FINAL

RECORD OF DECISION

Site 36, Aerospace Ground Equipment Yard, Building 4712

Davis-Monthan Air Force Base, Tucson, AZ

June 2020

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ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
AFCEC	Air Force Civil Engineer Center
AGE	Aerospace Ground Equipment
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	Conceptual Site Model
DMAFB	Davis-Monthan Air Force Base
ERA	Environmental Restoration Account, Air Force
ERP	Environmental Restoration Program
IRP	Installation Restoration Program
JMCE	James M. Montgomery Consulting Engineers, Inc.
JP-8	Jet Propellant 8
LUC	Land Use Control
MOGAS	Motor Gasoline
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
PIP	Public Involvement Plan
RA	Risk Assessment
RAB	Restoration Advisory Board
RPM	Restoration Project Manager
RSL	Regional Screening Level
Site	ERP Site 36, AGE Yard, Building 4712
SRL	soil remediation level
ST-36	ERP Site 36, AGE Yard, Building 4712
SVE	Soil Vapor Extraction
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VLEACH	Vadose Zone Leaching Model
VOC	volatile organic compound

1.0 THE DECLARATION

1.1 Site Name and Location

Site 36, Aerospace Ground Equipment (AGE) Yard, Building 4712 (ST-36 or the Site), Davis-Monthan Air Force Base (DMAFB), Arizona

DMAFB is located in Pima County, Arizona at the southeast edge of the City of Tucson, approximately 15 miles south of downtown Tucson, Arizona and east-northeast of Tucson International Airport. Site ST-36 comprises approximately one-half acre of DMAFB and is located east of the flight operations area at a fuel dispensing facility utilized by support vehicles. The facility is currently used for maintenance and refueling of AGE. ST-36 is surrounded by a chain link fence adjacent to the intersection of Phoenix Street and Winslow Street.

1.2 Statement of Basis and Purpose

This ROD presents No Further Action as the selected remedy for Environmental Restoration Program (ERP, formerly Installation Restoration Program [IRP]) ST-36, AGE Yard, Building 4712, at DMAFB, Arizona. No Further Action was selected based on sampling results indicating that residual contaminants of concern (COCs) do not pose an unacceptable risk to human health or the environment.

ST-36 is one of several ERP sites being addressed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) at DMAFB. DMAFB is not on the National Priorities List (NPL) for hazardous waste cleanup. However, consistent with United States Air Force (Air Force) policy, the DMAFB ERP addresses all sites in accordance with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The current land use at this site is industrial. However, to assess the need for land use controls (LUCs), a residential exposure scenario (unlimited use and unrestricted exposure [UU/UE]) was chosen as the most conservative scenario for the Site and is considered protective of human health and the environment. Although current industrial use is not expected to change at ST-36, hypothetical residential use was selected to evaluate potential human health risk so that no land use restrictions would be needed for risk-based closure of the Site. In order to achieve this, analytical data collected at the site were compared to the Arizona Department of Environmental Quality (ADEQ) 2007 residential soil remediation levels (SRLs).

The source of contamination at ST-36 was associated with a gasoline leak from a product pipeline located between a Jet Propellant 8 (JP-8) underground storage tank (UST) and the adjacent fuel dispensing island. In 1985, during the discovery of the release, the UST was utilized as a gasoline tank. The fuel tank and associated piping were removed from service after the leak was discovered. Site ST-36 is exempt under the petroleum exclusion from the definition of hazardous substances, pollutants, and contaminants under the CERCLA §101; however, the USAF and ADEQ have agreed to follow the CERCLA framework and thereby satisfy its obligations under the Resource Conservation and Recovery Act and Arizona's risk-based corrective action requirements. Therefore, the USAF issues this ROD to present the selected remedy for ST-36, chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the NCP. The Air Force is issuing this ROD solely. The Air Force is the lead agency and provides funding for site cleanups at DMAFB through the Environmental Restoration Account, Air Force (ERA). The ADEQ is the lead regulatory agency and concurs with the selected remedy. This decision is based on the Administrative Record file for the Site as well as on an interpretation of historical data and a review of current and anticipated future conditions at ST-36.

Remedial actions implemented at ST-36 included the installation of one nested soil vapor extraction (SVE) well containing one shallow well and one deep well which share the same boring connected to a granular activated carbon (GAC) SVE treatment system. The SVE wells were screened at two different intervals, with SVE-1D screened from 55 to 70 feet below ground surface (bgs) and SVE-2S screened from 20 to 35

feet bgs. The dual-completion SVE well is located in the vicinity of soil boring SB36-14. The GAC SVE system operated from March 19 through May 7, 2013 (Gilbane, 2014).

Following the operation of the GAC SVE system within the source area, initial soil gas measurements indicated significantly higher total volatile hydrocarbon concentrations than originally anticipated. An internal combustion engine (ICE) vapor processing system was utilized following the unexpected quick breakthrough experienced in the GAC units that were part of the original GAC SVE treatment system. The ICE SVE system operated from May 20 through September 27, 2013. The increase in hydrocarbon mass removal suggested an additional source area may be present (Gilbane, 2014). Analytical data from soil samples collected at the Site in July 2014 indicated the need for further investigation, and an additional site investigation was pursued.

