information that is driving the need for specific remedial actions described in this Decision Document. Remedial actions driven by risks associated with CERCLA COCs at USS and LSS are presented in a separate ROD.

Table 4-1 SS047 Non-CERCLA COPCs

Analyte	USS		LSS		Area A		Area C
	SO	SB	SO	SB	SO	SB	SO
Polycyclic Aromatic Hydrocarbons (PAHs)							
Benzo(a)anthracene	X	X	X				X
Benzo(a)pyrene	X	X	X	X			X
Benzo(b)fluoranthene	X	X	X				X
Benzo(k)fluoranthene		X	X				
Dibenz(a,h)anthracene	X	X	X				
Indeno(1,2,3-c,d)Pyrene	X	X	X				X
Naphthalene			X	X			
Total Petroleum Hydrocarbons (TPHs)							
Diesel Range Organics (DRO)					X	X	
Residual Range Organics (RRO)			X		X	X	

Key:
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COPC – chemical of potential concern
LSS – Lower Site Summit
SB – subsurface soil
SO – surface soil
USS – Upper Site Summit
X – Analyte selected as a COPC.

A baseline HHERA was performed for SS047 as part of the RI. Details on the original estimated human health and ecological risks and hazards for USS, LSS, Area A, and Area C are presented in the baseline HHERA (USAF, 2012c). The baseline HHERA was revised in accordance with an Informal Dispute Resolution Agreement (USAF et al., 2014) and details on the changes to the risk and hazards at USS and LSS are provided in the SFS (USAF, 2015). There were no changes to

the risks and hazards derived in the baseline HHERA for Area A and Area C. The changes to the risk analysis for USS and LSS include the elimination of the groundwater pathway as a complete exposure pathway, exclusion of areas contaminated by petroleum only from the risk assessment, and updates to risk assumptions for small mammal foraging areas.

4.1.1 Summary of Human Health Risk Assessment

A baseline risk assessment estimates what risks the site poses if no action is taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

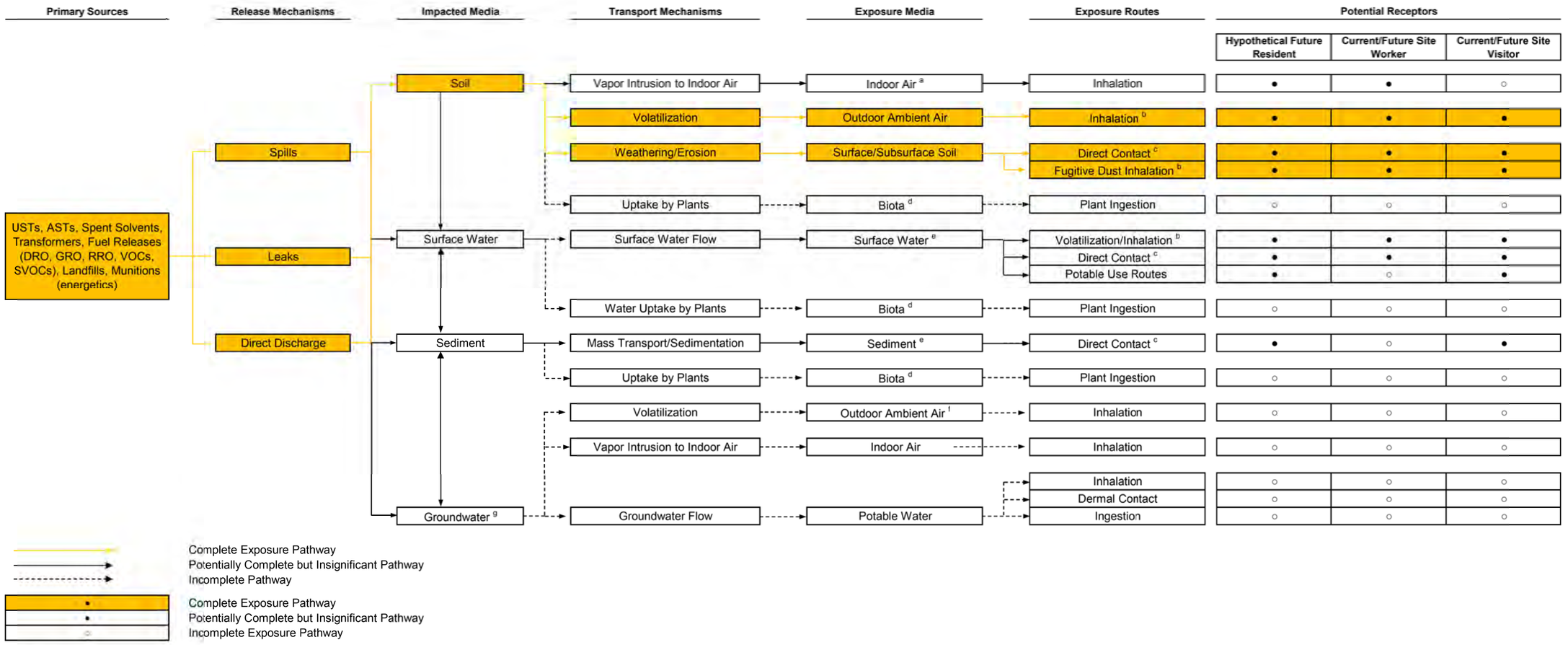
A human health risk assessment (HHRA) estimates the nature and probability of adverse health effects in humans who may be exposed to chemicals in contaminated environmental media – now or in the future. Two measurable outcomes of an HHRA are the incremental lifetime cancer risk (ILCR) and non-cancer hazard index (HI). The ILCR is the likelihood of one additional person, over the national average, to develop cancer from exposure to site contamination. An ILCR criterion of 1×10^{-5} (one person in 100,000) was used for SS047 as required by 18 AAC 75.325(g). The national average of developing cancer is about 1 in 3 people.

The HI expresses the likelihood that exposure to a site contaminant will cause a negative health effect other than cancer. The HI is generated by adding the hazard quotients for all COCs and pathways at a site that affect the same target organ (e.g., liver), or that act through the same mechanism of action within a medium or across all media to which an individual may reasonably be exposed. A HI greater than 1 indicates a potential for a non-cancerous health effect to result from exposure to a contaminant.

A Conceptual Site Model (CSM) was developed to aid in determining reasonable exposure scenarios and pathways based on current and future populations and current and reasonably anticipated future land uses. The populations and exposure pathways that were qualitatively and quantitatively evaluated for USS and LSS are presented in **Figures 4-1** and **4-2**, respectively. Human health CSMs are not provided for Areas A and C, because the SFS determined that all potential exposure pathways at Area A are incomplete and that potentially complete pathways at Area C were insignificant (USAF, 2015).

Receptors quantitatively evaluated in the HHRA for SS047 consisted of site workers, site visitors, and hypothetical future residents. The current land use at SS047 is not anticipated to change; however, future resident was used as a potential receptor to provide a conservative estimate of possible risks. The chemicals, exposure pathways, and populations associated with unacceptable risk are highlighted, because they serve as the primary basis for remedial action.

Human receptors with a potential exposure to surface soil at SS047 include site workers, site visitors, and hypothetical future residents. Site workers/visitors and hypothetical future residents may be exposed to chemicals in soil via direct contact and inhalation pathways. Complete exposure pathways exist at SS047 for all potential human receptors from soil through volatilization and subsequent exposure to outdoor ambient air, as well as weathering/erosion of soil.



Notes:

[a] Modeling of indoor air VOC concentrations from soil VOC concentrations is imprecise, and soil data are not suitable for quantitative vapor intrusion assessment (ADEC, 2009c). Therefore, the soil to indoor air pathway was not quantitatively evaluated.

[b] Nike Site Summit is located on the top of a mountain where wind speeds are consistently high, and it is likely that rapid dispersal in ambient air would prevent significant inhalation exposures. However, the inhalation of volatile contaminants and fugitive dust pathways were conservatively included in the risk and hazard calculations for soil.

[c] Direct Contact means exposure through both incidental ingestion and dermal absorption of soil, sediment, or surface water.

[d] There is little vegetation at Upper Site Summit and it is primarily dominated by mosses and lichens.

[e] No surface water or sediment is present at the Upper Site Summit. However, it is possible for contamination derived from the Upper Site Summit to impact surface water and sediment in off-site locations following transport with groundwater. No COPCs were identified in surface water samples collected downgradient of the Upper Site Summit; therefore, surface water and sediment pathways are assumed to be potentially complete but insignificant.

[f] The groundwater to outdoor ambient air pathway is potentially complete, but insignificant compared to exposure to groundwater derived VOCs in indoor air.

