PROPOSED PLAN
FOR
FLOOR DRAIN DISCHARGE TO DITCH AT THE VEHICLE MAINTENANCE BUILDING (DD018) AND FORMER WASH RACK DISCHARGE TO DITCH (RW004)

KINGSLEY FIELD
OREGON AIR NATIONAL GUARD
KLAMATH FALLS, OREGON

Contract Number GS00Q14OADU122
Delivery Order Number W9133L20F4011

DRAFT FINAL
July 2021

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July 2021

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Proposed Plan
for Sites DD018 and RW004
Kingsley Field ANGB, Klamath Falls, Oregon

CONTENTS

Note: Words that appear in **bold-faced type** are defined in the glossary of terms.

INTRODUCTION AND PURPOSE

The National Guard Bureau (NGB) and Oregon Air National Guard (ORANG) are issuing this Proposed Plan as part of their public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, commonly referred to as the "Superfund Program." The Proposed Plan will be made available to the public to provide an opportunity to contribute to the decision-making process and to comment on the proposed actions. The Proposed Plan will be available for public review (see information box at the end of this page).

This Proposed Plan documents the following for two sites at the Kingsley Field Air National Guard Base (ANGB) in Klamath Falls, Oregon:

- Excavation and offsite disposal as the recommended remedial alternative to prevent exposure to the constituents of concern (COCs) in soil at the Floor Drain Discharge to Ditch at the Vehicle Maintenance Building (DD018) and the Former Wash Rack Discharge to Ditch (RW004).

This Proposed Plan includes a summary of the site background, site characterization, and **human health risk assessment** (HHRA) and **ecological risk assessment** (ERA), as documented by the Site Investigation (SI) and **Remedial Investigation** (RI). The Proposed Plan also describes the **remedial action objectives** (RAOs) and provides a summary of alternatives analysis, comparison of remedial alternatives, and selection of a **preferred remedy** that addresses the COCs in soil at Sites DD018 and RW004. The remedial approach supporting the determination of the preferred remedy is described in this Proposed Plan.

Community members are invited to comment on the Proposed Plan for Sites DD018 and RW004 during the 30-day public comment period. The public comment period starts August 3, 2021 and ends September 2, 2021. If it is determined that there is sufficient public interest based on the public comments received on this Proposed Plan, ORANG will host a public meeting to discuss the preferred remedy as presented in this Proposed Plan. NGB, ORANG, and Oregon Department of Environmental Quality (ODEQ) representatives will be on hand to discuss the Proposed Plan, answer questions, and accept comments.

DATES TO REMEMBER – MARK YOUR CALENDAR:

Proposed Plan Public Review and Comment Period:

Dates – August 3, 2021 to September 2, 2021

Each of the public comments received will be carefully evaluated and summarized with responses to the comments provided in the "Responsiveness Summary" section of the **Record of Decision** (ROD). NGB and ORANG, in consultation with ODEQ, will make the final selection of remedy for the sites for incorporation into the ROD. (Note: The preferred remedy identified in this Proposed Plan for Sites DD018 and RW004 will become the selected remedy following approval of the ROD.)

This Proposed Plan summarizes information from the Preliminary Assessments (PAs) (BB&E 2010, ERM 2012), SI (ANG 2014), RI (Leidos 2017a), Focused Feasibility Study (FFS) (Leidos 2017b), and other relevant site-specific documents in the **Administrative Record**. The Proposed Plan and the supporting documents are available for public review at the locations provided below.

Available online at the following link:

https://www.173fw.ang.af.mil/Resources/Environmental-Information/

or

https://ar.afcec-cloud.af.mil/

Other records can be made available upon written requests submitted to the Kingsley Field Public Affairs Office:

173rd Fighter Wing Public Affairs
211 Arnold Avenue, Kingsley Field
Klamath Falls, OR 97603

INSTALLATION OVERVIEW

Kingsley Field is the home of the 173rd Fighter Wing (FW) in Klamath Falls, Klamath County, in southern Oregon. Kingsley Field ANGB is located on the western side of Crater Lake-Klamath Regional Airport, approximately 4 miles south of the city of Klamath Falls. The entire airport comprises approximately 1,200 acres, owned and operated by the city of Klamath Falls. The 173rd FW leases approximately 256 acres of Exclusive Use Area in the western portion of Kingsley Field. The Kingsley Field ANGB location is shown in **Figure 1**.

In 1942, the U.S. Navy opened the Klamath Falls Naval Station at this location and built many hangars and three paved runways prior to its departure in 1946. In 1954, the U.S. Air Force (USAF) took interest in the property and established an all-weather fighter-interceptor squadron and an aircraft warning and control squadron at the Station. The facility name was changed to Kingsley Field in 1956 to honor Second Lieutenant David R. Kingsley, a Medal of Honor recipient, who was killed in action on June 23, 1944, during a bombing mission over the oil fields of Ploesti, Romania.

In 1971, the USAF unit relocated and only a small alert detachment remained at Kingsley Field, permanently departing in 1979. ORANG began stationing units at Kingsley Field at this time (1971) with the 104th Tactical Control Squadron. In 1983, the 8123rd Fighter Interceptor Training Squadron was activated at Kingsley Field; its mission was to provide operational training and air defense training for F-4 Phantom pilots and weapons officers. In 1984, the 8123rd Fighter Interceptor Training Squadron was re-designated as the 114th Fighter Squadron, and in 1998, the unit converted to an F-16 schoolhouse. F-16 Flight Surgeon training was added to the unit in 1990, and in 1994, training for optometrists and dentists was added to orient military doctors to high-performance flight.

In 1995, the Air National Guard (ANG) assumed control of the airport tower from the Federal Aviation Administration and began establishment of the 270th Air Traffic Control Squadron. In 1996, when the 173rd FW was activated, the 114th Fighter Squadron became the flying component of the 173rd FW.

In 1998, the 173rd FW converted to the F-15 Eagle. The 173rd FW is currently composed of the 173rd Operations Group, the 173rd Maintenance Group, the 173rd Mission Support Group, and the 173rd Medical Group. Kingsley Field also continues to host the 270th Air Traffic Control Squadron.

The topography of Kingsley Field is relatively flat, although regionally, the area slopes gently to the east. The local topography generally slopes to the north toward the Bird Creek drainage area. Crater Lake-Klamath Regional Airport is 4095 feet above mean sea level (amsl) with Kingsley Field averaging 4,089 feet amsl.

The two sites are located at the Vehicle Maintenance Area (VMA), roughly 1/2 mile south/southeast of the main 173rd FW Installation (**Figure 1**).

The Defense Environmental Restoration Program (DERP) was established in 1984 to promote and coordinate efforts for the evaluation and cleanup of contamination at U.S. Department of Defense (DoD) installations. In 1987, DERP became part of CERCLA and the Superfund Amendments and Reauthorization Act of 1986. The **Installation Restoration Program** (IRP) was established under DERP to identify, investigate, and remediate contamination at DoD installations. The IRP focuses on remediation associated with past DoD operations to ensure that threats to public health are eliminated and to restore natural resources for future use following applicable or relevant and appropriate Federal, state, and local standards. The ANG Command manages the ANG IRP sites nationwide and works closely with ORANG to investigate, clean up, and eventually close IRP sites in Oregon.

Sites Included in this Proposed Plan

This Proposed Plan focuses on two sites at Kingsley Field ANGB. The sites included in this Proposed Plan are:

- Floor Drain Discharge to Ditch at the Vehicle Maintenance Building (DD018)
- Former Wash Rack Discharge to Ditch (RW004).

DESCRIPTION OF THE SITES

Description of the sites, relevant site characterization, and the human health and ecological **risk** evaluation results are summarized in the site-specific sections. The site locations are shown in **Figure 2**. The risk evaluations are important because they form the basis for the selection of site contaminants and the recommendations for each site. The following paragraphs summarize the methodology used to conduct background comparison, baseline human health and ecological risk evaluations, fate and transport modeling, and hot spot evaluation.

Legend

Area of Concern

Installation Boundary*

*Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 11/05/2014.

N

0 250 500 1,000 1,500 Feet

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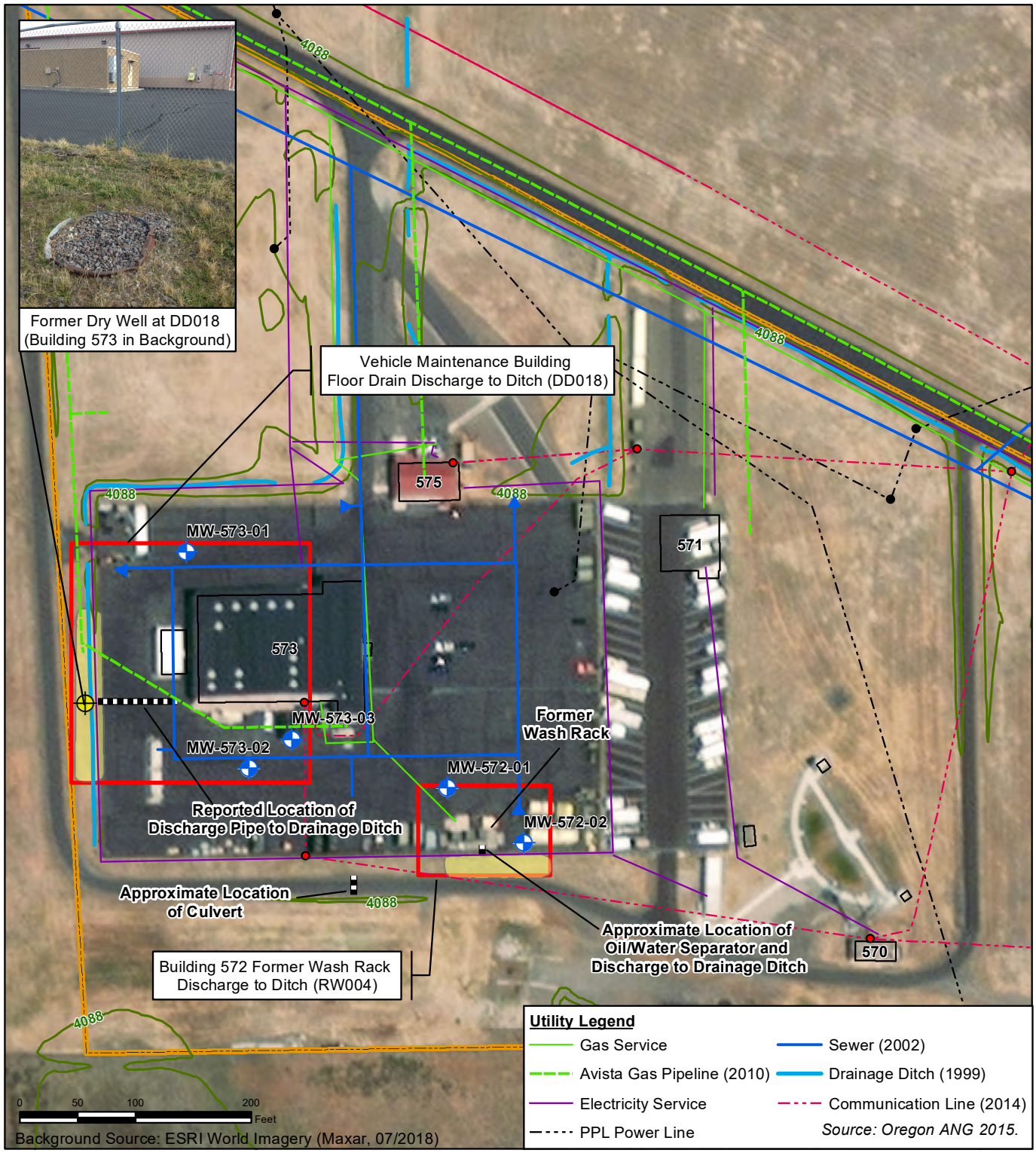
LOCATION OF COMPLIANCE
RESTORATION PROGRAM (CRP)
SITES IDENTIFIED IN RI/FS
AT KINGSLEY FIELD

173rd FIGHTER WING
KLAMATH FALLS, OREGON

PROJECT: \ANG FY20 Nationwide PP_ROD\z_GIS\Kingsley \Projects\PP\Figure 1 Location Map.mxd

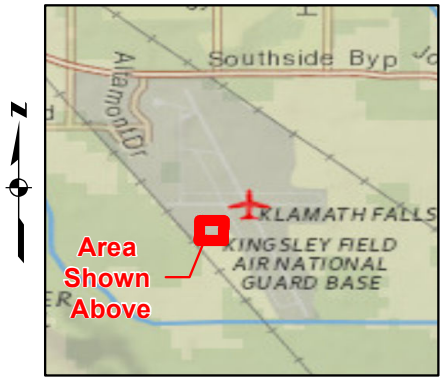
FIGURE: 1	DATE: 12/21/2020



Legend

- SI Monitoring Well
- 2-ft Topographic Contour (NAVD88)*
- Extent of SI Surface Soil Sampling
- Area of Concern
- Building
- Installation Boundary*
- Former Dry Well at DD018

*Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 11/05/2014. NAVD88 = North American Vertical Datum of 1988.