A Phase I Supplemental Site Investigation included collecting soil samples from 10 soil borings to further delineate the lateral and vertical extent of hydrocarbon contamination in the sub-surface soils associated with the UST areas and underground piping (Ayuda, 2015).

A Phase II Supplemental Site Investigation included the installation of two nested SVE wells for total of six extraction locations. The investigation provided a more accurate delineation of the vertical extent of soil contamination. The Phase II activities also included sub-slab vapor sampling to evaluate vapor intrusion, and a five-day pilot test (October 24th through October 28th, 2016) of the SVE system using the previously installed SVE wells and two new nested SVE well pairs. Vadose zone leaching (VLEACH) modeling was also conducted to evaluate if the contamination present could act as a potential source for groundwater contamination.

The Phase II investigation was presented in the *Final Additional Site Characterization* (Ayuda, 2017). To address a data gap identified in the Phase II investigation, two additional borings were drilled in 2018 to a depth of 160 feet bgs (Ayuda, 2019). The results were used to evaluate the eastern extent of potential subsurface impacts from the verified release. The results were non-detect for any fuel related contaminants confirming the eastern extent of contamination.

1.3 Description of the Selected Remedy

The Air Force has determined that No Further Action is appropriate for ST-36.

1.4 Statutory Determinations

The Air Force has determined that No Further Action is necessary to ensure protection of human health and the environment at ST-36, AGE Yard, Building 4712. Previous responses at the site eliminated the need to conduct further remedial action. A five-year review will not be required based on the earlier response actions as there are no hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for UU/UE.

1.5 Authorizing Signatures

On the basis of the remedial investigation and successful completion of removal actions performed, Site ST036 NFA and closure with UU/UE is recommended. Site ST036 poses no current or future potential threat to human health or the environment.

Jeffrey Domm

1 Dec 2020

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Director, Environmental Management Air Force Civil Engineer Center (AFCEC)

Date

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01/01/2021

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Date

2.0 DECISION SUMMARY

2.1 Site Name, Location, and Description

ST-36 comprises approximately one-half acre of DMAFB and is located east of the flight operations area at a fuel dispensing facility utilized by support vehicles. The facility is currently used for maintenance and refueling of AGE. ST-36 is surrounded by a chain link fence adjacent to the intersection of Phoenix Street and Winslow Street. A fueling vehicle maintenance work area and Building 4712 border ST-36 to the southeast (**Figure 2-1**).

ST-36 formerly housed two above-ground fueling dispensers and three USTs. The dispensers on the western island have been removed as well as the western UST.

2.2 Site History

ST-36 comprises approximately one-half acre of DMAFB and is located east of the flight operations area at a fuel dispensing facility utilized by support vehicles. The facility is currently used for maintenance and refueling of AGE. ST-36 is surrounded by a chain link fence adjacent to the intersection of Phoenix Street and Winslow Street. A fueling vehicle maintenance work area and Building 4712 border ST-36 to the southeast. ST-36 formerly housed two above ground fueling dispensers and three USTs. **Figure 2-2** presents a site layout.

A motor gasoline (MOGAS) leak from a product pipeline between an UST and the adjacent fuel dispensing island was identified in 1985 (JMCE, 1988). The fuel tank and some associated piping were removed from service after the leak was discovered. Two USTs and one fuel-dispensing island, that formerly dispensed diesel and MOGAS, remain in service at ST-36 and currently dispense JP-8. For the remaining systems, DMAFB conducts a yearly tightness test on the USTs and associated piping. Each test conducted to date has met the criteria for tightness.

2.3 Previous Investigations

A complete list of the documents included in the Administrative Record files for DMAFB can be obtained online at (http://afcec.publicadmin-record.us.af.mil/) or from the Restoration Project Manager (RPM) (contact information is provided in **Section 2.5**, below). **Table 2-1** provides a chronological list of the previous principal investigations and evaluations conducted at the Site, as identified through information available in the Administrative Record Files for DMAFB.

2.4 CERCLA Enforcement Activities

The Site has no history of CERCLA enforcement activities.

2.5 Community Participation

The Restoration Advisory Board (RAB) was formed in 1994. It was discontinued by DMAFB in October 2008 due to lack of continued public interest, as the implementation of RAB-approved remedial actions was in progress at all sites. Until October 2008, DMAFB community participation consisted of the RAB. RAB meetings were open to the public to provide opportunities for public comment and input, including assumptions about reasonably anticipated future land use. RAB meetings and public review periods were publicized.

DMAFB has prepared a Public Involvement Plan (PIP) that is used to promote two-way communication between residents of Tucson, Arizona and the government agencies responsible for the activities performed at sites such as ST-36 under the ERP at DMAFB, as well as to facilitate community involvement in site-related activities (URS/FPM Remediations, 2017). The public involvement activities outlined in the PIP are implemented to ensure that residents of the local communities are continually informed about, and provided with appropriate opportunities to become involved in the ERP activities. The PIP is updated as necessary per project activities and changes in community concerns. As part of the PIP, a 30-day notice

is posted in the local newspaper regarding the public review and comment periods for Proposed Plans and Decision Documents. No significant changes or issues with the Site have been noted in the Administrative Record since the discontinuation of the RAB.