[g] Groundwater at the Upper Site Summit is not present in sufficient quantities to supply a potable water well; however, there is potential for contaminated groundwater derived from the Upper Site Summit to impact surface water at off site locations. The groundwater to surface water pathway was evaluated through analysis of downgradient surface water samples (refer to footnote 'e').

ASTs - Aboveground Storage Tanks
DRO - diesel range organics
GRO - gasoline range organics
RRO - residual range organics
SVOCs - semi volatile organic compounds
VOCs - volatile organic compounds
USTs - Underground Storage Tanks

NO SCALE	JOINT BASE ELMENDORF-RICHARDSON, ALASKA NIKE SITE SUMMIT SS047 DECISION DOCUMENT	UPPER SITE SUMMIT - HUMAN HEALTH CONCEPTUAL SITE MODEL	FIGURE 4-1

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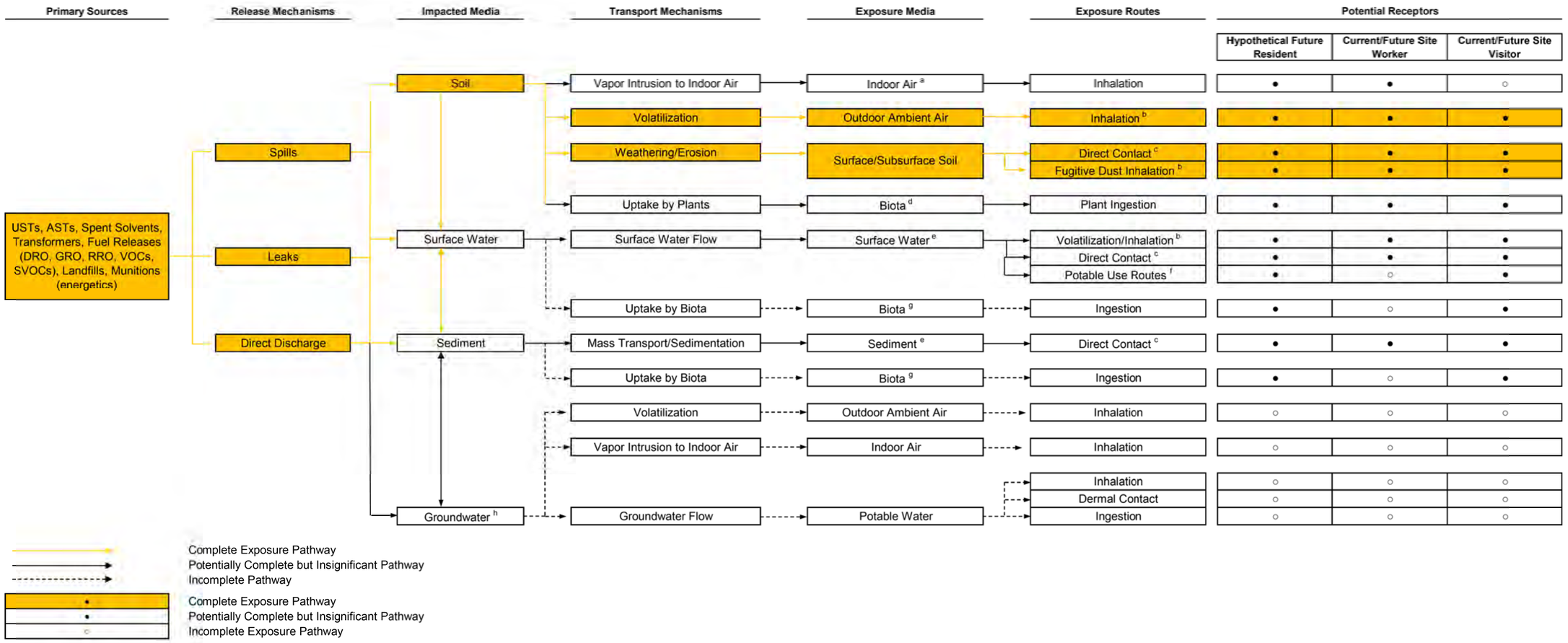

Notes:

[a] Modeling of indoor air VOC concentrations from soil VOC concentrations is imprecise, and soil data are not suitable for quantitative vapor intrusion assessment (ADEC, 2009c). Therefore, the soil to indoor air pathway was not quantitatively evaluated.

[b] Nike Site Summit is located on the top of a mountain where wind speeds are consistently high, and it is likely that rapid dispersal in ambient air would prevent significant exposures. However, the inhalation of volatile contaminants and fugitive dust pathways were conservatively included in the risk and hazard calculations for soil.

[c] Direct Contact means exposure through both incidental ingestion and dermal absorption of soil, sediment, or surface water.

[d] Recreational foraging is frequent at times when berries are growing on the slopes bordering Nike Site Summit, however, berry consumption is assumed to be only a small portion of the diet and this exposure pathway is considered to be complete but insignificant.

[e] Exposures to surface water and sediment is a potentially complete pathway for the pond at Area C and for off-site drainages downgradient of the Nike Site Summit. However, no chemicals detected in samples collected from surface water or sediment at the Area C pond or downgradient drainages were retained for evaluation in the human health risk assessment following screening. Therefore, surface water and sediment exposure pathways are considered to be potentially complete but insignificant.

[f] Potable use routes for surface water in the Area C pond and downgradient off-site drainages include direct consumption by current/future site visitors and hypothetical future residents, and potential pumping of water from the pond at Area C to hypothetical future homes.

[g] No biota were observed in the Area C pond during visual assessments made as part of the 2010 RI. Therefore, consumption of biota from Area C pond is an incomplete pathway. Consumption of biota from downgradient off-site drainages is possible. However, no COPCs were identified in downgradient off-site surface water samples; therefore, biota consumption pathways are assumed to be potentially complete but insignificant.

[h] Groundwater at the Lower Site Summit is present in insufficient yields to serve as a potable water supply; as a result, all groundwater-related exposure pathways at the Lower Site Summit are incomplete.

ASTs - Aboveground Storage Tanks
DRO - diesel range organics
GRO - gasoline range organics
RRO - residual range organics
SVOCs - semi-volatile organic compounds
VOCs - volatile organic compounds
USTs - Underground Storage Tanks

NO SCALE

JOINT BASE ELMENDORF-RICHARDSON, ALASKA
NIKE SITE SUMMIT
SS047 DECISION DOCUMENT

LOWER SITE SUMMIT - HUMAN HEALTH CONCEPTUAL SITE MODEL

FIGURE
4-2

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The results of the risk characterization indicate that future exposures to non-CERCLA contaminants in surface and subsurface soil at SS047 could pose an unacceptable threat of cancer and non-cancer effects. The human health risk estimates for the media and receptors evaluated for USS, LSS, Area A, and Area C are presented in **Table 4-2**.

Table 4-2 Cumulative Risk Estimates for Human Receptors at SS047

Medium	Current/Future Site Workers		Current Future Site Visitors		Future Resident	
	ILCR	**HI**	**ILCR**	**HI**	**ILCR**	**HI**
Upper Site Summit						
Surface soil	7×10^{-6}	NA[1]	7×10^{-7}	NA[1]	**2×10^{-5}**	NA[1]
Subsurface soil	**3×10^{-5}**	NA[2]	3×10^{-6}	NA[2]	**7×10^{-5}**	NA[2]
Lower Site Summit						
Surface soil	**4×10^{-5}**	< 1	4×10^{-6}	< 1	**1×10^{-4}**	< 1
Subsurface soil	NC	NA[2]	NC	NA[2]	NC	NA[2]
Area A						
Surface soil	NA[3]	1	NA[3]	< 1	NA[3]	**10**
Subsurface soil	NA[3]	< 1	NA[3]	< 1	NA[3]	**4**
Area C						
Surface soil	1×10^{-5}	NA[1]	1×10^{-6}	NA[1]	**3×10^{-5}**	NA[1]

Key:
COC – contaminant of concern
HI – hazard index
ILCR – incremental lifetime cancer risk
NA[1] – Not applicable as there are no non-carcinogenic COCs in the surface soil.
NA[2] – Not applicable as there are no non-carcinogenic COCs in the subsurface soil.
NA[3] – Not applicable as there are no carcinogenic COCs in the surface soil or subsurface soil.
NC – Not calculated as there are no carcinogenic COCs in the subsurface soil.
Values in **bold/red** exceed the risk criteria for ILCR of 1×10^{-5} or an HI greater than 1, as required by 18 AAC 75.325(g).