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SITE FEATURES AT THE
VEHICLE MAINTENANCE AREA

173rd FIGHTER WING
KLAMATH FALLS, OREGON

PROJECT: \ANG FY20 Nationwide PP_ROD\z_GIS\Kingsley \Projects\PP\Figure 2 Site Features.mxd

FIGURE: 2	DATE: 11/30/2020

Background Comparison

Inorganic (metals) site **concentrations** are compared to regional background metals concentrations established for the Basin and Range region in Oregon (ODEQ 2013). Site concentrations statistically consistent with background levels are considered as natural background. Metals with concentrations exceeding the background levels are assumed to be **site related**. Detected organic compounds are considered site related because background concentrations of organics are assumed to be zero.

Human Health Risk Assessment

An HHRA was conducted for the RI Report, using soil and groundwater data collected during the 2012 SI and 2015 RI field investigations (Leidos 2017a). The objective of the HHRA included evaluation of the potential risks to human health associated with current and potential future exposures to contaminants if no remedial action is conducted for each site. This assessment represents the risks for the 'no action' alternative for the FFS. The HHRA evaluates potential exposures to **groundwater** and soil for appropriate receptors at the site. The current and expected future site use of Kingsley Field ANGB is expected to be industrial. Plausible receptor scenarios include an industrial worker, a construction worker, and an excavation worker. Risks to a hypothetical future resident also were quantified. ORANG currently leases property from the Klamath Falls Airport, and the utilization of land use beyond the lease period (2045) is unknown.

The HHRA for the sites consisted of a comparison of detected concentrations in site soil and groundwater to **applicable or relevant and appropriate requirements** (ARARs), including ODEQ regulatory criteria. Other ARARs included Federal maximum contaminant levels (MCLs), U.S. Environmental Protection Agency (USEPA) regional screening levels (RSLs), and state and Federal surface water criteria.

Concentrations in soil were compared to the November 2015 ODEQ risk-based concentration (RBC) screening criteria (ODEQ 2015) as follows:

- RBCs for soil ingestion, dermal contact, and inhalation under the occupational receptor scenario
- RBCs for soil ingestion, dermal contact, and inhalation under the construction and excavation worker scenario
- RBCs for vapor intrusion into buildings under the occupational receptor scenario
- USEPA industrial RSLs for direct contact (USEPA 2015)
- Regional background levels of metals in soils (ODEQ 2013).

Concentrations in groundwater were compared to ODEQ criteria as follows:

- Occupational volatilization to outdoor air inhalation
- Occupational volatilization to vapor intrusion in buildings
- RBCs for groundwater ingestion, dermal contact, and inhalation under the construction and excavation worker scenario
- USEPA MCLs (if established).

Risk-based criteria take into consideration cancer and noncancer effects. For **chemicals** that are known to have carcinogenic effects, the criteria are calculated using scenario-specific exposure assumptions, a cancer slope factor (which is the slope of the dose-response curve from laboratory studies), and an acceptable risk as the target (i.e., ODEQ uses 1 in 1,000,000 [1×10^{-6}]). Cancer risk is expressed as the probability of an individual developing cancer over his/her lifetime. For chemicals that exhibit noncarcinogenic effects, the criteria are calculated using exposure assumptions, a reference dose (RfD) or reference concentration (RfC) (i.e., a concentration at which no adverse health effects are expected), and an acceptable target hazard quotient (HQ) (i.e., ODEQ uses an HQ of 1). The target HQ of 1 is the ratio of the intake to the RfD/RfC. However, per ODEQ guidance (ODEQ 2010), the non-cancer RBCs were adjusted to an HQ of 0.1 for HHRA screening purposes. USEPA RSLs used in the HHRA correspond to a cancer risk of 1E-6 and a noncancer HQ of 0.1 (Leidos 2017a).

The HHRA also evaluated carcinogenic polynuclear aromatic hydrocarbons (cPAHs) as benzo(a)pyrene equivalents to quantify human health risk, in accordance with ODEQ guidance that states that cPAHs are to be considered as a single hazardous substance for assessing human health risk (ODEQ 2015).

Ecological Risk Assessment

A screening-level ecological risk assessment (SLERA) was conducted for the two sites (DD018 and RW004) during the RI according to USEPA's *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA 1997) and ODEQ's *Guidance for Ecological Risk Assessments* (ODEQ 1998). In a

SLERA, site-related contaminants and ecological exposure pathways are identified.

Fate and Transport

Contaminant fate and transport (F&T) modeling was conducted as part of the 2015 RI to assess the potential for contaminants at the two sites to leach from soil and impact groundwater beneath the site and downgradient receptor locations. Computer-based contaminant F&T analyses were performed to predict the rate of contaminant migration in the identified primary transport media and to project likely future contaminant concentrations at receptor locations through these media. The ultimate objectives of these analyses are to evaluate potential future impacts to human health and the environment and to provide a basis for evaluating the effectiveness of the future remedial alternatives (Leidos 2017a).

F&T modeling was used to simulate vertical transport of contaminants from a principal source area containing maximum observed contaminants in soil to groundwater, as well as horizontal transport within the groundwater system from the source area to receptor locations. No primary contaminant sources are located on the two sites. Secondary sources (contaminated media) include soil at DD018 and RW004. Based on the SI and RI data, constituents of interest consisted of polynuclear aromatic hydrocarbons (PAHs).

Soil leachability analysis is a screening analysis performed prior to F&T modeling to define contaminant migration constituents of potential concern (CMCOPCs). CMCOPCs are defined as chemicals with potential to leach to groundwater and migrate to a downgradient receptor location at concentrations exceeding respective RSLs. Soil screening analysis and Seasonal Soil Compartment (SESOIL) modeling were performed for the initial CMCOPC at each site (naphthalene) that has the potential to reach the water table within 1,000 years based on the soil screening analysis results.

For F&T, all soil concentrations are screened against USEPA MCL-based generic soil screening levels (GSSLs). If the GSSL for a chemical was not available, the USEPA risk-based soil screening level (SSL) for groundwater migration (HQ of 1) was used (USEPA 2015).

Hot Spot Evaluation

Evaluation of 'hot spots' in water and media other than water (e.g., soil, sediment, and sludges) is required when conducting a **Feasibility Study** (FS), according to Oregon's Environmental Cleanup Rules (Oregon Administrative Rules [OAR] 340-122-080 and 340-122-085). Results from the 2012 SI eliminated groundwater as a medium of concern. Based on results from the 2015 RI, an evaluation of hot spots in soil was conducted for the FFS to evaluate whether cPAH concentrations in surface soil at Sites DD018 and RW004 and subsurface soil at Site RW004 can be reliably contained. A hot spot in contaminated soil is defined in OAR 340-122-115(31)(b) as media other than groundwater or surface water (e.g., contaminated soil, debris, sediments, and sludges; drummed waste) in which hazardous substances present a risk to human health or the environment exceeding the acceptable risk level to the extent to which the hazardous substances are present in concentrations exceeding RBCs of either: (a) 100 times the acceptable risk level for human exposure to each individual carcinogen, (b) 10 times the acceptable risk level for human exposure to each individual non-carcinogen, or (c) 10 times the acceptable risk level for individual ecological receptors or populations of ecological receptors to each individual hazardous substance. In addition, a hot spot in contaminated soil exists if the hazardous substances are reasonably likely to migrate to such an extent that it would pose a significant adverse effect on beneficial uses of water, or if the hazardous substances are not reliably containable.

FLOOR DRAIN DISCHARGE TO DITCH AT THE VEHICLE MAINTENANCE BUILDING (DD018)

Site Background

The site boundary of DD018 encompasses an area both inside the maintenance yard perimeter fence and outside the fence, adjacent to the asphalt road (**Figure 2**). According to the *Compliance Restoration Program – Western Region 1, Final Site Investigation Report, 173rd Fighter Wing, Oregon Air National Guard, Kingsley Field, Klamath Falls, Oregon* (ANG 2014), floor drains located inside the former Vehicle Maintenance Building (Building 573) formerly discharged westward via a subsurface pipe to a drainage ditch located outside the current perimeter fence. A ground-penetrating radar (GPR) utility survey was conducted during the 2015 RI field activities (Leidos 2017a) to confirm the presence or absence of the subsurface pipe and, if possible, to trace the underground pipe to its discharge location. The GPR utility locator was able to trace the former floor drain discharge pipeline from approximately 15 feet west of the southwestern corner of Building 573 directly to a former dry well, where it terminated. The RI Report (Leidos 2017a) noted that the discharge pipeline was approximately 1.5 to 2 feet below ground surface (bgs) and likely became shallower as it approached the dry well (**Figure 2**).

Note that Site DD018 is fairly flat with no evident depressions or other surface features indicating a pathway for concentrated flow; thus, the term 'ditch' is a misnomer based upon current site conditions. However, historical plans associated with the VMA indicated a former wet-weather conveyance or ditch running north-south approximately 30 feet west of the existing maintenance area fence line (**Figure 2**).

Site Characterization

Previous investigations at Site DD018 have consisted of PAs in 2010/2012 (BB&E 2010, ERM 2012), an SI in 2012 (ANG 2014), and an RI in 2015 (Leidos 2017a). Detailed site characterization discussion is provided in the RI Report (Leidos 2017a). The overall site characterization results for Site DD018 are summarized below.

2010/2012 Preliminary Assessments

In November 2010, a PA/Trip Report site visit was conducted at Kingsley Field. The purpose of the site visit was to investigate and identify areas of concern (AOCs) at the Base. The Trip Report indicated that the former floor drains in the vehicle maintenance bays historically drained to the adjacent stormwater ditch. Due to the maintenance activities in the building and use of chemicals, including petroleum, oil, and lubricants, the Trip Report identified this site as an AOC and recommended soil and groundwater sampling (BB&E 2010).

A second PA was conducted at Kingsley Field in May 2012. The 2012 PA supplements information collected during the previous November 2010 PA to assist in planning the subsurface investigation efforts. The PA recommended surface soil samples and surface water (if observed during the SI) samples will be collected from the drainage ditch at this location (ERM 2012).

2012 SI Activities

Four surface soil samples were collected at 0.5 feet bgs outside the fence along the western edge of the VMA and analyzed for **volatile organic compounds** (VOCs), **semivolatile organic compounds** (SVOCs), total petroleum hydrocarbons (TPH), and metals. Analytes were screened against the project screening goals (PSGs): ODEQ occupational RBCs, where available, and USEPA industrial soil RSLs for constituents that do not have established ODEQ occupational RBCs. SVOCs were detected in each of the surface soil samples; only benzo(a)pyrene concentrations (520 to 1,200 micrograms per kilogram [µg/kg]) exceeded the PSG of 290 µg/kg (**Figure 3**). No other analytes exceeded PSGs (ANG 2014).