The DMAFB Management Action Plan provides detailed information on community participation for all ERP actions at DMAFB. The DMAFB Administrative Record file serves as the primary vehicle for public participation for the ST-36 project. In addition to the materials in the Administrative Record, an information repository has been established for the Site at the Pima County Public Library (101 North Stone Avenue, Tucson, Arizona 85701). For access to further information contained in the official Administrative Record files for DMAFB, please contact:

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The documents in the Administrative Record file provided the basis for the response selection developed in the Proposed Plan for the Site. An announcement was placed in the local newspaper of record, the *Arizona Daily Star*. Copies of the Proposed Plan were placed in the Administrative Record for review and download. The Public Comment Period ran from May 6, 2020 to June 5, 2020. No comments on the Proposed Plan for ST-36 were received from the public or from supporting agencies, and there was no request for a public meeting during the public comment period.

2.6 Scope and Role of the Remedial Action

DMAFB is not on the NPL for hazardous waste cleanup; however, ST-36 is one of several ERP sites at DMAFB being addressed in accordance with CERCLA and NCP. In the early 1980s, the Air Force initiated Phase I activities on all Air Force Bases. A Phase I is an evaluation of the environmental liability associated with a property. Phase I activities begin with a site inspection and may have included such activities as a historical research; interviews with local regulators, fire departments, tenants, and property owners; or other applicable activities based on the nature of the property.

Environmental assessment and restoration activities began at DMAFB in 1982 under the ERP and continue to the present. Several potential hazardous waste sites have been identified and addressed at DMAFB during this time. At ST-36 a gasoline leak from a product pipeline located between a Jet Propellant 8 (a motor gasoline tank at the time of leak) UST and the adjacent fuel dispensing island was identified in 1985.

2.7 Site Characteristics

Site characteristics, including geographical and geological details and a brief description of the conceptual site model (CSM), are presented in the following subsections.

2.7.1 Site Overview

DMAFB occupies approximately 10,760 acres within the city limits of Tucson, Arizona, as shown on **Figure 2-1**. It is located in an area of relatively low relief, with elevations ranging from 2,200 to 2,300 feet above mean sea level. The area is characterized as generally flat, with dry washes leading toward tributaries of the Santa Cruz River and Rillito Creek. The developed portion of DMAFB include aviation support, industrial, institutional, commercial, residential, public, recreational facilities, and an airfield with an associated 13,645-foot runway. The majority of the undeveloped areas of DMAFB are closed ranges and open desert.

Tucson is situated on a high valley floor within the Tucson Basin, part of the Basin and Range physiographic province. The Tucson Basin is surrounded by rugged mountain ranges. The basin is composed of unconsolidated alluvium consisting of sequences of interbedded coarse- and fine-grained silt, clay, sand, and gravel deposits. Erosion from these mountain ranges has resulted in the Tucson Basin being hundreds to thousands of feet thick.

Precipitation in southern Arizona tends to be extremely variable, with average annual precipitation ranging from about 12 inches in the Tucson Basin to as much as 30 inches in the mountains surrounding the basin. The depth to groundwater varies greatly ranging from less than 100 feet bgs near the Santa Cruz River and Rillito Creek to greater than 500 feet bgs in areas south of the Tortolita Mountains. In general, the depth to water throughout the Tucson Basin increases as the distance from the Santa Cruz River increases. The static depth to groundwater in the vicinity of DMAFB currently ranges from approximately 300 to 340 feet bgs.

DMAFB provides its own drinking water from water supply wells located on the Base. As there are no active DMAFB water supply wells in proximity to the Site, groundwater immediately beneath the Site is not currently used as drinking water for the Base. However, the aquifer beneath DMAFB is part of the City of Tucson drinking water aquifer and could be used in the future by either DMAFB or the City of Tucson.

2.7.2 Conceptual Site Model

A CSM was developed by Ayuda in 2019 for the Site using all historical and current data (**Figure 2-3**). The CSM is a description of the Site and its environment based on existing knowledge. It describes source(s) of contamination, potential receptors, and the interactions that link them. Based on the data available, soil vapor intrusion into Building 4712 is a potentially complete pathway for exposure. The depth of soil contamination, greater than 20 ft bgs, combined with the asphalt or concrete cover, eliminate exposure to surface soils via fugitive dust or ingestion. There are no surface water or sediment pathways present at the Site. The pathway for exposure from ingestion of groundwater was also eliminated based on the current maximum depth of contamination and the depth to groundwater, greater than 300 ft bgs. Modeling was conducted to determine if the contamination present at the Site poses a future threat to groundwater (Ayuda, 2017).

The primary source of impact at ST-36 is related to a gasoline leak from a product pipeline located between a Jet Propellant 8 (a motor gasoline tank at the time of the leak) UST and the adjacent fuel dispensing island that was discovered in 1985. The fuel tank and associated piping were removed from service after the leak was discovered.