The estimated human health risk at USS is from site worker or potential future resident contact with the following contaminants in soil:

- Surface soil: Benzo(a)pyrene
- Subsurface soil: Benzo(a)pyrene and Dibenz(a,h)anthracene

The estimated human health risk at LSS is from site worker or potential future resident contact with the following contaminant in surface soil:

- Benzo(a)pyrene

The estimated human health risk at Area A is from potential future resident contact with the following contaminants in soil:

- Surface soil: DRO and RRO
- Subsurface soil: DRO

The estimated human health risk at Area C is from potential future resident contact with the following contaminant in surface soil:

- Benzo(a)pyrene

There are many uncertainties in assessing risks from chemicals occurring in the environment, as detailed in the baseline HHERA in the RI Report. Uncertainty reflects limitations in knowledge and simplifying assumptions that must be made in order to quantify health or ecological risks. Risk assessments involve several components, including analysis of toxicity and exposure, each with inherent uncertainty. The major uncertainties include: representing chemical concentrations in environmental media, quantifying how people or wildlife come in contact with chemicals, interpreting the toxicological significance of the exposure, and predicting how conditions may change in the future. Other uncertainties include the following:

- Contaminant source characterization: The biased nature of sampling known or suspected source areas is expected to result in a protective assessment of potential risks.
- Background data: The incorporation of background data into the HHERA creates uncertainty, because no two data sets are exactly equivalent and there is a possibility of error from statistical comparisons among data sets.

The major uncertainties affecting the HHERA, including uncertainties related to COPC or identification, exposure assessment, toxicity characterization, and risk characterization, are detailed in the baseline HHERA (USAF, 2012c).

4.1.2 Summary of Ecological Risk Assessment

An ecological risk assessment (ERA) is the process for evaluating how likely it is that the environment may be impacted as a result of exposure to one or more environmental stressor, such as chemicals, land change, disease, invasive species, and climate change. An ERA was conducted at SS047 to determine if plants or animals are exposed to contaminants and if the exposure could have an adverse ecological effect (e.g., mortality, reproductive failure, etc.). The purpose for conducting the ERA is to: 1) identify and characterize the current and potential threats to the environment from a hazardous substance release; 2) evaluate the ecological impacts of alternative remediation strategies; and 3) establish cleanup levels that will protect the natural resources at risk.

A baseline ERA estimates site risks to ecological receptors if no remedial actions were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

The baseline ERA identified unacceptable risks associated with non-CERCLA chemicals present at SS047, but the results of the ERA changed due to updates to the small mammal foraging area assumptions (USAF, 2015). The primary driver of the ecological risk-based cleanup level (ERBCL) was ingestion of PHC-contaminated soils by the masked shrew or tundra vole.

Following review of the specific locations at SS047 where fuel spills have occurred, those detections on gravel pads were eliminated from evaluation since mammals do not forage on gravel pads (USAF, 2015). As a result of this change, no contaminants of potential ecological concern (COPECs) were identified for SS047.

4.1.3 Basis for Action

Based on the results of the HHERA, as summarized above, the response actions selected in this Decision Document are necessary to protect the public health or welfare or the environment from actual or threatened releases of contaminants regulated by the State of Alaska from USS, LSS, Area A, and Area C into the environment.

4.2 CONTAMINANT CONCENTRATIONS AND CLEANUP LEVELS

Cleanup levels for non-CERCLA contaminants at SS047 are based on 18 AAC 75 Method Two under-40-inch zone (ADEC, 2017), which are human health risk-based values. The cleanup levels for these contaminants have changed since the Informal Dispute Memorandum (USAF et al., 2014) to be consistent with the newly promulgated ADEC cleanup standards (July 2017). Non-CERCLA contaminants are present in surface and subsurface soil at SS047. **Table 4-3** summarizes the non-CERCLA COCs at SS047 by area and provides the cleanup levels for each COC.

4.3 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) provide a general description of what the cleanup will accomplish. These goals typically serve as the design basis for the remedial alternatives.

The RAO for USS is to prevent direct contact (ingestion or dermal absorption) with soil that has contaminant concentrations exceeding cleanup levels. The following non-CERCLA contaminants exceed their cleanup levels in soil at USS:

- Surface soil
  - Benzo(a)anthracene above the cleanup level of 2 milligrams per kilogram (mg/kg).
  - Benzo(a)pyrene above the cleanup level of 0.2 mg/kg.
  - Benzo(b)fluoranthene above the cleanup level of 2.0 mg/kg.
  - Dibenz(a,h)anthracene above the cleanup level of 0.2 mg/kg.
- Subsurface soil
  - Benzo(a)anthracene above the cleanup level of 2 mg/kg.
  - Benzo(a)pyrene above the cleanup level of 0.2 mg/kg.
  - Dibenz(a,h)anthracene above the cleanup level of 0.2 mg/kg.
  - Indeno(1,2,3-c,d)pyrene above the cleanup level of 2 mg/kg.

Table 4-3 SS047 Non-CERCLA COCs in Soil

Area	COCs	Medium	Maximum Detected Concentration (mg/kg)	Detection Frequency	ADEC Cleanup Level[1] (mg/kg)
USS	Benzo(a)anthracene	Surface soil	8.61	10 of 23	2
	Benzo(a)pyrene		5.75	8 of 23	0.2
	Benzo(b)fluoranthene		6.93	8 of 23	2
	Dibenz(a,h)anthracene		2.42	5 of 23	0.2
	Benzo(a)anthracene	Subsurface soil	3.43	4 of 37	2
	Benzo(a)pyrene		3.71	4 of 37	0.2
	Dibenz(a,h)anthracene		0.85	3 of 37	0.2
	Indeno(1,2,3-c,d)pyrene		2.09	4 of 37	2
LSS	Benzo(a)anthracene	Surface soil	2.84	10 of 37	2
	Benzo(a)pyrene		2.55	12 of 37	0.2
	Benzo(b)fluoranthene		3.37	11 of 37	2
	Dibenz(a,h)anthracene		0.368	2 of 37	0.2
	RRO		24,400	37 of 37	10,000
	Benzo(a)pyrene	Subsurface soil	0.347	5 of 36	0.2
A	DRO	Surface soil	19,200	14 of 15	10,250
	RRO		161,000	15 of 15	10,000
	DRO	Subsurface soil	28,400	11 of 19	10,250
	RRO		52,900	12 of 19	10,000
C	Benzo(a)pyrene	Surface soil	1.62	2 of 6	0.2

Key:
1 – 18 AAC 75.341, Table B1 Method Two, Under 40 inch zone (ADEC, 2017), for all COCs except DRO and RRO, for which 18 AAC 75.341, Table B2 Method Two, Under 40 inch zone, cleanup levels were used.
AAC – Alaska Administrative Code
ADEC – Alaska Department of Environmental Conservation
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC – chemical of concern
DRO – diesel range organics
LSS – Lower Site Summit
mg/kg – milligrams per kilogram
RRO – residual range organics
USS – Upper Site Summit

The RAO for LSS is to prevent direct contact (ingestion or dermal absorption) with soil that has contaminant concentrations exceeding cleanup levels. The following non-CERCLA contaminants exceed their cleanup levels in soil at LSS:

- Surface soil
  - Benzo(a)anthracene above the cleanup level of 2 mg/kg.
  - Benzo(a)pyrene above the cleanup level of 0.2 mg/kg.
  - Benzo(b)fluoranthene above the cleanup level of 2 mg/kg.
  - Dibenz(a,h)anthracene above the cleanup level of 0.2 mg/kg.
  - RRO above the cleanup level of 10,000 mg/kg.
- Subsurface soil
  - Benzo(a)pyrene above the cleanup level of 0.2 mg/kg.

The RAO for Area A is to prevent direct contact (ingestion or dermal absorption) with soil that has contaminant concentrations exceeding cleanup levels. The following contaminants exceed their cleanup levels in soil at Area A:

- Surface soil
  - DRO above the cleanup level of 10,250 mg/kg.
  - RRO above the cleanup level of 10,000 mg/kg.
- Subsurface soil
  - DRO above the cleanup level of 10,250 mg/kg.
  - RRO above the cleanup level of 10,000 mg/kg.

The RAO for Area C is to prevent direct contact (ingestion or dermal absorption) with soil that has contaminant concentrations exceeding cleanup levels. The following contaminant exceeds its cleanup level in surface soil at Area C:

- Benzo(a)pyrene above the cleanup level of 0.2 mg/kg.

These RAOs were developed based on the current and reasonably anticipated land use. These RAOs address the risks identified in the risk assessment by applying limited actions that will reduce ecological exposure to contamination and prevent activities that may result in increased exposure or spread the extent of contamination.