During the 2012 SI, three soil borings were advanced within the former Vehicle Maintenance Building (Building 573) to total depths ranging from 7 to 10 feet bgs (**Figure 3**). Soil samples were collected from each boring at 3 and 7 feet bgs, and one additional sample was collected at 10 feet bgs. In addition, three groundwater monitoring wells were installed at the site, including one upgradient well to the northwest and two downgradient wells to the south/southeast of Building 573 (**Figure 2**). Two groundwater samples were collected from each well. All soil and groundwater samples were analyzed for the same parameters as surface soil samples. No constituents in subsurface soil or groundwater were detected at concentrations above PSGs (ANG 2014).

2015 RI Activities

Twenty-three soil samples from 13 borings were collected from west of the VMA fence line at Site DD018 to define the nature and extent of contamination both vertically and laterally across Site DD018 (**Figure 3**). Nine primary samples were sent for immediate analysis of PAHs. Locations for the

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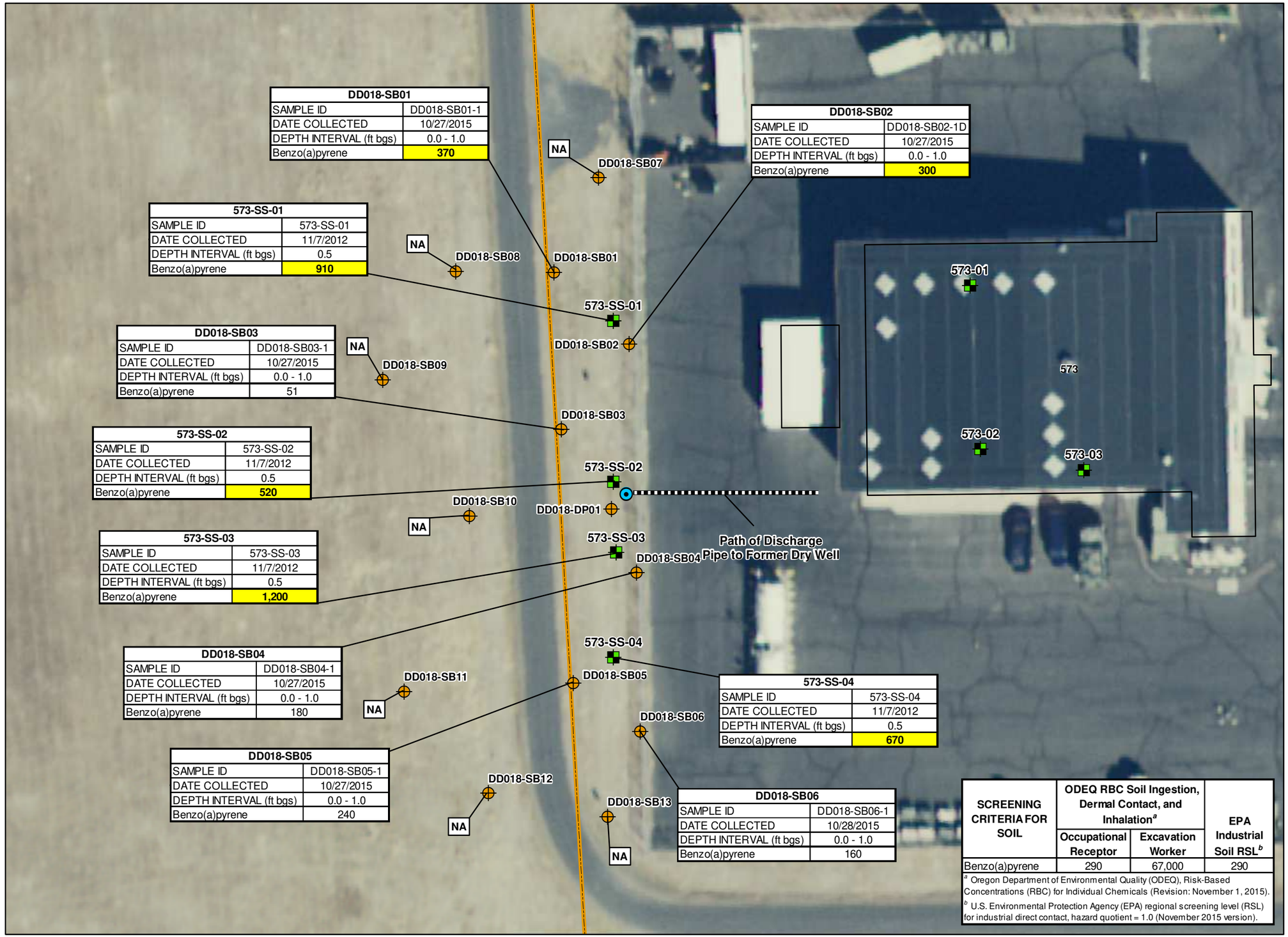

SCREENING CRITERIA FOR SOIL	ODEQ RBC Soil Ingestion, Dermal Contact, and Inhalation[a]		EPA Industrial Soil RSL[b]
	Occupational Receptor	Excavation Worker	
Benzo(a)pyrene	290	67,000	290

[a] Oregon Department of Environmental Quality (ODEQ), Risk-Based Concentrations (RBC) for Individual Chemicals (Revision: November 1, 2015).
[b] U.S. Environmental Protection Agency (EPA) regional screening level (RSL) for industrial direct contact, hazard quotient = 1.0 (November 2015 version).

LEGEND:

- 2015 RI Soil Boring
- 2012 SI Soil Boring
- Building
- Installation Boundary*
- Former Dry Well at DD018

XXX.....Detected concentration exceeds the ODEQ RBC for the Occupational Receptor
BGS.....Below ground surface
J.....Detected at the estimated concentration shown
NA.....Not analyzed (Contingency sample)
U.....Not detected at or above the concentration shown

NOTES:

1. All units are reported in µg/kg.
2. Soil samples were analyzed for polyaromatic hydrocarbons (PAHs); only constituents detected above screening criteria are shown.
3. Only the maximum detected value is reported between the grab sample and duplicate, when applicable.
4. 2012 analytical data as reported in the Final Site Investigation Report (ANG 2014).
5. Subsurface samples (3-4 ft bgs) were collected from DD018-SB01, -SB03, and -SB05. Subsurface samples were not collected from DD018-SB02, -SB04, or -SB06 due to the presence of a buried electrical line. All subsurface sample results were reported as non-detect or below screening criteria.
6. Soil and groundwater samples were collected from DP-1 in October 2015 to assess potential impacts from the former dry well; all sample results were below screening values.
7. * Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 11/05/2014. Background Source: 2018 Oregon Statewide Imagery Program (OSIP) (https://oregonexplorer.info/).

0 10 20 40 Feet

173rd FIGHTER WING
KLAMATH FALLS, OREGON

2012 AND 2015 SURFACE SOIL EXCEEDANCES AT FLOOR DRAIN DISCHARGE TO DITCH AT VEHICLE MAINTENANCE BUILDING (DD018)

FIGURE: 3 | DATE: 11/30/2020

PROJECT: \ANG FY20 Nationwide PP_ROD\z_GIS\Kingsley\Projects\PP\Figure 3 DD018 2012-15 Surface Screening_11x17.mxd

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remaining 14 samples were determined based upon results of the primary samples. In general, two soil samples were collected from each soil boring: one from 0 to 1 foot bgs and a second from 3 to 4 feet bgs (Leidos 2017a).

The horizontal and vertical extents of PAH contamination in soil above industrial criteria were delineated based on respective ODEQ RBCs and USEPA industrial RSLs with 18 soil borings installed during both the SI and RI.

One cPAH, benzo(a)pyrene, was detected in 10 of 10 surface soil samples collected at concentrations ranging from 51 to 1,200 µg/kg during the 2012 SI and 2015 RI (**Figure 3**). Benzo(a)pyrene concentrations exceeded the ODEQ RBC and USEPA industrial RSL (290 µg/kg) in 6 of the 10 detected samples.

The nature and extent of cPAH contamination at Site DD018 has been fully delineated, as reported in the RI Report (Leidos 2017a). The horizontal extent of cPAH-impacted soil above ODEQ criteria encompasses the non-paved area approximately 70 feet north and 70 feet south of the dry well in the vicinity of Site DD018. cPAH contamination in soil is limited vertically to less than 3 feet bgs (**Figure 3**).

Summary of Site Risks

F&T Modeling

Soil screening analysis and SESOIL modeling were performed for the initial CMCOPC at Site DD018 (naphthalene) that has the potential to reach the water table within 1,000 years based on the soil screening analysis results. Naphthalene was predicted to exceed the RSL in leachate beneath Site DD018. Based on the soil screening and SESOIL modeling, only naphthalene in soil was retained as a CMCOPC for Site DD018.

Lateral transport modeling showed the maximum predicted concentration of naphthalene in groundwater at Site DD018 would not exceed the lowest screening criterion (risk-based RSL) beneath the source or at the downgradient receptor location within 1,000 years. This is consistent with the SI groundwater sampling data because naphthalene was not detected in monitoring wells located in the vicinity of Site DD018. In addition, it is important to note that the predicted naphthalene concentration beneath the source and at the downgradient receptor location also did not exceed the occupational ODEQ groundwater RBC. Therefore, naphthalene was not identified as a contaminant migration chemical of concern (CMCOC) at Site DD018 (Leidos 2017a).

A qualitative assessment of the sample results was performed, and the limitations and assumptions of the models were considered to identify if any CMCOCs are present in soil at Kingsley Field ANGB that may potentially impact groundwater. The assessment concluded that there are no CMCOCs in soil, and that the sites investigated is not adversely impacting groundwater quality based on the 2012 SI and 2015 RI data and are not predicted to have any future impacts. **No further action** (NFA) is required for soil at Site DD018 to be protective of groundwater.

HHRA

An HHRA for Site DD018 consisted of a comparison of detected concentrations in site soil and groundwater to conservative risk-based ODEQ RBC criteria. The HHRA criteria used to select the COCs were discussed earlier in the Description of Sites section (see Page 2).

During the 2012 SI, groundwater was eliminated as a medium of concern at Site DD018 and was not evaluated in the RI. Within the defined boundary of this AOC, subsurface soil located within Building 573 also was eliminated as a medium of concern. Therefore, groundwater analytical data collected from three monitoring wells and subsurface soil data collected from three borings located within Building 573 were not evaluated in the 2015 RI. In addition, TPH and VOCs were eliminated as COCs in soil and also were not evaluated in the 2015 RI (Leidos 2017b).

Six cPAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, and indeno[1,2,3-cd]pyrene) were identified as carcinogenic in the HHRA for Site DD018. Based on recent ODEQ guidance, cPAHs are to be considered as a single hazardous substance for assessing human health risk (ODEQ 2015). Therefore, total cPAHs were represented as benzo(a)pyrene equivalents and used to quantify human health risk in soil at Site DD018. Benzo(a)pyrene was identified as the only human health constituent of potential concern (COPC). The HHRA concluded for Site DD018 that cPAHs were the only COCs in soil for the hypothetical future resident (**Table 1**).

The total estimated incremental lifetime cancer risk (ILCR) for exposure to cPAHs under occupational land use scenarios ranges from 2E-9 for a short-term excavation worker exposed to subsurface soil to 4E-7 for a longer-term industrial worker exposed to surface soil. These risks fall within the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) acceptable range of 10-6 to 10-4 and are below the ODEQ maximum ILCR of 1E-6. Therefore, NFA was recommended for soil under the occupational land use scenario (Leidos 2017a).