2.7.2.1 Soil Exposure Pathway

There is no complete soil pathway at ST-36 due to the depth of contamination greater than 20 feet bgs. Soil vapor from deeper impacted soil can migrate through the soil profile and has the potential to impact indoor air quality in the adjacent Building 4712 or hypothetical future residents and is the only potential exposure route at the site. However, the depth of the contamination eliminated the direct exposure pathway. Infiltration was eliminated based on modeling and non-detect laboratory results for groundwater over the course of 10 years of monitoring.

2.7.2.2 Groundwater Exposure Pathway

The pathway for exposure from ingestion of groundwater was eliminated based on previous monitoring investigations indicating no contamination at wells MW-9 (1989-2003) (ITSI, 2005) and MW-22 (1992-1998) (Malcolm Pirnie, Inc., 2000), the current maximum depth of contamination, the depth to groundwater of greater than 300 ft bgs, and the results of modeling the potential for contaminants to leach to groundwater using VLEACH. The groundwater samples from monitoring wells were non-detect for site contaminants and these monitoring wells were subsequently abandoned. As requested by the

USACE, modeling the potential for contaminants to leach to groundwater was conducted with VLEACH and the results are presented in the Additional Site Characterization Report (Ayuda, 2017). The VLEACH modeling results indicated that site contamination does not pose a threat to groundwater (Ayuda, 2017). As part of the Tier 3 risk assessment (RA), an additional modeling application, the GPL model, was requested by ADEQ and used to evaluate the potential for contaminants to leach to groundwater, and the results also indicate that the site contamination does not pose a threat to groundwater (Ayuda, 2019). In addition, the closest off-base municipal wells downgradient of the Site are over two miles from ST-36.

2.7.2.3 Surface Water Exposure Pathway

There are no permanent surface water features in the vicinity of the Site. Current or future receptors will not be exposed to COCs via a surface water exposure pathway.

2.7.3 Source of Contamination

As described above, the primary source of impact at ST-36 is related to a gasoline leak from a product pipeline located between a JP-8 UST and the adjacent fuel dispensing island. In 1985, during the discovery of the release, the UST was utilized as a gasoline tank. The fuel tank and associated piping were removed from service after the leak was discovered.

2.7.4 Nature and Extent of Contamination

After the leak was discovered in 1985, soil sampling has been conducted at a total of 32 soil borings and two monitoring well locations at the Site to evaluate the nature and extent of contamination. The analytes were evaluated against ADEQ Soil Remediation Levels (SRLs) (ADEQ, 2017a), ADEQ Tier 1 Clean-up Standards (ADEQ, 2017b) and United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) (USEPA, 2018a). No BTEX or total fuel hydrocarbons were detected in any of the groundwater samples collected between 1989 and 1998, and the wells were subsequently abandoned (JMCE, 1991 and ITSI, 2005).

The approximate lateral extent of the impacted area has been identified at a maximum width of 35 ft and length of 85 ft. The contamination has migrated approximately 46 ft to the east and 30 ft to the west from the source, and approximately 20 ft to the north and south. The two additional borings (ST36-SB32 and ST36-SB33) conducted in 2018 provided confirmation of the eastern extent of contamination as illustrated on **Figure 2-4** (Ayuda, 2019). Complete analytical results are presented in the Final Additional Site Characterization Report (Ayuda, 2017).

The vertical extent of contamination was evaluated using the available historical soil data. The highest detected contaminant concentrations are between 60 and 80 ft bgs. No contaminants were detected above RSLs above a depth of 20 feet or below a depth of 90 ft. One shallow sample at 4 feet had PAHs detected above RSLs but was determined to be associated with asphalt debris and is not considered to be associated with the pipeline leak. Soil boring contaminant concentrations decreased to non-detect levels for fuel related compounds at depths of 137 ft bgs (ST36-SB25) and 126 ft bgs (ST36-SB26).

Soil vapor from impacted soil at lower depths can migrate through the soil profile and has the potential to impact indoor air quality in the adjacent Building 4712 or hypothetical future residents and is the only potential exposure route at the site. Sub-slab soil vapor samples were collected from five locations ST36-V01 through ST36-V05. The sample locations were positioned parallel to and approximately 20 ft from the west side of Building 4712 (see **Figure 2-2**). The VOC results for the soil gas samples were compared to the USEPA RSLs for residential air. There are five analytes that were detected that have no RSLs and limited or incomplete toxicology information. Therefore, quantitative risk estimates were not possible. These analytes are 1,3-dichlorobenzene (Chemical Abstract Service [CAS] 541-73-1), 2-methyl-2-propanol (CAS 75-65-0), 4-ethyltoluene (CAS 622-96-8), ethanol (CAS 64-17-5), and trichlorofluoromethane (CFC 11) (CAS 75-69-4). A literature review was conducted to evaluate potential toxicity for these compounds to see if

a qualitative analysis could be performed. Based on the measured concentrations in soil gas, compared to limited toxicity information, it is unlikely that there would be any adverse effects due to exposure from soil gas. Of the detected compounds that had RSLs, seven VOCs exceeded the residential RSL in at least one of the soil gas samples.