4.4 DESCRIPTION OF ALTERNATIVES

Remedies for USS, LSS, Area A, and Area C were evaluated in the SFS (USAF, 2015). The SFS identified the following two remedy components to be retained for evaluation:

- **Land Use Controls.** A LUC is any type of physical, legal, proprietary, or administrative mechanism that restricts the use of, or limits access to, real property to prevent or reduce risks to human health and the environment. Physical mechanisms (i.e., engineering controls) encompass a variety of engineered remedies to contain or reduce contamination and physical barriers to limit access to property, such as landfill caps, fences, or signs. The legal, proprietary, or administrative mechanisms used for LUCs are generally the same as

those used for institutional controls (ICs), as discussed in the National Contingency Plan (NCP). Examples of ICs include: deed notices; IC registries; property easements and covenants; installation administrative controls, such as construction and work request review and approval processes; and administrative orders and cleanup agreements.

- **Excavation and Off-Site Treatment/Disposal.** For soil, excavation refers to removing contaminated soil, backfilling with clean material, and disposal of the excavated soil at a permitted disposal facility. All excavated waste will be transported to a treatment facility or, if necessary, a waste management facility that is permitted to accept PHC-contaminated soil. Excavation and disposal will be achieved in a single construction season.

The remedy selected for each area is detailed in Sections 5 through 8 and summarized in Section 9.

5.0 UPPER SITE SUMMIT

5.1 SITE CHARACTERISTICS

USS is located at an elevation of 3,900 feet amsl, and is characterized by limited vegetation and disturbed soils. Surface and subsurface soil consist primarily of angular and rounded gravel fill material atop of bedrock.

5.1.1 Hydrogeology and Geology

Surface and subsurface soil consist primarily of angular and rounded gravel fill material on top of bedrock.

5.1.2 Hydrogeology and Groundwater Use

During the RI, it was determined that minimal amounts of water were present at USS. Water was found only in areas of depressed bedrock where former USTs had previously been located and had accumulated in these depressions after rainfall events or during a snowmelt period. An informal dispute resolution determined that this water would be reclassified as "pit" water (USAF et al., 2014), which is not considered a drinking water source; therefore, there is no groundwater present at USS.

5.1.3 Ecological Setting

The predominant vegetation at USS is limited to lichens and mosses. No special status plants are known to exist at SS047. A more detailed appraisal of SS047 ecology is provided in the baseline HHERA (USAF, 2012c).

5.1.4 Site Characterization Activities

PA/SI. Based on the analytical results from soil sampling at SS047, the PA/SI Report recommended further investigation at USS to further characterize and delineate releases from USTs, the aboveground storage tank, and French drains in the Vehicle Maintenance Shop and boiler room of the Launch Control Building (U.S. Army, 1996a, b). The PA/SI Report also recommended developing a remedial action plan to address contaminated soils at USS.

RI. Surface soil, subsurface soil, and water samples collected during the RI confirmed PA/SI results and provided additional information on the nature and extent of contamination at SS047 (USAF, 2012a,b). The findings of the RI are summarized by USS action area (**Figure 5-1**) as:

- **Battery Control and Barracks Building (Action Areas USS-A, -B, -C, and -D)** – The potential contaminant sources investigated included leaks or overfilling of the former diesel and gasoline USTs. Both USTs were removed prior to the 1996 PA/SI. Additionally, the pipeline that supplied diesel fuel from the UST to the building appears to be partially intact and some leakage is anticipated to have occurred. Contaminants that were detected above their respective cleanup levels in surface soil at Action Area USS-D and in surface and

subsurface soil at Action Areas USS-A and USS-C include PHCs and associated PAHs. No contaminants were detected at concentrations above the cleanup levels at Action Area USS-B.

- **High Power Acquisition Radar (HIPAR) Foundation** – No source of contamination was identified at this action area.
- **Electrical Substation C** – Dry-type transformers (rather than oil-filled transformers) were used at the substation. No polychlorinated biphenyl (PCB) discharge was detected at this action area.
- **Former Motor Pool Maintenance Building and Foundation** – This building included a floor drain and lube-pit that likely received wastes from vehicle maintenance operations. The floor drain and lube-pit have been backfilled with soil; therefore, mobilization of any potential contamination from either within the lines or the lube-pit has been minimized. Cadmium, a COC regulated under CERCLA, was detected in surface soil at a concentration that exceeds its cleanup level. The source of contamination is wastes from vehicle maintenance operations discharged from the floor drain or lube-pit. A remedy under CERCLA to address this contamination was determined in the SS047 ROD.
- **Radar Domes (Action Areas USS-G, -H, and -I)** – PAHs were detected above their respective cleanup levels in surface soil at Action Areas USS-G, -H, and -I. The source of contamination is uncertain; however, given the composition of the analytes detected, lubricants used to operate the clam-shell enclosures of the three radar antennas are the likely source.
- **Septic System and Outfall** – Sanitary wastes and possibly other wastes (oils, paints, and sediment) were collected and piped into a small concrete septic tank. Effluent from this system discharged directly onto the alpine tundra north of the facility. The septic tank has been backfilled with soil; therefore, further mobilization of potential contamination from either within the lines or the tank to the outfall has been minimized. Cadmium, lead, and semi-volatile organic compounds (SVOCs) were detected above their respective cleanup levels in surface soil near the septic system outfall. The source of contamination is fluids and sediment discharged from the septic system. A remedy under CERCLA to address this contamination was determined in the SS047 ROD.

5.1.5 Nature and Extent of Contamination

This section establishes that there is evidence of contamination remaining above ADEC cleanup levels at USS by comparing investigation results to the applicable regulatory cleanup levels. The regulatory framework establishing applicable cleanup levels is discussed below, followed by a summary of environmental investigation results for USS.

Action areas are defined as those areas where RI soil sample results exceed the defined cleanup levels. The current action areas identified have changed since the original FS following an informal dispute resolution. The informal dispute resolution agreement allowed the "migration-to-groundwater" exposure pathway to be removed from evaluation, because the pit water at USS is not considered a potential future drinking water source and, therefore, groundwater is not considered a media of concern at USS.

TIME: 26-APR-2017 11:43 FILE: C:\D\CAD\Proj\AFCEC\2016-2017 JBER-Nike Site Summit (10505394)_185750655\2017 SS047 Decision Document\draft - April 2017\FIG 5-1 - Upper Site - sample locations and action areas.dgn

LEGEND:

- A — ACTION AREA
- B(a)P - 1.0 (0.2) — SURFACE SOIL ACTION AREA AT OR ABOVE PCL
- B(a)P - 3.71 (0.2) — SUBSURFACE SOIL ACTION AREA AT OR ABOVE PCL
- (0.2) — PROPOSED CLEANUP LEVEL (PCL)
- ADEC REGULATED PETROLEUM COC'S (ACTION AREA)
- MONITORING WELL LOCATION
- BOREHOLE/SUBSURFACE SOIL SAMPLE
- SURFACE SOIL SAMPLE LOCATION

Semivolatile Organic Compounds

B(a)A = Benzo(a)anthracene
B(a)P = Benzo(a)pyrene
B(b)F = Benzo(b)flouranthene
D(a,h)A = Dibenz(a,h)anthracene
I(1,2,3-c,d)P= Indeno(1,2,3-c,d)pyrene

ALL CONCENTRATIONS AND PCLS ARE IN MILLIGRAMS PER KILOGRAM (mg/kg)

SEPTIC SYSTEM OUTFALL
APPROIMATE LOCATION OF SEPTIC LINE
SEPTIC TANK
APPROIMATE LOCATION OF SEPTIC LINE
HIPAR BUILDING
B(a)P - 1.0 (0.2)
SS03USS
HIPAR FOUNDATION
TARGET TRACKING RADAR
THIRD PARTY COMMUNICATION BUILDINGS & EQUIPMENT
SS02USS
TARGET RANGING RADAR
MW03USS
H B(a)P - 1.12 (0.2)
B(b)F - 3.18 (2.0)
D(a,h)A - 2.42 (0.2)
A B(a)A - 3.43 (2.0)
B(a)P - 3.71 (0.2)
D(a,h)A - 0.85 (0.2)
I(1,2,3-c,d)P-2.09 (2.0)
MW12USS
SS15USS
MW04USS
BH06USS
C B(a)P - 1.62 (0.2)
D(a,h)A - 0.273 (0.2)
BH10USS
SS16USS
D B(a)A - 8.61 (2.0)
B(a)P - 5.75 (0.2)
B(b)F - 6.93 (2.0)
D(a,h)A - 0.488 (0.2)
B(a)P - 0.231 (0.2)
THIRD PARTY COMMUNICATION BUILDINGS & EQUIPMENT
MOTOR POOL MAINTENANCE BUILDING FOUNDATION
BATTERY CONTROL & BARRACKS BUILDING
OUTFALL FROM MOTOR POOL MAINTENANCE BUILDING
MISSILE RANGING RADAR
APPROIMATE LOCATION OF BURIED DRAIN LINE
SS01USS
G B(a)A - 4.16 (2.0)
B(a)P - 3.85 (0.2)
B(b)F - 3.79 (2.0)
D(a,h)A - 0.64 (0.2)
ELECTRICAL SUBSTATION C