Table 1. Summary of COCs at the Floor Drain Discharge to Ditch at the Vehicle Maintenance Building (DD018)

PAHs Detected Above ODEQ RBCs and USEPA RSLs	F&T	Human Health			Ecological
		Industrial Worker	Construction Worker	Hypothetical Future Resident	
Floor Drain Discharge to Ditch at the Vehicle Maintenance Building (DD018)					
Benzo(a)pyrene	None	None	None	cPAHs	None

COC = Constituent of Concern
cPAH = Carcinogenic Polynuclear Aromatic Hydrocarbon
F&T = Fate and Transport
ODEQ = Oregon Department of Environmental Quality
PAH = Polynuclear Aromatic Hydrocarbon
RBC = Risk-Based Concentration
RSL = Regional Screening Level
USEPA = U.S. Environmental Protection Agency

The total estimated ILCR under a residential land use scenario is 8E-6. Although the risk for the hypothetical future resident falls within the acceptable NCP risk range, it exceeds the ODEQ maximum acceptable risk value. Based upon this result, further action (evaluation in an FS) was recommended for surface soil at Site DD018 to determine a path forward if future residential development were to be considered (Leidos 2017a).

Ecological Risk Assessment

A streamlined SLERA was completed for Site DD018 following USEPA guidance (USEPA 1997). Due to the limited exposure potential at the site, adequate information is available with which to conclude that ecological risks are negligible. Therefore, only Step 1 (Problem Formulation and Ecological Effects Evaluation) of USEPA's eight-step process for ERA was completed.

Due to the limited habitat quality (maintained grassy strips with no trees or shrubs to provide cover from predators) and quantity, the ERA concluded no natural habitat is present and no complete pathways in surface soil exist. Regardless of how the small grassy area at the site is defined (as natural habitat or not), they are unlikely to attract many, if any, ecological receptors. Those that might occur at the site are likely to be urban-adapted. In addition, the site is bounded by the VMA and a road and are within 1,000 feet of one of the Klamath Falls Airport runways where flight noise and activity would be further deterrents to wildlife activity.

Although surface and subsurface soil at the site is impacted, limited wildlife activity is expected; therefore, limited ecological exposures to these media are expected. Surface water and sediment are not present at the site. Groundwater at the site is not contaminated. Thus, ecological risks are negligible from surface soil, subsurface soil, surface water, sediment, and groundwater because no complete exposure pathways exist.

Hot Spot Evaluation

According to Oregon's Environmental Cleanup Rules (OAR 340-122-080 and 340-122-085), an evaluation of 'hot spots' in water and media other than water (e.g., soil, sediment, and sludges) is required when conducting an FS. The calculated carcinogenic risks, developed during the baseline HHRA, correspond to levels below the hot spot ILCR criteria. The F&T evaluation concluded that contaminants are not likely to migrate vertically through the soil to the shallow water table or laterally to the nearest downgradient receptor location (a drainage ditch located approximately 4,800 feet from the source area). In addition, the ERA determined that ecological risks are negligible due to limited habitat quality, the absence of wildlife present, and the absence of surface water and sediment at Site DD018. Based on these evaluations, it was determined that Site DD018 does not contain hot spot areas.

FORMER WASH RACK DISCHARGE TO DITCH (RW004)

Site Background

Wastewater from a former wash rack located in the southeastern portion of the VMA reportedly was transported to a second drainage ditch located south of and immediately adjacent to the former wash rack at Building 572 (ANG 2014). The site boundary of Site RW004, as documented in the 2014 SI Report and shown in **Figure 2**, encompasses areas both inside the maintenance yard perimeter fence and outside the fence, adjacent to the asphalt road.

This area is fairly flat with no evident depressions or other surface features indicating a pathway for concentrated flow; thus, the term 'ditch' is a misnomer based upon current site conditions. However, as with Site DD018, historical drawings associated with the former wash rack imply that a ditch running east-west previously existed to the south of the current maintenance area fence line. Site features are illustrated in **Figure 2**.

Site Characterization

Previous investigations at Site RW004 have consisted of PAs in 2010/2012 (BB&E 2010, unknown author and date), an SI in 2012 (ANG 2014), and an RI in 2015 (Leidos 2017a). A detailed site characterization discussion is provided in the RI Report (Leidos 2017a). The overall site characterization results for Site RW004 are summarized below.

2010/2012 Preliminary Assessments

In November 2010, a PA/Trip Report site visit was conducted at Kingsley Field ANGB. The purpose of the site visit was to investigate and identify AOCs at the Base. The Trip Report identified the ditch and former wash rack area as an AOC and recommended soil and groundwater sampling (BB&E 2010).

A second PA was conducted at Kingsley Field ANGB in May 2012. The 2012 PA supplements information collected during the previous November 2010 PA to assist in planning the subsurface investigation efforts. The PA recommended surface soil samples and surface water (if observed during the SI) samples to be collected from the drainage ditch at this location (ERM 2012).

2012 SI Activities

Four surface soil samples were collected at 0.5 feet bgs outside the fence along the southern edge of the VMA, south of the former wash rack, and analyzed for VOCs, SVOCs, TPH, and metals (**Figure 4**). SVOCs were detected in each of the four surface soil samples; four PAHs were detected at concentrations above PSGs in one or more surface soil samples. These included benzo(a)pyrene up to 3,800 µg/kg, more than 10 times the PSG of 290 µg/kg; benzo(b)fluoranthene up to 5,200 µg/kg, above the PSG of 2,900 µg/kg; dibenzo(a,h)anthracene up to 780 µg/kg, above the PSG of 290 µg/kg; and indeno(1,2,3-cd)pyrene up to 3,300 µg/kg, slightly above the PSG of 2,900 µg/kg. No other analytes exceeded the PSGs (ANG 2014).

During the 2012 SI, three soil borings were installed at the former wash rack area (**Figure 4**). Soil samples were collected from each boring at 3 and 7 feet bgs. In addition, two groundwater monitoring wells were installed at the site, including one upgradient well to the northwest and one well to the southeast of the former wash rack but still north of the drainage ditch. Two groundwater samples were collected from each well. All soil and groundwater samples were analyzed for the same parameters. No analytes were detected at concentrations above PSGs in subsurface soil or groundwater (ANG 2014).

2015 RI Activities

Twenty-four soil samples from 12 borings were collected to the south of the VMA fence line to define the nature and extent of contamination both vertically and laterally across Site RW004 (**Figures 4 and 5**). Fourteen primary samples were sent for immediate analysis of PAHs. Locations for the remaining 10 samples were determined based upon results of the primary samples. Two soil samples were collected from each soil boring: one from 0 to 1 foot bgs and a second from 3 to 4 feet bgs (Leidos 2017a).

The horizontal and vertical extents of PAH contamination in soil were delineated based on respective ODEQ RBCs and the USEPA industrial RSLs with 16 soil borings installed during both the SI and RI.

Surface soil samples (i.e., samples collected from 0 to 1 foot bgs) collected during the 2012 SI and 2015 RI identified five cPAHs at concentrations greater than the industrial screening criteria. cPAH detections included benzo(a)anthracene at concentrations ranging from 2.8 to 3,000 µg/kg; benzo(a)pyrene at concentrations ranging from 4.5 to 3,800 µg/kg; benzo(b)fluoranthene at concentrations ranging from 7 to 5,200 µg/kg; dibenzo(a,h)anthracene at concentrations ranging from 1.7 to 780 µg/kg; and indeno(1,2,3- cd)pyrene detected in all 16 surface soil samples at concentrations ranging from 5.5 to 3,300 µg/kg.

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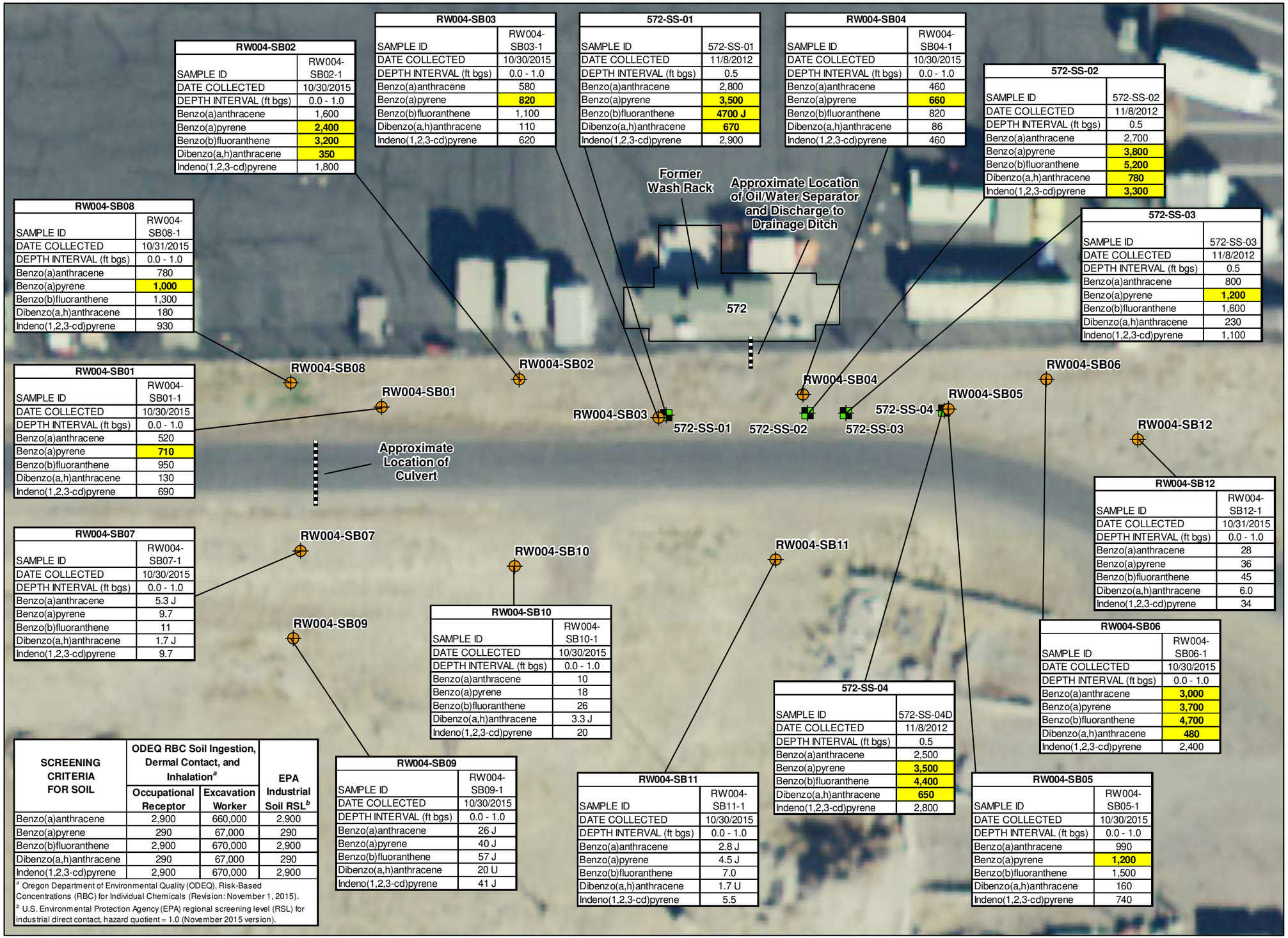

RW004-SB02	
SAMPLE ID	RW004-SB02-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	1,600
Benzo(a)pyrene	**2,400**
Benzo(b)fluoranthene	**3,200**
Dibenzo(a,h)anthracene	**350**
Indeno(1,2,3-cd)pyrene	1,800

RW004-SB03	
SAMPLE ID	RW004-SB03-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	580
Benzo(a)pyrene	**820**
Benzo(b)fluoranthene	1,100
Dibenzo(a,h)anthracene	110
Indeno(1,2,3-cd)pyrene	620