Because of this exceedance, the seven VOCs (2-hexanone, chloroform 2-propanol, benzene, carbon tetrachloride, chloroform, ethyl acetate, and trichloroethene) are selected as chemicals of potential concern. It is worth noting that this initial screening exercise compares soil gas concentrations directly to indoor air screening levels and is therefore conservative. This direct comparison assumes that there is no attenuation between soil gas and indoor air. These compounds and concentrations were further evaluated using the November 2018 USEPA Vapor Intrusion Screening Level (VISL) calculator to predict the potential indoor air concentration (**Table 2-2**).

2.8 Current and Potential Future Site Uses

The following subsections describe the current and potential future land uses for ST-36. The selected remedy will enable the Base to use the Site as designated in the Base General Plan.

2.8.1 Current Land Uses

The Site is currently an active maintenance and refueling center and is part of the DMAFB ERP. No LUCs are in place, or required, at ST-36. (LUCs are measures that limit human exposure by restricting activity, use, and access to properties with residual contamination.)

2.8.2 Potential Future Site Use

The current land use at this site is industrial. However, to assess the need for LUCs, a residential exposure scenario (UU/UE) was chosen as the most conservative scenario for the Site and is considered protective of human health and the environment. Although current industrial use is not expected to change at ST-36, hypothetical residential use was selected to evaluate potential human health risk so that no land use restrictions would be needed for risk-based closure of the Site. In order to achieve this, analytical data collected at the site were compared to the ADEQ residential SRLs.

2.9 Summary of Site Risks

The primary source of impact at ST-36 is related to a gasoline leak from a product pipeline. A human health RA and an ecological RA have been performed at ST-36 and are discussed in the following subsections.

2.9.1 Summary of Human Health Risk

The risk-based methodology used in the RA, consistent with USEPA guidance, facilitated the risk evaluation of the Site by carefully considering site-specific parameters and representative soil gas contaminant concentrations that produced a conservative evaluation of potential human health risks. Per the Final Tier 3 Risk Assessment (Ayuda, 2019), the lateral and vertical extent of contamination has been defined and does not present a complete exposure pathway due to the depth of contamination. Modeling results for impacted soil left in place, using VLEACH and GPL, indicate that the contamination does not pose an unacceptable risk to groundwater despite using more conservative site-specific parameters than are expected for actual future use.

The only potentially complete pathway identified was vapor intrusion. A residential exposure scenario was chosen as the most conservative scenario for the Site and is considered protective of possible future property use although current industrial use is not expected to change. Residential use is highly unlikely at ST-36, but this land use was selected to evaluate potential human health risk so no land use restrictions would be needed for risk-based closure of the Site.

The indoor air concentrations were calculated using the maximum detected concentration of each analyte. Theses concentrations were compared to the residential indoor air RSL. The parts per billion volume were converted to micrograms per cubic meter for the VISL model. The results indicate that none of the contaminants detected in soil gas would create indoor air concentrations that exceed the residential indoor air RSLs.

Cancer risks calculated by the VISL were compared to the Arizona Risk-based Corrective Action Standard carcinogenic risk (CR) of less than $1x10^{-6}$ and a non-cancer hazard quotient (HQ) target of less than 0.1 (Arizona Administrative Code, 2017). The vapor intrusion inhalation carcinogenic risk (CR) for individual analytes were less than 1×10^{-6}. Similarly, the individual analyte hazard quotients (HQ) were less than 0.1 (Ayuda, 2019). Further, the cumulative excess lifetime cancer risk (ELCR) of $1x10^{-6}$ to $1x10^{-4}$, and a non-cancer hazard index (HI) target of less than 1.0 (Arizona Administrative Code, 2017) was calculated. The sum of the individual cancer risks or cumulative CR was 3×10^{-7}. The sum of the individual HQs or hazard index (HI) was 4×10^{-2}. Based on the RA results, contaminants of potential concern detected in soil vapor do not pose an unacceptable threat of cancer or non-cancer effects for hypothetical future residential receptors (protective of other potential receptors) assumed to be exposed to indoor air.

2.9.2 Summary of Ecological Risk

No quantitative ecological RA was conducted for ST-36. Ecological receptors (plant and animal) with existing habitats that have been identified at DMAFB include a number of rare, threatened, or endangered species including the burrowing owl, Swainson's hawk, Cooper's hawk, and great horned owl. However, ST-36 lacks habitat for ecological receptors and none of these species of concern have been identified at the site.

2.10 Documentation of Significant Changes

The Proposed Plan identified No Further Action as the preferred alternative for the Site (Ayuda, 2019). No comments were received from the public or from supporting agencies during the public comment period for the Proposed Plan for ST-36. Therefore, it was determined that no significant changes to the remedy as originally identified in the Proposed Plan were necessary or appropriate.

3.0 RESPONSIVENESS SUMMARY

No comments were received from the public or from supporting agencies on the Proposed Plan recommending No Further Action during the public comment period.

3.1 Stakeholder Issues and Lead Agency Responses

No issues with the ST-36 Proposed Plan were identified and no comments were received from stakeholders or supporting agencies during the public comment period.

3.2 Technical and Legal Issues

No technical or legal issues with the ST-36 Proposed Plan were identified and no comments were received from stakeholders or supporting agencies during the public comment period.