0 30'

JOINT BASE ELMENDORF-RICHARDSON, ALASKA
NIKE SITE SUMMIT

SS047 DECISION DOCUMENT

UPPER SITE SUMMIT
SAMPLE LOCATIONS AND ACTION AREAS

FIGURE
5-1

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Past military activities and disposal practices caused releases of non-CERCLA contaminants (petroleum products and oil) in surface and subsurface soil at USS. Following is a summary of the action areas impacted by non-CERCLA COCs at USS:

- **Battery Control and Barracks Building (Action Areas USS-A, -C, and -D)** – PAHs were detected at concentrations above their respective cleanup levels in surface and subsurface soil at Action Areas USS-A, -C, and -D. Further action under Alaska State law is warranted to address surface and subsurface soil contamination at Action Areas USS-A, -C, and -D.
- **Radar Domes (Action Areas USS-G, -H, and -I)** – PAHs were detected at concentrations above their respective cleanup levels in surface soil only at Action Areas USS-G, -H, and -I. Further action under Alaska State law is warranted to address surface soil contamination at Action Areas USS-G, -H, and -I.

The non-CERCLA action areas for USS are shown on Figure 5-1 in blue.

5.2 SELECTED REMEDY

The USAF will be responsible for implementing, maintaining, monitoring, reporting, and enforcing the remedy selected in this Decision Document. The selected remedy for USS is Surface and Subsurface Soil Excavation with Offsite Treatment/Disposal.

5.2.1 Summary of the Rationale for the Selected Remedy

The selected remedy includes excavation and off-site treatment or disposal of contaminated surface soil and subsurface soil at USS Action Areas USS-A, -C, -D, -G, -H, and -I (Figure 5-1). This remedy was selected based upon the ability to protect human health and the environment and compliance with applicable requirements. This remedy is easily implemented, cost effective, and provides both a short- and long-term solution for contamination at USS. In addition, USS will be eligible for closure by ADEC without ICs or LUCs after implementation of the selected remedy.

5.2.2 Description of the Selected Remedy

Under the selected remedy, all surface and subsurface soil with contamination exceeding cleanup levels will be excavated. This alternative will rapidly remove contaminated soil from USS Action Areas USS-A, -C, -D, -G, -H, and -I. Using the area assumptions for surface and subsurface soil, approximately 1,070 square feet of soil to various depths will be removed from the six Action Areas (about 270 cubic yards). Much of the excavated soil will be surface soil only, but deeper excavations will be required for Action Areas USS-A and USS-C. The lateral and vertical extents of contamination will be fully delineated prior to excavation. The estimated soil volume to be excavated within each Action Area at USS is summarized in **Table 5-1**.

Table 5-1 USS – Soil Volume Estimates by Action Area

Action Area	Area (square feet)	Depth (feet)	Volume (cubic feet)	Volume (cubic yards)	Sample Basis	Chemicals of Concern
USS-A	200	15	3,000	111	BH12USS	B(a)A, B(a)P, D(a,h)A, I(1,2,3-c,d)P
USS-C	100	13	1,300	48	BH04USS	B(a)P, D(a,h)A
USS-D	470	5	2,350	87	SS15USS, SS16USS, BH10USS	B(a)A, B(a)P, B(b)F, D(a,h)A
USS-G	100	2	200	7	SS01USS	B(a)A, B(a)P, B(b)F, D(a,h)A
USS-H	100	2	200	7	SS02USS	B(a)P, B(b)F, D(a,h)A
USS-I	100	2	200	7	SS03USS	B(a)P
Totals	**1,070**	**--**	**7,250**	**267**	**--**	**--**

Key:
B(a)A – benzo(a)anthracene
B(b)F – benzo(b)fluoranthene
B(a)P – benzo(a)pyrene
D(a,h)A – dibenz(a,h)anthracene
I(1,2,3-c,d)P – indeno(1,2,3-c,d)pyrene
USS – Upper Site Summit

Excavated soil will be transported off-site to a thermal desorption facility or, if warranted, an approved, off-site waste management facility that is permitted to accept PHC-contaminated soil. Removal of the contaminated soil will be confirmed by post-excavation sampling of the bottom and sidewalls of the excavation. Following excavation, disposal, and backfilling, no further surface or subsurface soil contamination will remain at USS at concentrations above cleanup levels. USS will achieve the RAOs specified in this Decision Document after cleanup activities are finished, therefore meeting closure requirements for a cleanup complete determination by ADEC.

The major components of the selected remedy for USS are as follows:

- Excavation and offsite treatment or disposal of contaminated surface soil from Action Areas USS-D, -G, -H, and -I.
- Excavation and offsite treatment or disposal of contaminated subsurface soil from Action Areas USS-A, -C, and -D.
- Collection of post-excavation confirmation samples to verify that cleanup levels have been met.

6.0 LOWER SITE SUMMIT

6.1 SITE CHARACTERISTICS

LSS is located at an elevation of about 3,100 feet amsl, and is characterized by limited vegetation and disturbed soils.

6.1.1 Hydrogeology and Groundwater Use

Existing data on the subsurface hydrology at LSS is limited to information gathered during the 2010/2011 RI and the assessment conducted as part of the 2015 SFS.

The results of the RI indicated that subsurface water at LSS appears to follow the contours of the bedrock and is most plentiful in the area where the former UST was located. Groundwater is shallowest nearest the excavated bedrock behind the Launch Control Building and steadily drops as it heads downslope toward the northeast edge of the LSS construction pad. The RI concluded that this perched aquifer is only present on the north/northeast side of LSS and is discontinuous, as evidenced by a borehole on the eastern edge of SS047 that did not encounter groundwater and met with refusal at 25 feet bgs, whereas adjacent boreholes encountered groundwater at lesser depths (approximately 16 feet bgs on average).

The 2015 SFS included a groundwater assessment to evaluate the quantity and potential impact of groundwater at LSS. The results indicated that groundwater at LSS does not support a drinking water source, due to limited recharge volumes and low permeability of the groundwater-bearing strata at LSS, which results in low yield. This low yield does not meet the EPA's classification of a drinking water source, which must produce a minimum of 150 gallons per day for a family of four. Several of the LSS wells were pumped dry during the purge process that is conducted prior to collecting a groundwater sample. Groundwater at LSS has insufficient yield to be classified as a drinking water source. Using the EPA *Guidelines for Ground-Water Classification*, LSS groundwater is a Class IIIA, insufficient yield water source. Additionally, the groundwater determination demonstrated that any contamination from LSS would pose a minimal risk to a downgradient groundwater source within the catchment basin area evaluated in Arctic Valley, due to low solubility and concentrations of contaminants (USAF, 2015).

6.1.2 Site Characterization Activities

PA/SI. Based on the analytical results from soil sampling at SS047, the PA/SI recommended further investigation at LSS. This included investigating releases from the French drains in the Motor Pool Building and boiler rooms of the Composite Building and determining the source of contaminants detected in water samples from sumps in the missile launch bunkers. Limited action was recommended to characterize and delineate solvent and PAH contamination, to develop a remedial action plan for addressing PHC-contaminated soils, and to investigate and close a 20,000-gallon UST.