572-SS-01	
SAMPLE ID	572-SS-01
DATE COLLECTED	11/8/2012
DEPTH INTERVAL (ft bgs)	0.5
Benzo(a)anthracene	2,800
Benzo(a)pyrene	**3,500**
Benzo(b)fluoranthene	**4700 J**
Dibenzo(a,h)anthracene	**670**
Indeno(1,2,3-cd)pyrene	2,900

RW004-SB04	
SAMPLE ID	RW004-SB04-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	460
Benzo(a)pyrene	**660**
Benzo(b)fluoranthene	820
Dibenzo(a,h)anthracene	86
Indeno(1,2,3-cd)pyrene	460

572-SS-02	
SAMPLE ID	572-SS-02
DATE COLLECTED	11/8/2012
DEPTH INTERVAL (ft bgs)	0.5
Benzo(a)anthracene	2,700
Benzo(a)pyrene	**3,800**
Benzo(b)fluoranthene	**5,200**
Dibenzo(a,h)anthracene	**780**
Indeno(1,2,3-cd)pyrene	**3,300**

572-SS-03	
SAMPLE ID	572-SS-03
DATE COLLECTED	11/8/2012
DEPTH INTERVAL (ft bgs)	0.5
Benzo(a)anthracene	800
Benzo(a)pyrene	**1,200**
Benzo(b)fluoranthene	1,600
Dibenzo(a,h)anthracene	230
Indeno(1,2,3-cd)pyrene	1,100

RW004-SB08	
SAMPLE ID	RW004-SB08-1
DATE COLLECTED	10/31/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	780
Benzo(a)pyrene	**1,000**
Benzo(b)fluoranthene	1,300
Dibenzo(a,h)anthracene	180
Indeno(1,2,3-cd)pyrene	930

RW004-SB01	
SAMPLE ID	RW004-SB01-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	520
Benzo(a)pyrene	**710**
Benzo(b)fluoranthene	950
Dibenzo(a,h)anthracene	130
Indeno(1,2,3-cd)pyrene	690

RW004-SB07	
SAMPLE ID	RW004-SB07-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	5.3 J
Benzo(a)pyrene	9.7
Benzo(b)fluoranthene	11
Dibenzo(a,h)anthracene	1.7 J
Indeno(1,2,3-cd)pyrene	9.7

RW004-SB10	
SAMPLE ID	RW004-SB10-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	10
Benzo(a)pyrene	18
Benzo(b)fluoranthene	26
Dibenzo(a,h)anthracene	3.3 J
Indeno(1,2,3-cd)pyrene	20

RW004-SB09	
SAMPLE ID	RW004-SB09-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	26 J
Benzo(a)pyrene	40 J
Benzo(b)fluoranthene	57 J
Dibenzo(a,h)anthracene	20 U
Indeno(1,2,3-cd)pyrene	41 J

RW004-SB11	
SAMPLE ID	RW004-SB11-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	2.8 J
Benzo(a)pyrene	4.5 J
Benzo(b)fluoranthene	7.0
Dibenzo(a,h)anthracene	1.7 U
Indeno(1,2,3-cd)pyrene	5.5

572-SS-04	
SAMPLE ID	572-SS-04D
DATE COLLECTED	11/8/2012
DEPTH INTERVAL (ft bgs)	0.5
Benzo(a)anthracene	2,500
Benzo(a)pyrene	**3,500**
Benzo(b)fluoranthene	**4,400**
Dibenzo(a,h)anthracene	**650**
Indeno(1,2,3-cd)pyrene	2,800

RW004-SB05	
SAMPLE ID	RW004-SB05-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	990
Benzo(a)pyrene	**1,200**
Benzo(b)fluoranthene	1,500
Dibenzo(a,h)anthracene	160
Indeno(1,2,3-cd)pyrene	740

RW004-SB06	
SAMPLE ID	RW004-SB06-1
DATE COLLECTED	10/30/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	**3,000**
Benzo(a)pyrene	**3,700**
Benzo(b)fluoranthene	**4,700**
Dibenzo(a,h)anthracene	**480**
Indeno(1,2,3-cd)pyrene	2,400

RW004-SB12	
SAMPLE ID	RW004-SB12-1
DATE COLLECTED	10/31/2015
DEPTH INTERVAL (ft bgs)	0.0 - 1.0
Benzo(a)anthracene	28
Benzo(a)pyrene	36
Benzo(b)fluoranthene	45
Dibenzo(a,h)anthracene	6.0
Indeno(1,2,3-cd)pyrene	34

SCREENING CRITERIA FOR SOIL	ODEQ RBC Soil Ingestion, Dermal Contact, and Inhalation[a]		EPA Industrial Soil RSL[b]
	Occupational Receptor	Excavation Worker	
Benzo(a)anthracene	2,900	660,000	2,900
Benzo(a)pyrene	290	67,000	290
Benzo(b)fluoranthene	2,900	670,000	2,900
Dibenzo(a,h)anthracene	290	67,000	290
Indeno(1,2,3-cd)pyrene	2,900	670,000	2,900

[a] Oregon Department of Environmental Quality (ODEQ), Risk-Based Concentrations (RBC) for Individual Chemicals (Revision: November 1, 2015).
[b] U.S. Environmental Protection Agency (EPA) regional screening level (RSL) for industrial direct contact, hazard quotient = 1.0 (November 2015 version).

LEGEND:

- 2015 RI Soil Boring
- 2012 SI Soil Boring
- Building
- Installation Boundary*

XXX.....Detected concentration exceeds the ODEQ RBC for the Occupational Receptor
BGS.....Below ground surface
J.....Detected at the estimated concentration shown
U.....Not detected at or above the concentration shown

NOTES:

1. All units are reported in µg/kg.
2. Soil samples were analyzed for polyaromatic hydrocarbons (PAHs); only constituents detected above screening criteria are shown.
3. Only the maximum detected value is reported between the grab sample and duplicate, when applicable.
4. 2012 analytical data as reported in the Final Site Investigation Report (ANG 2014).
5. * Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 11/05/2014. Background Source: 2018 Oregon Statewide Imagery Program (OSIP) (https://oregonexplorer.info/).

N W E S

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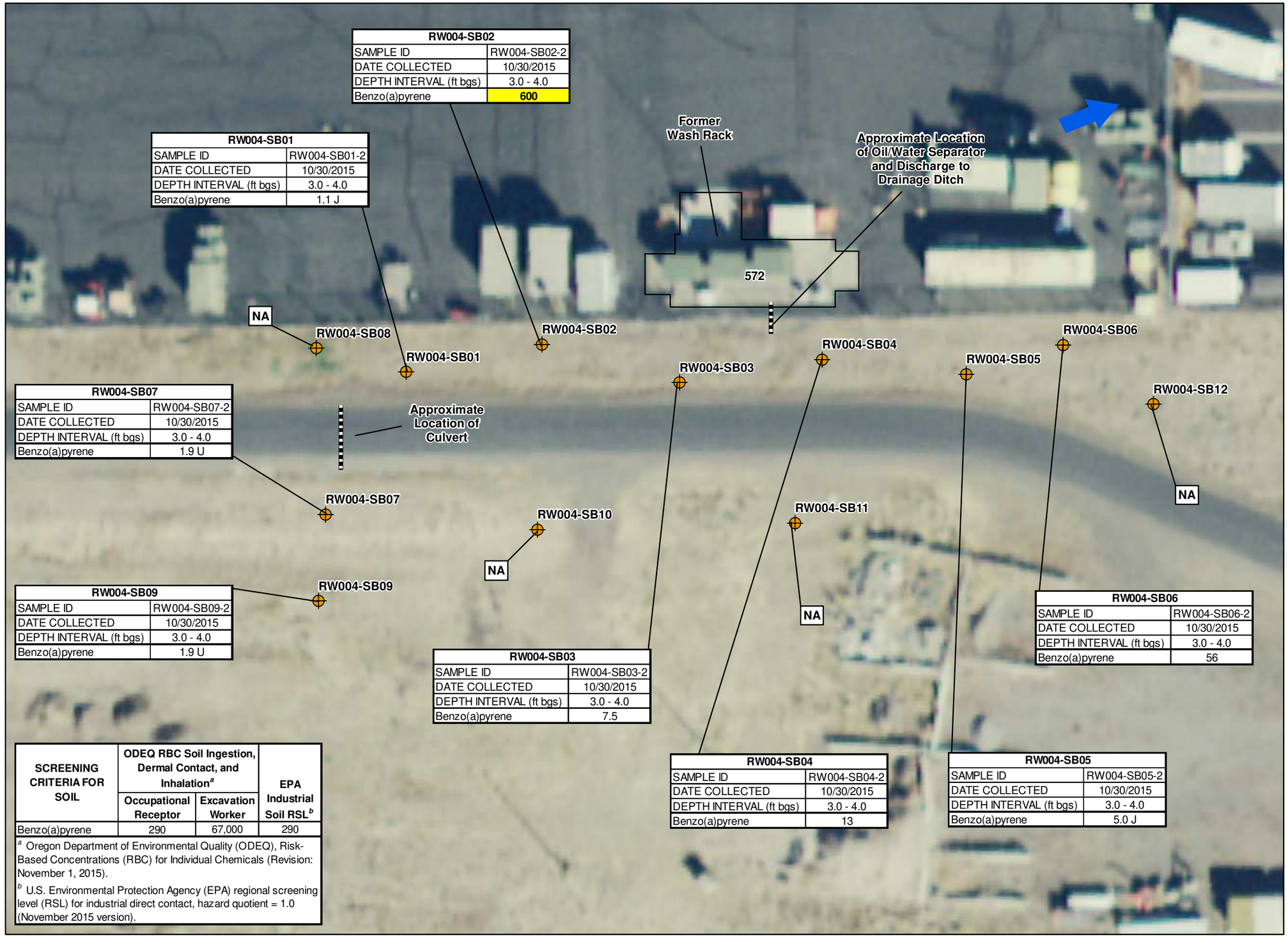
leidos

173rd FIGHTER WING
KLAMATH FALLS, OREGON

2012 AND 2015 SURFACE SOIL EXCEEDANCES AT FORMER WASH RACK DISCHARGE TO DITCH (RW004)

FIGURE: 4 | DATE: 11/30/2020

PROJECT: \ANG FY20 Nationwide PP_ROD\z_GIS\Kingsley\Projects\PP\Figure 4 RW004 2012-15 Surface Screening_11x17.mxd



SCREENING CRITERIA FOR SOIL	ODEQ RBC Soil Ingestion, Dermal Contact, and Inhalation[a]		EPA Industrial Soil RSL[b]
	Occupational Receptor	Excavation Worker	
Benzo(a)pyrene	290	67,000	290

[a] Oregon Department of Environmental Quality (ODEQ), Risk-Based Concentrations (RBC) for Individual Chemicals (Revision: November 1, 2015).

[b] U.S. Environmental Protection Agency (EPA) regional screening level (RSL) for industrial direct contact, hazard quotient = 1.0 (November 2015 version).

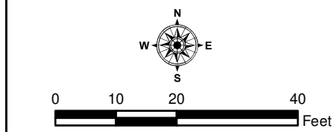
LEGEND:

- 2015 RI Soil Boring
- Building
- Installation Boundary*
- General Groundwater Flow Direction (2014 SI Report)

XXX.....Detected concentration exceeds the ODEQ RBC for the Occupational Receptor
BGS.....Below ground surface
J.....Detected at the estimated concentration shown
NA.....Not analyzed (contingency sample)
U.....Not detected at or above the concentration shown

NOTES:

1. All units are reported in µg/kg.
2. Soil samples were analyzed for polyaromatic hydrocarbons (PAHs); only constituents detected above screening criteria are shown.
3. Groundwater flow direction as reported in the Final Site Investigation Report (ANG 2014).
4. * Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 11/05/2014. Background Source: 2018 Oregon Statewide Imagery Program (OSIP) (https://oregonexplorer.info/).