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4.0 REFERENCES

Arizona Administrative Code (AAC), 2017. R18-12-263. A.A.C., Title 18 – Environmental Quality, Chapter 12, Article 263 – Risk-based Corrective Action Standards. December 31.

ADEQ, 2017a. Soil Remediation Level http://static.azdeq.gov/ust/tier1_petroleum_standards.pdf. July.

ADEQ, 2017b. UST Program Tier 1 Cleanup Standards for Petroleum Products, July 2017 Update of the ADEQ UST Program Release Reporting & Corrective Action Guidance. August, 2002.

Ayuda, 2015. Final Technical Memorandum – Investigation Results from Phase I Field Activities at ST-36, Davis-Monthan AFB, Tucson, Arizona. November.

Ayuda, 2017. Final Additional Site Characterization Report, Investigation and Upgrades of Existing SVE System at ST-36, Aerospace Ground Equipment Yard, Building 4712, Davis-Monthan AFB, Tucson, AZ, August.

Ayuda, 2019. Final Tier 3 Risk Assessment for ST-36, Aerospace Ground Equipment Yard, Building 4712. August.

Gilbane, 2014. Summary of Interim Remedial Actions Conducted at the AGE Yard (Building 4712). January.

Innovative Technical Solutions, Inc. (ITSI), 2005. Five-Year Review Report, AGE Yard Building 4712 (ST-36), Davis-Monthan Air Force Base. June.

JMCE, 1991. Final Remedial Investigation Report, Sites 35 and 36. November.

Malcolm Pirnie, Inc., 2000. First Five-Year Review for Installation Restoration Program Site ST-36, Davis Monthan Air Force Base, Arizona. May.

URS/FPM Remediations, Inc., 2017. Final Public Involvement Plan, Installation Restoration Program, Davis-Monthan Air Force Base, Arizona. January.

USEPA, 2018a. Regional Screening Levels. November.

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Figures

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SITE:

ST-36, AGE YARD BLDG. 4712
DAVIS MONTHAN AIR FORCE BASE
TUCSON, AZ

PROJECT:

RECORD OF DECISION
AT ST-36, AGE YARD BLDG. 4712

TITLE:

SITE LOCATION MAP

LEGEND:

Davis Monthan Air Force Base Installation Boundary

SCALE: 1:62,500

N

0 0.5 1 2

Miles

NAD 1983 StatePlane Arizona Central FIPS 0202 Feet

DRN/MOD BY:	DATE:	FIGURE:
ADS	11/1/2019 REV: N/A	2-1

DMAFB Facility Boundary provided by Prima County GIS Data Portal (prima.gov)

Service Layer Credits: © 2015 DigitalGlobe © 2015 Microsoft Corporation © 2015 HERE © AND © 2015 Microsoft Corporation,

SITE:

ST-36, AGE YARD BLDG. 4712
DAVIS MONTHAN AIR FORCE BASE
TUCSON, AZ

PROJECT:

RECORD OF DECISION
AT ST-36, AGE YARD BLDG. 4712

TITLE:

SITE LAYOUT

LEGEND:

- Sub-Slab Vapor Sample
- USTs
- UST Piping
- Removed UST
- Chain-link Fence
- SVE System Area
- Buildings

JP = Jet Propellant
UST = Underground Storage Tank
SVE = Soil Vapor Extraction
MOGAS = Mobile Automotive Gasoline
AOD = Area of Detail

SCALE: 1 in = 10 ft

0 2.5 5 10

Feet

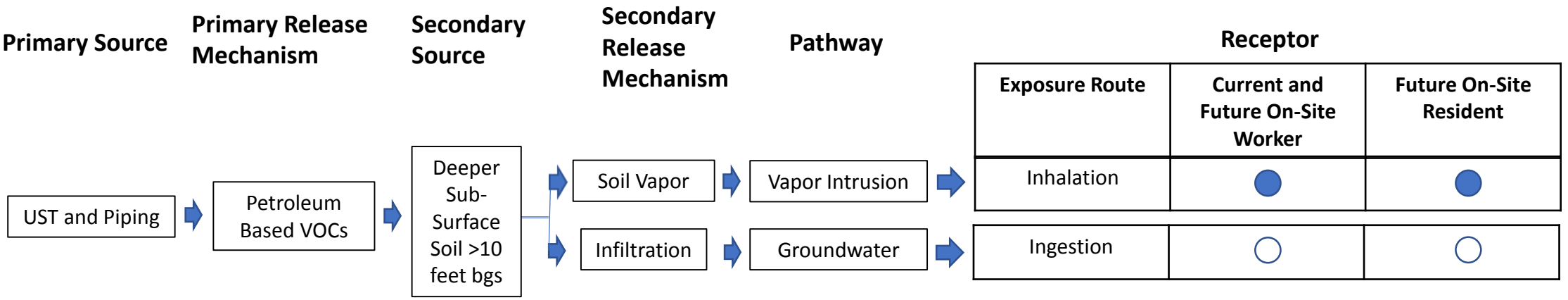
NAD 1983 StatePlane Arizona Central FIPS 0202 Feet

Imagery Layer: Hexagon Imagery Program 0.15m 2015 RGB | CIR Ortho
Data digitized using orthographic imagery or collected using a CM RTK GNSS unit while on site. Other data was taken from previous ST-36 reports.