RI. The RI included surface soil, subsurface soil, and groundwater sampling. Groundwater samples confirmed PA/SI results and provided additional information on the nature and extent of

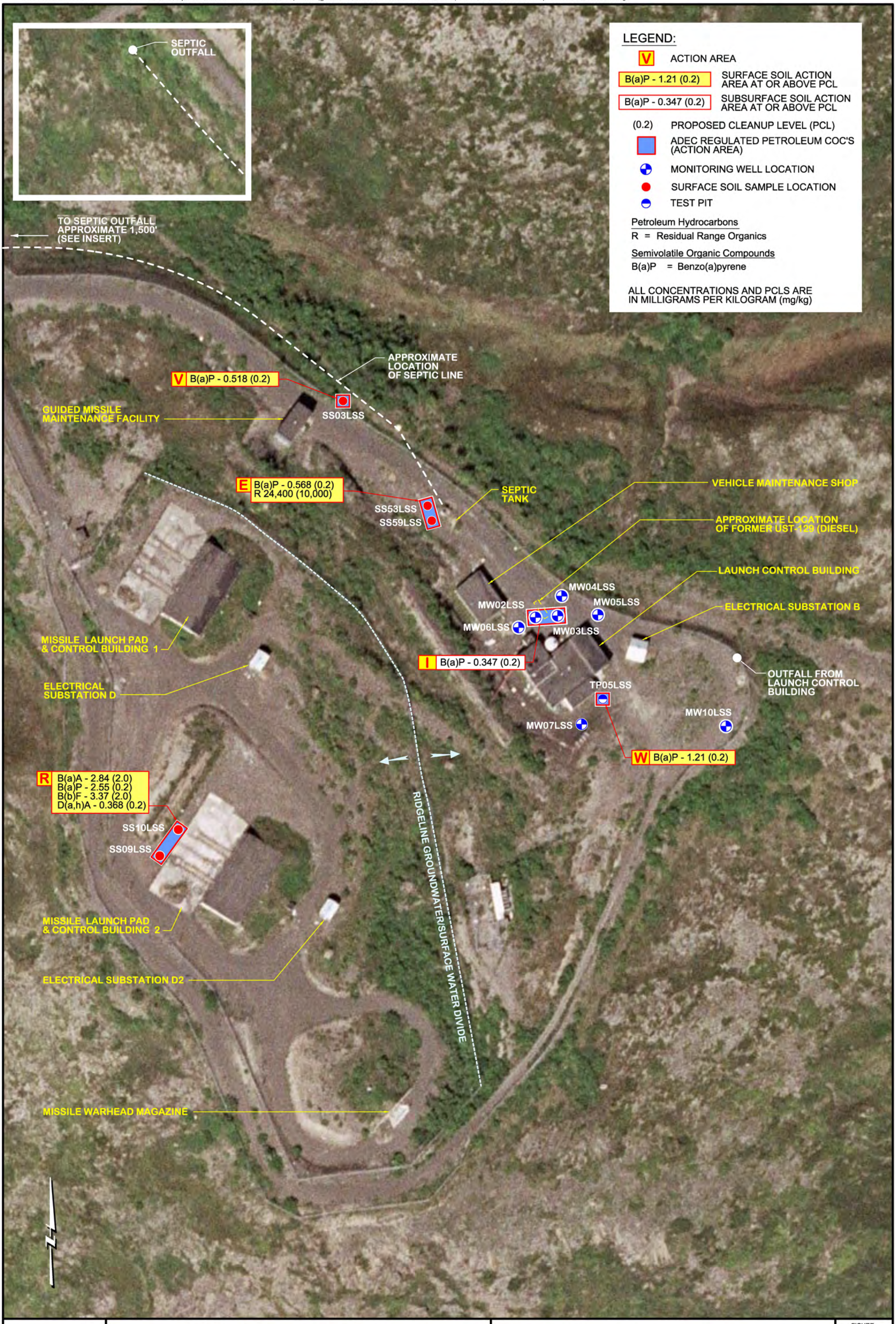
contamination at SS047. The findings of the RI are summarized by LSS source area (**Figure 6-1**) as:

- **Septic Tank and Septic System Outfall (Action Area LSS-E)** – Waste oil, diesel fuel, and cleaning fluids in the septic tank discharge were released to the surface soil northwest of the Septic Tank Pump House. COCs identified above their cleanup levels in surface soil at Action Area LSS-E include benzo(a)pyrene and RRO. A remedy under CERCLA to address CERCLA contamination at other action areas associated with this source area was determined in the SS047 ROD.
- **Launch Control Building (Action Areas LSS-I, LSS-Q, and LSS-W)** – A source of contamination located near the Launch Control Building was a former aboveground storage tank on the south side of the building. The RI analytical results indicate that surface and/or subsurface fuel releases occurred from this tank. The presence of PHCs, VOCs, and SVOCs suggests that surface spills of petroleum (possibly mixed with solvents) occurred in this area. The COC identified above the cleanup level at the Launch Control Building is benzo(a)pyrene in surface soil at Action Area LSS-W and in subsurface soil at Action Area LSS-I. A remedy under CERCLA to address CERCLA contamination at Action Area LSS-Q was determined in the SS047 ROD.
- **Missile Launch Pad and Control Building 1 & 2 (Action Areas LSS-B and LSS-R)** – Surface soil analytical results indicate several possible release mechanisms near these features: surface spills of fuel, spills of lubricants used for the cable or guide rails, and combustion byproducts from missile launches. The COCs identified above their cleanup levels in surface soil at Action Area LSS-R consist of the following: benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; and dibenz(a,h)anthracene. A remedy under CERCLA to address CERCLA contamination at Action Area LSS-B was determined in the SS047 ROD.
- **Vehicle Maintenance Shop (Action Area LSS-H)** – Disposal of waste oils and cleaning fluids from the Vehicle Maintenance Shop through the floor drains and lube pit presumably caused soil contamination at the terminus of the shop drain line from the shop. A CERCLA COC was identified at this area (LSS-H), and a remedy under CERCLA to address this contamination was determined in the SS047 ROD.
- **Guided Missile Maintenance Facility (Action Area LSS-V)** – Samples located down-gradient from the Guided Missile Maintenance Facility, just off the LSS pad, indicate possible run off from the pad. The COC identified above the cleanup level at Action Area LSS-V was benzo(a)pyrene in surface soil.

6.1.3 Nature and Extent of Contamination

This section establishes that there is evidence of contamination remaining above ADEC cleanup levels at LSS by comparing investigation results to the applicable regulatory cleanup levels. The regulatory framework establishing applicable cleanup levels is discussed below, followed by a summary of environmental investigation results for LSS.

TIME: 26-APR-2017 11:46 FILE: C:\D\CAD\Proj\AFCEC\2016-2017 JBER-Nike Site Summit (10505394)_185750655\2017 SS047 Decision Document\draft - April 2017\FIG 6-1 - Lower Site - sample locations and action areas.dgn



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NIKE SITE SUMMIT

SS047 DECISION DOCUMENT

LOWER SITE SUMMIT
SAMPLE LOCATIONS AND ACTION AREAS

FIGURE
6-1

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Action areas are defined as those areas where RI soil sample results exceed the defined cleanup levels. The current action areas identified have changed since the original FS, following an informal dispute resolution agreement. This agreement allowed the "migration-to-groundwater" exposure pathway to be removed from evaluation, because LSS groundwater is a Class IIIA, insufficient yield water source, and groundwater is not considered a media of concern at LSS.

Past military activities and disposal practices caused releases of non-CERCLA contaminants (petroleum products and oil) in surface and subsurface soil at LSS. Following is a summary of the action areas impacted by non-CERCLA COCs at LSS:

- **Septic Tank and Septic System Outfall (Action Area LSS-E)** – Benzo(a)pyrene and RRO were detected at concentrations above their respective cleanup levels in surface soil at Action Area LSS-E. Further action under Alaska State law is warranted to address surface soil contamination at Action Area LSS-E.
- **Launch Control Building (Action Areas LSS-I and LSS-W)** – Benzo(a)pyrene was detected at concentrations above its cleanup level in surface soil at Action Area LSS-W and in subsurface soil at Action Area LSS-I. Further action under Alaska State law is warranted to address surface soil contamination at Action Area LSS-W and subsurface soil contamination at Action Area LSS-I.
- **Missile Launch Pad and Control Building 1 & 2 (Action Area LSS-R)** – PAHs were detected at concentrations above their respective cleanup levels in surface soil at Action Area LSS-R. Further action under Alaska State law is warranted to address surface soil contamination at Action Area LSS-R.
- **Guided Missile Maintenance Facility (Action Area LSS-V)** – Benzo(a)pyrene was detected at concentrations above its cleanup level in surface soil at Action Area LSS-V. Further action under Alaska State law is warranted to address surface soil contamination at Action Area LSS-V.

The non-CERCLA action areas for LSS are shown on Figure 6-1 in blue.

6.2 SELECTED REMEDY

The USAF will be responsible for implementing, maintaining, monitoring, reporting, and enforcing the remedy selected in this Decision Document. The selected remedy for LSS is Surface and Subsurface Soil Excavation with Offsite Treatment/Disposal.