173rd FIGHTER WING
KLAMATH FALLS, OREGON

2015 SUBSURFACE SOIL EXCEEDANCES AT FORMER WASH RACK DISCHARGE TO DITCH (RW004)

FIGURE: 5 | DATE: 11/30/2020

PROJECT: \ANG FY20 Nationwide PP_ROD\z_GIS\Kingsley\Projects\PP\Figure 5 RW004 2015 Subsurface Screening_11x17.mxd

One cPAH was detected in subsurface soil samples (i.e., samples collected between the 3- to 4-foot bgs interval) collected during the 2012 SI and 2015 RI at a concentration above the industrial screening criteria. Benzo(a)pyrene was detected in six of eight subsurface soil samples at concentrations ranging from 1.1 to 600 µg/kg.

The nature and extent of cPAH contamination at Site RW004 has been fully delineated, as discussed in the RI Report (Leidos 2017a). The horizontal extent of cPAH concentrations above ODEQ criteria encompasses nearly the entire grassy/native fill portion of Site RW004 from east to west, with the highest detections observed within 80 feet of the discharge to drainage ditch leading south from Building 572. To the north and south, cPAH contamination is bound by thick, asphalt-paved areas. cPAH concentrations at Site RW004 exceed industrial screening criteria in subsurface soil at one location approximately 35 feet southwest of Building 572 (RW004-SB02) and are bound vertically at the 3- to 4-foot bgs interval.

Summary of Site Risks

F&T Modeling

Soil screening analysis and SESOIL modeling were performed for the initial CMCOPC at Site RW004 (naphthalene) that has the potential to reach the water table within 1,000 years based on the soil screening analysis results. Naphthalene was predicted to exceed the RSL in leachate beneath Site RW004. Based on the soil screening and SESOIL modeling, only naphthalene in soil was retained as a CMCOPC for Site RW004.

Lateral transport modeling showed the maximum predicted concentration of naphthalene in groundwater at Site RW004 would slightly exceed the lowest screening criterion (risk-based RSL) beneath the source; however, naphthalene was not predicted to exceed the lowest screening criterion at the downgradient receptor location within 1,000 years. Based on groundwater sampling conducted during the SI, naphthalene was not detected in monitoring wells located in the vicinity of Site RW004. It is important to note that the predicted naphthalene concentrations beneath the source and at the downgradient receptor location do not exceed the occupational ODEQ groundwater RBC. Therefore, naphthalene was not identified as a CMCOC at Site RW004.

A qualitative assessment of the sample results was performed, and the limitations and assumptions of the models were considered to identify if any CMCOCs are present in soil at Kingsley Field ANGB that may potentially impact groundwater. The assessment concluded that no CMCOCs exist in soil, and that the site investigated is not adversely impacting groundwater quality based on the 2012 SI and 2015 RI data and is not predicted to have any future impacts. NFA is required for soil at Site RW004 to be protective of groundwater.

HHRA

An HHRA for Site RW004 consisted of a comparison of detected concentrations in site soil and groundwater to conservative risk-based ODEQ RBC criteria. The human health risk assessment criteria used to select the COCs were discussed earlier in the Description of Sites section (see Page 2).

During the 2012 SI, groundwater was eliminated as a medium of concern at Site RW004. Within the defined boundary of this AOC, subsurface soil located adjacent to and north of Building 572 also was eliminated as a medium of concern. Therefore, groundwater analytical data collected from two monitoring wells and subsurface soil data collected from three borings were not evaluated in the 2015 RI. In addition, TPH and VOCs were eliminated as COCs in soil and also were not evaluated in the 2015 RI.

Six cPAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenzo[a,h]anthracene, and indeno[1,2,3-cd]pyrene) were identified as carcinogenic in the HHRA for Site RW004. Based on recent ODEQ guidance, cPAHs are to be considered as a single hazardous substance for assessing human health risk (ODEQ 2015). Therefore, total cPAHs were represented as benzo(a)pyrene equivalents and used to quantify human health risk. Six cPAHs were identified as human health COPCs. The HHRA concluded for Site RW004 that cPAHs were identified as COCs for the industrial worker (surface soil) and hypothetical future resident (surface and subsurface soil) (**Table 2**).

cPAHs were identified as a COPC in soil at Site RW004. The total estimated ILCR for exposure to cPAHs at Site RW004 ranges from 8E-9 for a short-term excavation worker exposed to subsurface soil to 2E-6 for a longer-term industrial worker exposed to surface soil under the current occupational land use scenarios. These risks fall within the range specified in the NCP of 10-6 to 10-4 (USEPA 1990); however, the determined risk for the industrial worker exposed to surface soil exceeds the ODEQ maximum acceptable ILCR of 1E-6 (Leidos 2017a).

Table 2. Summary of COCs at the Former Wash Rack Discharge to Ditch (RW004)

PAHs Detected Above ODEQ RBCs and USEPA RSLs	F&T	Human Health			Ecological
		Industrial Worker	Construction Worker	Hypothetical Future Resident	
Floor Wash Rack Discharge to Ditch (RW004)					
Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene	None	cPAHs	None	cPAHs	None

COC = Constituent of Concern
cPAH = Carcinogenic Polynuclear Aromatic Hydrocarbon
F&T = Fate and Transport
ODEQ = Oregon Department of Environmental Quality
PAH = Polynuclear Aromatic Hydrocarbon
RBC = Risk-Based Concentration
RSL = Regional Screening Level
USEPA = U.S. Environmental Protection Agency

The total estimated ILCR for a hypothetical future resident is 4E-5. This risk value is also within the acceptable NCP risk range but exceeds the ODEQ acceptable risk value. Based upon the ODEQ *Human Health Risk Assessment Guidance* (ODEQ 2010), human receptors may be exposed to PAHs in surface soil; therefore, further action (remediation or evaluation in an FS) was recommended.

Ecological Risk Assessment

A streamlined SLERA was completed for Site RW004 following USEPA guidance (USEPA 1997). Due to the limited exposure potential at the site, adequate information is available with which to conclude that ecological risks are negligible. Therefore, only Step 1 (Problem Formulation and Ecological Effects Evaluation) of USEPA's eight-step process for ERA was completed.

Site RW004 is located in close proximity to Site DD018, and Site RW004 possesses the same media of concern as Site DD018. Therefore, their ecological risks were found to be identical. Due to the limited habitat quality (maintained grassy strips with no trees or shrubs to provide cover from predators) and quantity, the ERA concluded no natural habitat is present and no complete pathways in surface soil exist. Regardless of how these small grassy areas at the two sites are defined (as natural habitat or not), they are unlikely to attract many, if any, ecological receptors. Those that might occur at the site are likely to be urban-adapted. In addition, the sites are bounded by the VMA and a road and are within 1,000 feet of one of the Klamath Falls Airport runways where flight noise and activity would be further deterrents to wildlife activity.

Although surface and subsurface soil at the site is impacted, limited wildlife activity is expected: therefore, limited ecological exposures to these media are expected. Surface water and sediment are not present at the sites. Groundwater at the sites is not contaminated. Thus, ecological risks are negligible from surface soil, subsurface soil, surface water, sediment, and groundwater because no complete exposure pathways exist.

Hot Spot Evaluation

The calculated carcinogenic risks, developed during the baseline HHRA, correspond to levels below the hot spot ILCR criteria. The F&T evaluation concluded that contaminants are not likely to migrate vertically through the soil to the shallow water table or laterally to the nearest downgradient receptor location (a drainage ditch located approximately 4,800 feet from the source area). In addition, the ERA determined that ecological risks are negligible due to limited habitat quality, the absence of wildlife present, and the absence of surface water and sediment at Site RW004. Based on these evaluations, it was determined that Site RW004 does not contain hot spot areas.

SCOPE AND ROLE OF THE ACTION

This Proposed Plan summarizes the remedial alternatives and identifies a preferred alternative for addressing the COCs in soil at Sites DD018 and RW004. ORANG developed RAOs to define the extent of cleanup at each site that will be protective of human health and the environment. In addition, ORANG established the cleanup criteria for the COCs in applicable media (soil). The RAOs include the applicable ODEQ criteria and will be considered the final remedial goals in the ROD. The cleanup criteria for soil are provided in **Table 3**.

In accordance with the NCP, the alternatives for Sites DD018 and RW004 were evaluated using the nine criteria described in Section 122(b) of CERCLA and the NCP §300.430(f)(5)(i), as shown in **Table 4**. These criteria are primarily divided into three groups and are classified as 1) threshold criteria, 2) balancing criteria, and 3) modifying criteria.

Table 3. Soil Constituents of Concern and Cleanup Criteria

Screening Criteria for Soil	ODEQ RBC Soil Ingestion, Dermal Contact, and Inhalation[a]		EPA Industrial Soil RSL[b]
	Occupational Receptor	Excavation Worker	
Benzo(a)anthracene	2,900	660,000	2,900
Benzo(a)pyrene	290	67,000	290
Benzo(b)fluoranthene	2,900	670,000	2,900
Dibenzo(a,h)anthracene	290	67,000	290
Indeno(1,2,3-cd)pyrene	2,900	670,000	2,900

[a] Oregon Department of Environmental Quality (ODEQ), Risk-Based Concentrations (RBCs) for Individual Chemicals (Revision: November 1, 2015).
[b] U.S. Environmental Protection Agency (EPA) regional screening level (RSL) for industrial direct contact, hazard quotient = 1.0 (November 2015 version).

Table 4. CERCLA Evaluation Criteria

Criterion Type	Evaluation Criteria
Threshold	1. **Overall Protection of Human Health and the Environment** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through **land use controls** (LUCs), engineering controls, or treatment.
	2. **Compliance with ARARs** evaluates whether the alternative meets Federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
Balancing	3. **Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain reliable protection of human health and the environment over time, once the cleanup goals have been met.
	4. **Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present (e.g., the anticipated performance of the treatment technology).
	5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
	6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of materials and services needed to implement the technology.
	7. **Cost** includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
Modifying	8. **State Acceptance** considers whether the state agrees with ANG's analyses and recommendations, as described in the FFS and Proposed Plan.
	9. **Community Acceptance** considers whether the local community agrees with ANG's analyses and preferred remedy. Comments received on the Proposed Plan are an important indicator of community acceptance.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria – the alternative must meet them or it is unacceptable. Overall protectiveness of human health and the environment and compliance with ARARs (Numbers 1 and 2 in **Table 4**) are the two threshold criteria the alternatives must satisfy.

After comparison to the threshold criteria, five primary balancing criteria (Numbers 3 through 7 in **Table 4**) identify the strengths and weaknesses of each alternative for addressing the contamination at Sites DD018 and RW004. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In the FFS evaluation for Sites DD018 and RW004 (Leidos 2017b), each of the alternatives considered for each site was evaluated against seven of the nine evaluation criteria. Within each evaluation criterion, additional consideration was given for the five balancing factors defined within Oregon's Environmental Cleanup Rules (OAR 340-122-0040 and 340-122-0090).Consideration of the evaluation criteria is the basis for ORANG's recommendation for a preferred remedy to address soil COCs at Sites DD018 and RW004.

The two modifying criteria (State and Community Acceptance) may prompt further revisions to the preferred remedy following the public comment period for the Proposed Plan. The public comments assist in determining the community acceptance of the alternative.

Remedial Action Objectives

The FFS evaluation of Sites DD018 and RW004 (Leidos 2017b) developed, screened, and evaluated alternatives that are potentially capable of remediating

chemical constituents in soil at Sites DD018 and RW004 based on RAOs developed for each site. RAOs are site-specific goals for protecting human health and the environment and serve as guidelines for development and evaluation of remedial alternatives. RAOs specify the contaminants and media of interest, **exposure pathways**, and cleanup goals, which are developed on the basis of the chemical-specific regulatory standards (ODEQ criteria) or site-specific risk factors (**Table 3**).