DRN/MOD BY:	DATE:	FIGURE:
ADS	11/1/2019 REV: N/A	**2-2**

Figure 2-3

Contaminant Exposure Pathway Analysis and
Conceptual Site Model
Record of Decision, ST-36, AGE Yard Building 4712
Davis-Monthan Air Force Base, Tucson, Arizona



Notes:

1. This CSM pertains to VOCs, such as Benzene associated with hydrocarbon contamination present in subsurface soils at the Site.
2. The depth to groundwater in the area is approximately 300 feet below ground surface. (see GPL discussion).
3. There is no likely pathway for contaminants to migrate directly from surface soil as all contamination detected is greater than 10 feet below ground surface.
4. No surface water or sediment pathway exists.

UST = Underground Storage Tank
bgs = below ground surface

Key

●	Potentially complete pathway; quantitative evaluation.
○	Pathway is not known to be complete.

SITE:
ST-36, AGE YARD BLDG. 4712
DAVIS MONTHAN AIR FORCE BASE
TUCSON, AZ

PROJECT:
RECORD OF DECISION
AT ST-36, AGE YARD BLDG. 4712

TITLE:
EXTENT OF IMPACTED
SOILS ABOVE STATE AND
FEDERAL SCREENING LEVELS

LEGEND:

Phase II Field Work Soil Boring
- Exceedance
- No Exceedance (total depth)

Phase I Field Work Soil Boring
- Exceedance
- No Exceedance (total depth)

2012 SVE Installation
- Exceedance

2010 5-Year Review Soil Boring
- Exceedance

2005 5-Year Review Soil Boring
- Exceedance

2000 5-Year Review Soil Boring
- Exceedance
- No Exceedance (total depth)

1990 Remedial Investigation
- Exceedance
- No Exceedance (total depth)

- Contaminant Concentrations Exceed State or Federal Screening Levels
- Chain-link Fence
- Underground Storage Tanks (USTs)
- UST Piping
- SVE System Area
- Buildings

21803
BUILDING 4712
COVERED WORK AREA
SB36-1 (65 ftbgs) No Exceedance
SB36-6 (160 ftbgs) No Exceedance
SB36-5 (160 ftbgs) No Exceedance
Fire hydrant
ST36-SB27 (100 ftbgs) No Exceedance
SB36-9 (160 ftbgs) No Exceedance
UST vent
SVE System Area
ST36-22 (50 ftbgs) No Exceedance
ST36-18 (52 ftbgs) No Exceedance
ST36-15 (50 ftbgs) No Exceedance
5000 GAL JP-8 UST (FORMERLY MOGAS)
FORMER 5000 GAL JP-8 UST
5000 GAL JP-8 UST (FORMERLY DIESEL)
ST36-SB33 (160 ftbgs) No Exceedance
ST36-SB28
SB36-7 (160 ftbgs) No Exceedance
ST36-16
ST36-SB32 (160 ftbgs) No Exceedance
ST36-23
ST36-19
ST36-SB25 SVE-03S/D
SB36-15 SVE-01D/SVE-02S
ST36-20
ST36-SB26 SVE-04S/D
SB36-3 (65 ftbgs) No Exceedance
SB36-4 (65 ftbgs) No Exceedance
SB36-2
SB36-11
SB36-10
SB36-12
SB36-13
ST36-24
ST36-SB30 (100 ftbgs) No Exceedance
ST36-21 (45 ftbgs) No Exceedance
ST36-17 (48 ftbgs) No Exceedance
ST36-SB29 (100 ftbgs) No Exceedance
SB36-8 (160 ftbgs) No Exceedance

JP = Jet Propellant
UST = Underground Storage Tank
MOGAS = Mobile Automotive Gasoline
ftbgs = feet below ground surface
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
SVE = Soil Vapor Extraction

SCALE: 1 in = 15 ft
0 5 10 20
Feet
NAD 1983 StatePlane Arizona Central FIPS 0202 Feet

DRN/MOD BY: ADS
DATE: 11/1/2019
REV: N/A
FIGURE: **2-4**

Tables

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Table 2-1: Previous Investigations
Record of Decision, ST-36, AGE Yard Building 4712
Davis-Monthan Air Force Base, Tucson, Arizona

Previous Investigation/Evaluation Title	Date
Final Remedial Investigation Report, Sites 35 and 36. November.	1991
First Five-Year Review for Installation Restoration Program Ste ST-36, Davis-Monthan Air Force Base, Arizona. May.	2000
Five-Year Report, AGE Yard Building 4712 (ST-36), Davis-Monthan Air Force Base. June.	2005
Draft Five-Year Review report, AGE Yard Building 4712 (ST-36), Davis-Monthan Air Force Base. October.	2012
Summary of Interim Remdial Actions Conduction at the AGE Yard (Building 4712). January.	2014
Final Technical Memorandum - Investigation Results from Phase I Field Activities at ST-36, Davis-Monthan AFB, Tucson, Arizona. November.	2015
Final Addition Site Characterization Report, Investigation and Upgrades of Existing SVE System at ST-36, Aerospace Ground Equipment Yard, Building 4712, Davis-Monthan AFB, Tucson, AZ. August.	2017
Final Tier 3 Risk Assessment Report for ST-36, Aerospace Ground Equipment Yard, Building 4712, Davis-Monthan AFB, Tucson, AZ. August.	2018

Table 2-2
Indoor Air Concentration and Risk Calculation
ST-36, AGE Yard Bldg. 4712
Davis Monthan Air Force Base, Tucson, AZ

Resident Vapor Intrusion Screening Levels (VISL)

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN; H = HEAST; W = see RSL user guide Section 2.3.5; E = see RSL user guide Section 2.3.6; S = see RSL user's guide Section 5.