6.2.1 Summary of the Rationale for the Selected Remedy

The selected remedy includes excavation and off-site treatment or disposal of contaminated surface and subsurface soil at LSS Action Areas LSS-E, -I, -R, -V, and -W. This remedy was selected based upon the ability to protect human health and the environment and compliance with applicable requirements. This remedy is easily implemented, cost effective, and provides both a short- and long-term solution for contamination at LSS. In addition, LSS will be eligible for closure by ADEC without ICs or LUCs after implementation of the selected remedy.

6.2.2 Description of the Selected Remedy

Under the selected remedy, all surface and subsurface soil with contamination exceeding cleanup levels will be excavated. This alternative will rapidly remove contaminated soil from LSS Action Areas LSS-E, -I, -R, -V, and -W (Figure 6-1). Using the area assumptions for surface and subsurface soil, approximately 2,800 square feet of soil to varying depths will be removed from the five Action Areas (about 360 cubic yards). Much of the excavated soil will be surface soil only, but a deeper excavation will be required to address contaminated subsurface soil at Action Area LSS-I. The lateral and vertical extents of contamination will be fully delineated prior to excavation. The estimated soil volume to be excavated within each Action Area at LSS is summarized in **Table 6-1**.

Table 6-1 LSS – Soil Volume Estimates by Action Area

Action Area	Area (square feet)	Depth (feet)	Volume (cubic feet)	Volume (cubic yards)	Sample Basis	Chemical of Concern
LSS-E	450	2	900	33	SS53LSS, SS59LSS	B(a)P, RRO
LSS-I	576	11	6,336	235	BH02LSS	B(a)P
LSS-R	1,000	2	2,000	74	SS09LSS, SS10LSS	B(a)A, B(a)P, B(b)F, D(a,h)A
LSS-V	100	2	200	7	SS03LSS	B(a)P
LSS-W	100	2	200	7	TP05LSS	B(a)P
Totals	**2,802**	--	**9,636**	**356**	--	--

Key:
B(a)A – benzo(a)anthracene
B(b)F – benzo(b)fluoranthene
B(a)P – benzo(a)pyrene
D(a,h)A – dibenz(a,h)anthracene
LSS – Lower Site Summit
RRO – residual range organics

Excavated soil will be transported off-site to a thermal desorption facility or, if warranted, an approved, off-site waste management facility that is permitted to accept PHC-contaminated soil. Removal of the contaminated soil will be confirmed by post-excavation sampling of the bottom and sidewalls of the excavation. Following excavation, disposal, and backfilling, no further surface or subsurface soil contamination will remain at LSS at concentrations above cleanup levels. LSS will achieve the RAOs specified in this Decision Document after cleanup activities are finished, therefore meeting closure requirements for a cleanup complete determination by ADEC.

The major components of the selected remedy for LSS are as follows:

- Excavation and offsite treatment or disposal of contaminated surface soil from Action Areas LSS-E, -R, -V, and -W.
- Excavation and offsite treatment or disposal of contaminated subsurface soil from Action Area LSS-I.
- Collection of post-excavation confirmation samples to verify that cleanup levels have been met.

7.0 AREA A

7.1 SITE CHARACTERISTICS

Area A is located at 2,950 feet amsl, and is characterized by limited vegetation and disturbed soils.

7.1.1 Hydrogeology and Groundwater Use

Test pits advanced to bedrock at Area A did not encounter groundwater. No borings were advanced at Area A.

7.1.2 Site Characterization Activities

Little is known about historical operations at Area A, but anecdotal evidence and field observations indicate the likely waste sources and release mechanisms. Wastes were potentially generated and released during operation of the Former RRS, vehicle maintenance facility, barracks, dining facility, and radio equipment buildings. A likely source of subsurface soil PHC contamination at Area A is leaks from the joints of a buried 2-inch pipeline and the pipeline delivery point. The pipeline is still present and buried at SS047.

PA/SI. Based on the analytical results from soil sampling at SS047, the PA/SI recommended further investigation at Area A. Based on the results of the additional investigation, limited action was recommended at Area A to address PHC-contaminated soils. Development and implementation of a remedial action plan was recommended, and further site investigation was recommended in the landfill area to define the nature and extent of any debris that may have been disposed in this area.

RI. Surface and subsurface soil sampling confirmed PA/SI results and provided additional information on the nature and extent of contamination at Area A (USAF, 2012a, b). The findings of the RI are summarized by Area A action area (**Figure 7-1**) as:

- **Suspected Disposal Area (Action Area ARA-A) –** RRO and DRO were detected above their respective cleanup levels in surface and subsurface soil at Action Area A.
- **Former Opportunity Strikes RRS Area (Action Area ARA-B) –** RRO was detected in surface and subsurface soil at Action Area B.

7.1.3 Nature and Extent of Contamination

This section establishes that there is evidence of contamination remaining above ADEC cleanup levels at Area A by comparing investigation results to the applicable regulatory cleanup levels. The regulatory framework establishing applicable cleanup levels is discussed below, followed by a summary of environmental investigation results for Area A.

Action areas are defined as those areas where RI soil sample results exceed the defined cleanup levels. The current action areas identified have changed since the original FS following the informal dispute resolution agreement. The USAF, EPA, and ADEC agreed that contamination

resulting from PHCs would be identified as No Action under CERCLA and managed under Alaska State laws and regulations.

Past military activities and disposal practices caused releases of non-CERCLA contaminants (petroleum products and oil) in surface and subsurface soil at Area A. Following is a summary of the action areas impacted by non-CERCLA COCs at Area A:

- **Suspected Disposal Area (Action Area ARA-A) –** RRO and DRO were detected above their respective cleanup levels in surface and subsurface soil at Action Area ARA-A. Further action under Alaska State law is warranted to address surface and subsurface soil contamination at Action Area ARA-A.
- **Former Opportunity Strikes RRS Area (Action Area ARA-B)** – RRO was detected in surface and subsurface soil at Action Area ARA-B. Further action under Alaska State law is warranted to address surface and subsurface soil contamination at Action Area ARA-B.

The non-CERCLA action areas for Area A are shown on Figure 7-1 in blue.

7.2 SELECTED REMEDY

The USAF will be responsible for implementing, maintaining, monitoring, reporting, and enforcing the remedy selected in this Decision Document. The selected remedy for Area A is Surface and Subsurface Soil Excavation with Offsite Treatment/Disposal.

7.2.1 Summary of the Rationale for the Selected Remedy

The selected remedy includes excavation and off-site treatment or disposal of contaminated surface soil at Action Areas ARA-A and ARA-B (Figure 7-1). This remedy was selected based upon the ability to protect human health and the environment and compliance with applicable requirements. This remedy is easily implemented, cost effective, and provides both a short- and long-term solution for contamination at Area A. In addition, Area A will be eligible for closure by ADEC without ICs or LUCs after implementation of the selected remedy.

7.2.2 Description of the Selected Remedy

Under the selected remedy, all surface and subsurface soil with contamination exceeding cleanup levels will be excavated. This remedy will rapidly remove contaminated soil from Area A Action Areas ARA-A and ARA-B. Using the area assumptions for surface and subsurface soil, approximately 465 cubic yards of soil will be removed from Area A. Deeper excavations will be required for both action areas. The lateral and vertical extents of contamination will be fully delineated prior to excavation. The estimated soil volume to be excavated within each Action Area at Area A is summarized in **Table 7-1**.

TIME: 26-APR-2017 11:47 FILE: C:\D\CAD\Proj\AFCEC\2016-2017 JBER-Nike Site Summit (10505394)_185750655\2017 SS047 Decision Document\draft - April 2017\FIG 7-1 - Area A - sample locations and action areas.dgn

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SS047 DECISION DOCUMENT

AREA A
SAMPLE LOCATIONS AND ACTION AREAS

FIGURE
7-1

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Table 7-1 Area A – Soil Volume Estimates by Action Area

Action Area	Area (square feet)	Depth (feet)	Volume (cubic feet)	Volume (cubic yards)	Sample Basis	Chemical of Concern
ARA-A	3,280	3	9,840	365	SS29ARA, TP06ARA, TP07ARA, TP08ARA	DRO, RRO
ARA-B	600	4.5	2,700	100	SS19ARA, TP10ARA	DRO, RRO
Totals	**3,880**	--	**12,540**	**465**	--	--

Key:
ARA – Area A
DRO – diesel range organics
RRO – residual range organics

Excavated soil will be transported off-site to a thermal desorption facility or a waste management facility permitted to accept PHC-contaminated soil. Post-excavation confirmation samples will be collected to verify that cleanup levels were achieved. Following excavation, disposal, and backfilling, no further surface or subsurface soil contamination will remain at Area A at concentrations above cleanup levels. Area A will achieve the RAOs specified in this Decision Document after cleanup activities are finished, therefore meeting closure requirements for a cleanup complete determination by ADEC.