Oregon provides multiple options for establishing site-specific cleanup criteria (OAR 340-122-0040 and 340-122-0115). Remedial actions should achieve one of the following: (a) acceptable risk levels, as determined by a residual risk assessment; (b) numeric cleanup standards; or (c) background concentrations for areas where hazardous substances naturally occur. The ODEQ RBCs will be used as the cleanup criteria for Sites DD018 and RW004 (ODEQ 2015).

cPAHs (as benzo[a]pyrene equivalents) in surface soil at Site DD018 were identified as COCs under the residential land use scenario. The following are RAOs for Site DD018:

- Protect potential future residential receptors from contact with cPAH-impacted soil posing a lifetime excess cancer risk greater than 1E-6 for individual carcinogens or greater than 1E-5 for multiple carcinogens
- Prohibit the development and use of property for residential housing, elementary and secondary schools, childcare facilities, and playgrounds until cleanup levels are met.

cPAHs (as benzo[a]pyrene equivalents) in soil at Site RW004 were identified as COCs under the occupational land use scenario (surface) and residential land use scenario (surface and subsurface). The following are RAOs for Site RW004:

- Protect current industrial worker receptors and potential future residential receptors from contact with cPAH-impacted soil posing a lifetime excess cancer risk greater than 1E-6 for individual carcinogens or greater than 1E-5 for multiple carcinogens
- Minimize/eliminate contact with or disturbance of cPAH-impacted soil in exceedance of ODEQ soil ingestion, dermal contact, and inhalation risk-based concentrations for the occupational receptor
- Prohibit the development and use of property for residential housing, elementary and secondary schools, childcare facilities, and playgrounds until cleanup levels are met.

SUMMARY AND EVALUATION OF REMEDIAL ALTERNATIVES

Considering the RAOs and site conditions and constraints, remedial alternatives were developed to address the COCs in soil at the VMA (Sites DD018 and RW004). The FFS (Leidos 2017b) identified and analyzed several possible remedial action alternatives that passed initial screening and were considered in detail in the FFS.

The following four alternatives were developed and evaluated for remediation of surface soil at Site DD018 and remediation of surface and subsurface soil at Site RW004:

- Alternative 1: No Action
- Alternative 2: Institutional Controls
- Alternative 3: Institutional Controls and Soil Excavation with Offsite Disposal for Continued Industrial Land Use
- Alternative 4: Soil Excavation with Offsite Disposal for Unrestricted Land Use.

Alternative 1: No Action

Evaluation of the No Action alternative is required by CERCLA as a baseline to reflect current conditions without remediation. This alternative is used for comparison purposes only. Under this alternative, the contaminated surface soil at Site DD018 and contaminated surface and subsurface soil at Site RW004 would not be removed or treated and no actions would be taken to prevent human exposure to the contaminated soil.

Alternative 2: Institutional Controls

This alternative consists of implementing institutional controls to restrict human exposure to the contaminated soil. Verification for the institutional control and continued implementation of this alternative will occur during CERCLA 5-year reviews. Under Alternative 2, cPAH concentrations in soil would be assumed to remain above the cleanup criteria and would continue to exceed acceptable ODEQ RBC risks under the occupational (Site RW004) and residential (Sites DD018 and RW004) land use scenarios. Under Alternative 2, institutional controls would require land use restrictions to limit exposure to cPAHs in soil for the current industrial worker receptor at Site RW004. The city of Klamath Falls Airport Planned Unit Development (PUD) zoning, which includes Kingsley Field ANGB, does not permit residential land use currently or in the foreseeable future. Therefore, no institutional controls would be required for Site DD018. If the zoning ordinance were to be revised in the future to permit residential land use, a deed

restriction on the Installation Development Plan (IDP) would be required to limit Sites DD018 and RW004 to commercial/industrial (C/I) land use only.

The following institutional controls would be applied to Site RW004:

- A deed restriction on the IDP to prohibit or require ODEQ approval for soil disturbances
- The installation of warning signs posted around the site to indicate the presence of soil contamination and whom to contact regarding the restrictions.

All institutional controls would be maintained over a 30-year period. CERCLA 5-year reviews would ensure that the deed restriction remains in place, posted warning signs remain intact, and the local zoning ordinance has been noted for the land.

Alternative 3: Institutional Controls and Soil Excavation with Offsite Disposal for Continued Industrial Land Use

Alternative 3 includes excavation of contaminated soil exceeding the ODEQ RBCs for the occupational receptor at Site RW004. The current and predicted future zoning ordinance for Kingsley Field ANGB is anticipated to prohibit residential land use; however, if zoning regulations change to permit residential land use, a deed restriction on the IDP would be required to limit Sites DD018 and RW004 to C/I land use only.

Soil excavation at Site RW004 will be conducted from 0 to 1 foot bgs for an area of approximately 4,500 square feet (ft^2) to remove concentrations exceeding the individual ODEQ occupational RBCs for PAHs (refer to Figure 2-1 of the FFS [Leidos 2017b]). The excavated soil (approximately 167 cubic yards [yd^3] from Site RW004) will be appropriately characterized for offsite disposal by sampling and analysis of one composite soil sample collected from the excavated soil. Following excavation, four soil samples will be collected at depths of approximately 1 foot bgs. All collected samples will be sent for laboratory analysis of PAHs to confirm that impacted surface soil is removed. Clean, native soil material, obtained from a locally sourced offsite location, will be used as backfill for the excavated site. The backfilled area will be brought to grade and seeded with vegetative grass cover to match the neighboring grassy areas. Upon completion of site restoration, a Corrective Action Completion Report will be submitted to ODEQ for review and approval. CERCLA 5-year reviews would be required under this alternative to ensure that the local zoning ordinance has not changed for the land and that the IDP continues to restrict land use to C/I. This institutional control would be maintained over a 30-year period.

Alternative 4 – Soil Excavation with Offsite Disposal for Unrestricted Land Use

Alternative 4 includes excavation of contaminated soil exceeding the ODEQ RBCs for a hypothetical future resident at Sites DD018 and RW004 for unlimited use and unrestricted exposure (UU/UE). Although the city of Klamath Falls Airport PUD zoning ordinance does not permit residential use currently or in the foreseeable future, this alternative is presented for the purpose of providing ANG additional information from a risk perspective.

Under this alternative, surface soil at Site DD018 will be excavated from 0 to 1 foot bgs for an area of approximately 3,700 ft^2 to remove benzo(a)pyrene concentrations exceeding the ODEQ RBC for a residential receptor (refer to **Figure 6**). Samples collected during the RI were screened against the occupational ODEQ RBCs (Leidos 2017a). Therefore, cPAH-impacted soil at Site DD018 is assumed to be bound to the north, east, and west by paved areas. To the south, impacted soil is assumed to be bound by the road pavement as it approaches the corner. At Site RW004, surface soil impacted with cPAHs will be excavated from 0 to 1 foot bgs for a total area of approximately 6,500 ft^2 (refer to **Figure 6**). An additional 1,900 ft^2 will be excavated from two deeper zones (1 to 4 feet bgs) at locations where benzo(a)pyrene exceeded the residential ODEQ RBC. Although soil data were screened against the occupational ODEQ RBCs in the 2017 RI Report, the proposed excavation boundaries under a hypothetical residential land use scenario are considered to be reasonable and conservative in the estimate. cPAH concentrations exceeding the ODEQ RBC for a residential receptor are assumed to be bound by paved areas and decreasing trends in the quantity of cPAH exceedances from soil data. Excavated soil (approximately 137 yd^3 from Site DD018 and 452 yd^3 from Site RW004) will be characterized and disposed of in the same manner proposed under Alternative 3. Following excavation, a total of 10 confirmation samples will be collected from Sites DD018 and RW004 and sent for laboratory analysis of PAHs to verify that all contaminated soil is removed. The site will be backfilled and restored in the same manner proposed under Alternative 3. Upon completion of site restoration, a Corrective Action Completion Report will be submitted to ODEQ for review and approval. It is anticipated that NFA would be issued by ODEQ for these sites. This alternative would meet the residential ODEQ RBC cleanup criteria and would provide UU/UE for Sites DD018 and RW004. CERCLA 5-year reviews would not be required under this alternative.

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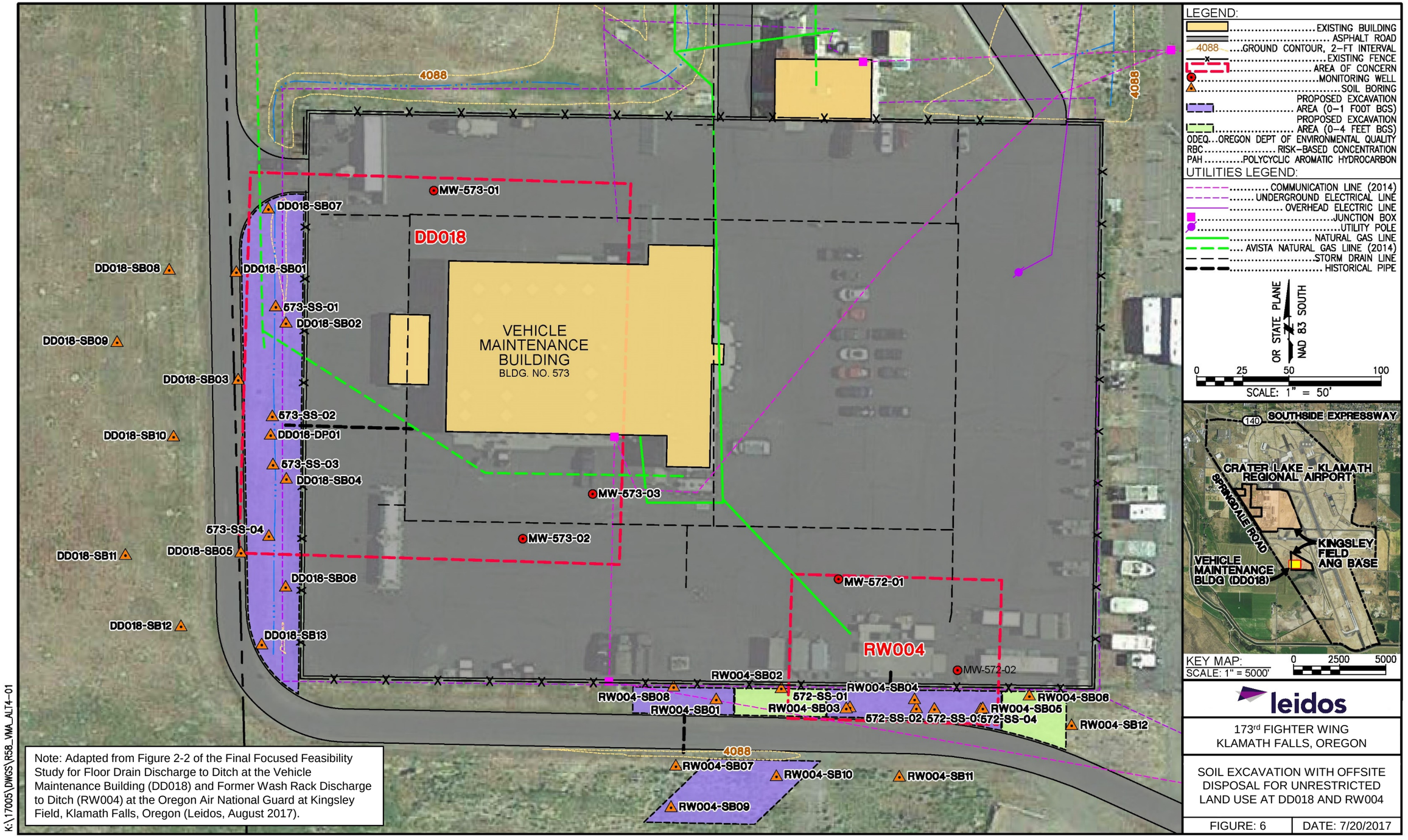

Note: Adapted from Figure 2-2 of the Final Focused Feasibility Study for Floor Drain Discharge to Ditch at the Vehicle Maintenance Building (DD018) and Former Wash Rack Discharge to Ditch (RW004) at the Oregon Air National Guard at Kingsley Field, Klamath Falls, Oregon (Leidos, August 2017).