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=1) MIN($C_{ia,c}$,$C_{ia,nc}$) (µg/m^3)	Toxicity Basis	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=1) C_{sg},Target (µg/m^3)	Target Groundwater Concentration (TCR=1E-06 or THQ=1) C_{gw},Target (µg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} (25 °C) (µg/m^3)	Maximum Groundwater Vapor Concentration C_{hc} (µg/m^3)	Temperature for Maximum Groundwater Vapor Concentration (°C)	Lower Explosive Limit LEL (% by volume)	LEL Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$ (µg/m^3)	Noncarcinogenic VISL THQ=1 $C_{ia,nc}$ (µg/m^3)
Benzene	71-43-2	Yes	Yes	Yes	Yes	3.60E-01	CA	12	1.59	Yes (5)	3.98E+08	4.06E+08	25	1.2	U	7.80E-06	U	0.03	U	No	0.36	31.3
Ethyl Acetate	141-78-6	Yes	Yes	Yes	Yes	7.30E+01	NC	2430	13300	--	4.42E+08	4.38E+08	25	2	U			0.07	U	No		73
Hexanone, 2-	591-78-6	Yes	Yes	Yes	Yes	3.13E+01	NC	1040	8210	--	6.25E+07	6.55E+07	25	1	U			0.03	U	No		31.3
Isopropanol	67-63-0	Yes	Yes	Yes	Yes	2.09E+02	NC	6950	630000	--	1.47E+08	3.31E+08	25	2	U			0.2	U	No		209
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	4.78E-01	CA	15.9	1.19	Yes (5)	4.88E+08	5.15E+08	25	8	U	4.10E-06	U	0.002	U	Mut	0.478	2.09
Chloroform	67-66-3	Yes	Yes	Yes	No	1.20E-01	CA	4.1	0.81	Yes (80)	1.27E+09	1.19E+09	25			2.30E-05		9.80E-02	A	No	0.12	100

Site-specific VISL Results
Resident Equation Inputs

*** Inputted values different from Resident defaults are highlighted.**
Output generated 03JAN2019:16:16:18

Variable	Resident Air Default Value	Value
AF_{gw} (Attenuation Factor Groundwater) unitless	0.001	0.001
AF_{ss} (Attenuation Factor Sub-Slab) unitless	0.03	0.03
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration first phase) years	2	2
ED_{2-6} (mutagenic exposure duration second phase)	4	4
ED_{6-16} (mutagenic exposure duration third phase)	10	10
ED_{16-26} (mutagenic exposure duration fourth phase)	10	10
EF_{res} (exposure frequency) days/year	350	350
EF_{0-2} (mutagenic exposure frequency first phase)	350	350
EF_{2-6} (mutagenic exposure frequency second	350	350
EF_{6-16} (mutagenic exposure frequency third phase)	350	350
EF_{16-26} (mutagenic exposure frequency fourth	350	350
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time first phase)	24	24
ET_{2-6} (mutagenic exposure time second phase)	24	24
ET_{6-16} (mutagenic exposure time third phase)	24	24
ET_{16-26} (mutagenic exposure time fourth phase)	24	24
THQ (target hazard quotient) unitless	0.1	1
LT (lifetime) years	70	70
TR (target risk) unitless	0.000001	0.000001

Resident Vapor Intrusion Risk

Output generated 03JAN2019:16:16:18

Chemical	CAS Number	Site Sub-Slab and Exterior Soil Gas Concentration C_{sg} (µg/m^3)	Site Indoor Air Concentration $C_{i,a}$ (µg/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	IUR (ug/m^3)$^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Temperature (°C) for Groundwater Vapor Concentration	Mutagen?
Benzene	71-43-2	0.54	1.62E-02	4.50E-08	0.000518	7.80E-06	U	0.03	U	25	No
Ethyl Acetate	141-78-6	39.64	1.20E+00		0.0164			0.07	U	25	No
Hexanone, 2-	591-78-6	4.51	1.35E-01		0.00432			0.03	U	25	No
Isopropanol	67-63-0	49.15	1.47E+00		0.00705			0.2	U	25	No
Trichloroethylene	79-01-6	0.39	1.17E-02	2.45E-08	0.00561	4.10E-06	U	0.002	U	25	Mut
Chloroform	67-66-3	0.303	9.09E-03	7.40E-08	0.000089	2.30E-05	U	0.098	A	25	No
**Sum*				*1.44E-07*	*0.033987*						