The major components of the selected remedy for Area A are as follows:

- Excavation and offsite treatment or disposal of contaminated surface and subsurface soil from Action Areas ARA-A and ARA-B.
- Collection of post-excavation confirmation samples to verify that cleanup levels have been met.

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8.0 AREA C

8.1 SITE CHARACTERISTICS

Area C is located at 2,500 feet amsl, off of Arctic Valley Road, and is characterized by limited vegetation and disturbed soils.

8.1.1 Hydrogeology and Groundwater Use

Groundwater conditions at Area C were not investigated because no sources with potential to impact groundwater were identified during the PA/SI or the RI and surface investigations did not indicate presence of contamination.

8.1.2 Surface Water Hydrology

The only known surface water body at SS047 consists of a ponded area at Area C. The pond forms behind a weir that was installed in an unnamed tributary of Ship Creek to provide water for SS047 during its operative years. The tributary and pond collect seasonal surface snowmelt and precipitation runoff from the watershed between Mount Gordon Lyon and Rendezvous Peak.

8.1.3 Site Characterization Activities

Area C, the Former Pump House, contained a day tank to operate the pump and may have been a source of fuel releases to the surrounding area. However, accurate drawings are not available. In 2013, the Pump House was removed and the area was graded. During the removal, a subsurface pipe, believed to lead to the adjacent ponded area for water extraction, was exposed.

PA/SI. Based on the analytical results from soil sampling at SS047, the PA/SI recommended further investigation at Area C. For Area C, the PA/SI Addendum (U.S. Army, 1996b) stated that the extent of surface water contamination was not fully defined, based on the results of five surface water samples. Further investigation, including samples to verify PA/SI surface water results, was recommended.

RI. Surface soil and surface water samples provided additional information on the nature and extent of contamination at Area C. The Area C source area was adjacent to the former Pump House that was demolished in 2013. One of the six surface soil samples collected had benzo(a)pyrene at a concentration above its cleanup level. Based on the RI results, Area C sediment and surface water are not impacted, and Area C surface soil is impacted to a limited extent by a petroleum-related contaminant. The sample location and action area is shown on **Figure 8-1**.

8.1.4 Nature and Extent of Contamination

This section establishes that there is evidence of contamination remaining above ADEC cleanup levels at Area C by comparing investigation results to the applicable regulatory cleanup levels.

The regulatory framework establishing applicable cleanup levels is discussed below, followed by a summary of environmental investigation results for Area C.

Action areas are defined as those areas where RI soil sample results exceed the defined cleanup levels. The current action areas identified have changed since the original FS following the informal dispute resolution agreement. The USAF, EPA, and ADEC agreed that contamination resulting from PHCs would be identified as No Action under CERCLA and managed under Alaska State laws and regulations (USAF et al., 2014).

Past military activities and disposal practices caused releases of non-CERCLA contaminants (petroleum products and oil) in surface soil at Area C. Following is information on the action area impacted by non-CERCLA COCs at Area C:

- **Former Pump House (Action Area ARC-A)** – Benzo(a)pyrene was detected in surface soil at one location at Area C at a concentration above its cleanup level. Further action under Alaska State law is warranted to address surface soil contamination at Area C.

The non-CERCLA action area for Area C is shown on Figure 8-1 in blue.

8.2 SELECTED REMEDY

The USAF will be responsible for implementing, maintaining, monitoring, reporting, and enforcing the remedy selected in this Decision Document. The selected remedy for Area C is Surface Soil Excavation with Offsite Treatment/Disposal.

8.2.1 Summary of the Rationale for the Selected Remedy

The selected remedy includes excavation and off-site treatment or disposal of contaminated surface soil at Area C Action Area ARC-A (Figure 8-1). This remedy was selected based upon the ability to protect human health and the environment and compliance with applicable requirements. Area C will be eligible for a cleanup complete determination by ADEC without ICs or LUCs when cleanup activities are completed.

8.2.2 Description of the Selected Remedy

Under the selected remedy, all surface soil with contamination exceeding cleanup levels will be excavated. This alternative will rapidly remove contaminated soil from Area C Action Area ARC-A (Figure 8-1). Using the area assumptions, approximately 100 square feet of soil to a depth of 2 feet will be removed from Area C (about 7 cubic yards). The lateral and vertical extents of contamination will be fully delineated prior to excavation. The estimated soil volume to be excavated at Area C is summarized in **Table 8-1**.

TIME: 26-APR-2017 11:48 FILE: C:\D\CAD\Proj\AFCEC\2016-2017 JBER-Nike Site Summit (10505394)_185750655\2017 SS047 Decision Document\draft - April 2017\FIG 8-1 - Area C - sample locations and action areas.dgn

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AREA C
SAMPLE LOCATIONS AND ACTION AREA

FIGURE
8-1

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Table 8-1 Area C – Soil Volume Estimates by Action Area

Action Area	Area (square feet)	Depth (feet)	Total Volume (cubic feet)	Total Volume (cubic yards)	Sample Basis	Chemical of Concern
ARC-A	100	2	200	7.4	SS01ARC	B(a)P

Key:
ARC – Area C
B(a)P – benzo(a)pyrene

Excavated soil will be transported off-site to a thermal desorption facility or a waste management facility permitted to accept PHC-contaminated soil. Post-excavation confirmation samples will be collected to verify that cleanup levels were achieved. Following excavation, disposal, and backfilling, no further surface soil contamination will remain at Area C at concentrations above cleanup levels. Area C will achieve the RAOs specified in this Decision Document after cleanup activities are completed, therefore meeting closure requirements for a cleanup complete determination by ADEC.

The major components of the selected remedy for Area C are as follows:

- Excavation and offsite treatment or disposal of contaminated surface soil from Action Area ARC-A.
- Collection of post-excavation confirmation samples to verify that cleanup levels have been met.

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9.0 SUMMARY OF SELECTED REMEDIES

9.1 SELECTED REMEDIES

The remedies selected by the USAF for each area at SS047 in accordance with Alaska State law are as follows:

- USS, LSS, and Area A – Surface and Subsurface Soil Excavation with Offsite Treatment/Disposal.
- Area C – Surface Soil Excavation with Offsite Treatment/Disposal.

These remedies do not include LUCs as a component. The estimated volume of soil to be removed from each area of SS047 is summarized in **Table 9-1**.

Table 9-1 SS047 – Soil Volume Estimates by Area

Area	Estimated Total Volume (cubic feet)	Estimated Total Volume (cubic yards)
Upper Site Summit	7,250	267
Lower Site Summit	9,636	356
Area A	12,540	465
Area C	200	7.4

9.2 STATUTORY DETERMINATIONS

The selected remedies satisfy the applicable State of Alaska statutory requirements (18 AAC 75).

The signature on this Decision Document will signify the initiation of remedial action.

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10.0 REFERENCES

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U.S. Army. 2010. Nike Site Summit Remedial Investigation/Feasibility Studies and Baseline Risk Assessment Work Plan, Fort Richardson, Alaska. August.

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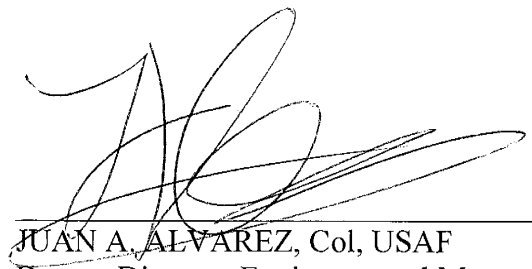
U.S. Air Force Selection
SS047 Decision Document
Joint Base Elmendorf-Richardson, Alaska

This signature sheet documents the U.S. Air Force's selection of the remedies contained in the Decision Document for SS047 at Joint Base Elmendorf-Richardson, Alaska.



JUAN A. ALVAREZ, Col, USAF
Deputy Director, Environmental Management Directorate

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Date

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ADEC Concurrence Page
SS047 Decision Document
Joint Base Elmendorf-Richardson, Alaska

By signing this declaration, the Alaska Department of Environmental Conservation agrees that proper implementation of the selected remedy for SS047 will comply with State environmental laws. These decisions will be reviewed and may be modified in the future if information becomes available that indicates the presence of contaminants or potential exposures that present unacceptable risk to human health or the environment.

Kimberly DeRuyter — 2/20/18

KIM DeRUYTER, Environmental Program Manager
Contaminated Sites Program, Federal Facilities Section
Alaska Department of Environmental Conservation

Date

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