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leidos

173rd FIGHTER WING
KLAMATH FALLS, OREGON

SOIL EXCAVATION WITH OFFSITE DISPOSAL FOR UNRESTRICTED LAND USE AT DD018 AND RW004

FIGURE: 6 | DATE: 7/20/2017

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CONCLUSIONS

A detailed analysis of these alternatives against the threshold and balancing criteria was conducted, followed by a comparative analysis, to determine the advantages or disadvantages of each alternative with respect to each other. **Table 5** presents the comparative analysis of alternatives for Sites DD018 and RW004 at the VMA. Based on the comparative analysis, Alternative 4 (Soil Excavation with Offsite Disposal for Unrestricted Land Use) is recommended for implementation at the VMA.

Soil, the only medium of concern, presents human health risks to the current industrial receptor at Site RW004 and a potential future residential receptor at Sites DD018 and RW004. Currently, the land is zoned in a C/I land use area and is expected to remain C/I for the foreseeable future (i.e., less than 50 years). In terms of risk to ANG, land use beyond the foreseeable future (i.e., greater than 50 years) is a factor to be considered.

The total cost for Alternative 4 is approximately $276K. Based on the elimination of long-term risk to ANG, Alternative 4 (Soil Excavation with Offsite Disposal for Unrestricted Land Use) is the preferred remedy for Sites DD018 and RW004. Alternative 4 offers the most protection to human health, provides the most effective long-term solution, and would be easy to implement with minimal disturbance to the environment. In addition, upon completion of implementation and site restoration of Alternative 4, the occupational receptor would be able to resume lawn maintenance activities without restrictions.

COMMUNITY PARTICIPATION

ORANG and ODEQ are requesting comments and suggestions from the community on the preferred alternative proposed for Sites DD018 and RW004 at Kingsley Field ANGB. The comment period will extend from August 3 to September 2, 2021. If it is determined that there is sufficient public interest for a public meeting based on the public comments received on this Proposed Plan, ORANG will host a public meeting to discuss the preferred alternative as presented in this Proposed Plan for Sites DD018 and RW004 at Kingsley Field ANGB and accept both verbal and written comments.

Public comments received on this Proposed Plan will be considered prior to the issuance of a ROD documenting the remedy for each site. The comments will be summarized and responses will be provided in the "Responsiveness Summary" section of the ROD.

The ROD is a legal, technical, and public document that will describe the selected remedy for each site. Because the preferred alternatives selected in the ROD are based on previous investigations and remedial actions (e.g., SI, RIs, FFS), the public is encouraged to review this Proposed Plan and the supporting technical documentation available in the online Administrative Record (see Page 1) to gain an understanding of the proposed remedy for Sites DD018 and RW004.

At the end of the comment period, ORANG and ODEQ will review the suggestions and make a final decision about the proposed alternative. Community involvement with the Proposed Plan is an important part of the decision-making process.

Table 5. Comparative Analysis of Remedial Action Alternatives for the Floor Drain Discharge to Ditch at the Vehicle Maintenance Building (DD018) and Former Wash Rack Discharge to Ditch (RW004)

Remedial Action Alternative	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Total Cost*
1 – No Action	○	○	○	○	●	●	$0
2 – Institutional Controls	●	●	◒	○	●	●	$67,227
3 – Institutional Controls and Soil Excavation with Offsite Disposal for Continued Industrial Land Use	●	●	◒	●	●	●	$185,332
4 – Soil Excavation with Offsite Disposal for Unrestricted Land Use	●	●	●	●	●	●	$276,415

ARAR = Applicable or relevant and appropriate requirement.

*** =** The discounted rate is included in the total cost for Alternatives 2 and 3. The FS present value analysis used a discount rate of 2.50 percent.

● = Fully meets criterion.

◒ = Partially meets criterion.

○ = Does not meet criterion.

FOR MORE INFORMATION CONTACT:

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Base Point of Contact (POC)
Kingsley Field ANGB
Oregon Air National Guard
173 CES/CEV, 211 Arnold Avenue, Suite 26 Kingsley Field, OR 97603
Telephone: (541) 885-6326
email: joseph.young.4@us.af.mil

OPPORTUNITIES FOR COMMUNITY INVOLVEMENT

Comment Period: August 3, 2021 to September 2, 2021

We encourage you to comment on this Proposed Plan based on supporting documents during the 30-day public comment period. Written comments may be sent via email (preferable) to joseph.young.4@us.af.mil or postmarked no later than September 2, 2021 to: Captain Joseph Young, Base POC, 173 CES/CEV, 211 Arnold Avenue, Suite 26, Kingsley Field, OR 97603.

Public Meeting: (if requested in writing)

You are invited to this community meeting to discuss your opinion of the preferred alternative proposed for Sites DD018 and RW004 at Kingsley Field ANGB. You will have an opportunity to ask clarifying questions and formally provide verbal or written comments to ANG representatives who will be on hand to provide visual displays and information on the environmental investigations and limited response actions.

GLOSSARY OF TERMS
(SPECIALIZED TERMS USED IN THIS PROPOSED PLAN ARE DEFINED BELOW)

Administrative Record – Files maintained by the lead agency and containing all of the information that the lead agency used to make its decision on the selection of a response action under CERCLA.

Applicable or Relevant and Appropriate Requirement – Any state or Federal statute that pertains to environmental conditions or use of a particular cleanup technology at a Superfund site.

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund, is the Federal law that concerns the removal or cleanup of hazardous substances in the environment at hazardous waste sites (ATSDR 2009).

Chemical – A substance with a distinct molecular composition that is produced by or used in a chemical process.

Concentration – The relative amount of one substance mixed with another substance (e.g., the amount of a chemical present in a given amount of soil) (USEPA 1997).

Ecological Risk Assessment – The process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more chemicals of potential concern.

Exposure –The amount of pollutant present in a given environment that represents a potential health threat to living organisms (USEPA 2014).

Exposure Pathway – Exposure pathway means the manner by which a person or an organism may be exposed to a chemical of concern or contaminant. A complete exposure pathway consists of a source, a release from a source, a migration and transport mechanism, an exposure medium (e.g., air) or media (in cases of intermediate transfer), an exposure point, and an exposure route (ATSDR 2009).

Feasibility Study – An analysis to determine the best way to clean up environmental contamination. A number of factors are considered, including health risk, costs, and what methods will work well (ATSDR 2009).

Groundwater – Water beneath the Earth's surface in the spaces between soil particles and between rock surfaces (ATSDR 2009).

Human Health Risk Assessment – The process that evaluates the likelihood that adverse human health effects may occur or are occurring as a result of exposure to one or more chemicals of potential concern.

Installation Restoration Program – The U.S. Department of Defense program to identify and clean up hazardous waste sites at its installations. The Installation Restoration Program process includes preliminary assessment, remedial investigation, feasibility study, remedial design, and remedial action.

No Further Action – An NFA determination is an approach from the regulatory agency that no further investigation or remediation is required for a site.

Preferred Remedy – The cleanup approach proposed by the lead agency based on the information contained in the FS. The preferred remedial alternative, as presented in this Proposed Plan, is subject to change or revision based on public comment.

Proposed Plan – A document that describes for public comment the preferred cleanup strategy, rationale for the preference, and the alternatives presented in the detailed analysis of the Remedial Investigation/ Feasibility Study.

Record of Decision – The ROD is a legal, technical, and public document that explains which cleanup alternatives will be used to clean up a Superfund site. A ROD contains site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, scope and role of response action, and the remedy selected for clean-up (USEPA 2011).

Remedial Action Objective – A requirement that the remedial action alternatives must fulfill to protect human health and the environment from the chemicals of concern.

Remedial Investigation – The CERCLA process of determining the type and extent of hazardous material contamination at a site (ATSDR 2009).

Risk – A measure of the probability that damage to life, health, property, and/or the environment will occur as the result of a given hazard (USEPA 2014).

Semivolatile Organic Compound – A semivolatile organic compound is an organic compound that has a boiling point higher than water and that may vaporize when exposed to temperatures above room temperature. Semivolatile organic compounds include phenols and polynuclear aromatic hydrocarbons.

Site Related – An inorganic or organic chemical substance occurring at a site that is the result or product of site-specific use or release. For the purposes of risk evaluation, all organic substances detected are considered site-related.

Volatile Organic Compound – An organic compound that has a low boiling point, usually less than 100ºC; therefore, it evaporates readily. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects.

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ACRONYMS AND ABBREVIATIONS

µg/kg	Micrograms per Kilogram
amsl	Above Mean Sea Level
ANG	Air National Guard
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C/I	Commercial/Industrial
CMCOC	Contaminant Migration Constituent of Concern
CMCOPC	Contaminant Migration Constituent of Potential Concern
COC	Constituent of Concern
COPC	Constituent of Potential Concern
cPAH	Carcinogenic Polynuclear Aromatic Hydrocarbon
DERP	Defense Environmental Restoration Program
DoD	U.S. Department of Defense
ERA	Ecological Risk Assessment
F&T	Fate and Transport
FFS	Focused Feasibility Study
FS	Feasibility Study
ft^2	Square Feet
FW	Fighter Wing
GPR	Ground-Penetrating Radar
GSSL	Generic Soil Screening Level
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IDP	Installation Development Plan
ILCR	Incremental Lifetime Cancer Risk
IRP	Installation Restoration Program
LUC	Land Use Control
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NGB	National Guard Bureau
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ORANG	Oregon Air National Guard
PAH	Polynuclear Aromatic Hydrocarbon
POC	Point of Contact
PSG	Project Screening Goal
PUD	Planned Unit Development
RAO	Remedial Action Objective
RBC	Risk-Based Concentration
RfC	Reference Concentration
RfD	Reference Dose
RSL	Regional Screening Level
RI	Remedial Investigation
ROD	Record of Decision
SESOIL	Seasonal Soil Compartment
SI	Site Investigation
SLERA	Screening-Level Ecological Risk Assessment
SVOC	Semivolatile Organic Compound
TBD	To Be Determined
TPH	Total Petroleum Hydrocarbon
USAF	U.S. Air Force
UU/UE	Unlimited Use and Unrestricted Exposure
USEPA	U.S. Environmental Protection Agency
VMA	Vehicle Maintenance Area
VOC	Volatile Organic Compound
yd^3	Cubic Yards

PROPOSED PLAN FOR SITES DD018 AND RW004
KINGSLEY FIELD ANGB
OREGON AIR NATIONAL GUARD KLAMATH FALLS, OREGON
COMMENT FORM

You may use this sheet to send us your comments.
If you use this form to send us your comments, please include your name and address.
All written comments must be postmarked no later than September 2, 2021.
Please send this form to:

Captain Joseph Young
Base POC
Kingsley Field ANGB
Oregon Air National Guard
173 CES/CEV, 211 Arnold Avenue, Suite 26,
Klamath Falls, OR 97603

You also may email this same information to:

email: joseph.young.4@us.af.mil

Name: _____

Address: _____

Affiliation (if any): _____

Telephone number (optional): _____

Comments: (If you need more space, please feel free to use another sheet of paper)

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Your comments are considered public records and, if requested, may be subject to release.