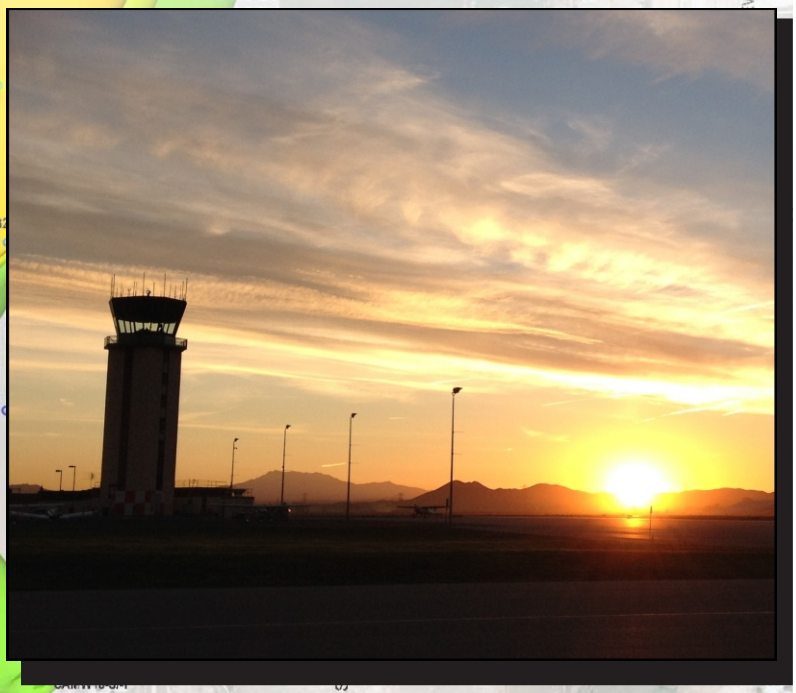
August 2018

HUMAN HEALTH AND SCREENING ECOLOGICAL RISK ASSESSMENT CHINO AIRPORT SAN BERNARDINO COUNTY, CALIFORNIA



Prepared for:
County of San Bernardino
Department of Airports Administration
777 East Rialto Avenue
San Bernardino, California 92415

Prepared by:
TETRA TECH
301 E. Vanderbilt Way Suite 450
San Bernardino, CA 92408

777 East Rialto Avenue, San Bernardino, CA 92415-0831 | Phone: 909.387.8810 Fax: 909.387.8815
www.SBCounty.gov

SAN BERNARDINO COUNTY

Airports
Administration

James E. Jenkins
Director

August 8, 2018

Ms. Patricia Hannon
Site Cleanup Program
California Regional Water Quality Control Board, Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

SUBJECT: Final Human Health and Screening Ecological Risk Assessment, Chino Airport Groundwater Assessment, San Bernardino County, California

Reference: a) Cleanup and Abatement Order No. R8-2017-0011

Dear Ms. Hannon:

On behalf of the County of San Bernardino, Department of Airports, and in accordance with the above referenced Cleanup and Abatement Order, one electronic copy of the Final Human Health and Screening Ecological Risk Assessment is being submitted via Geotracker for your review and approval.

Thank you in advance for your participation in the review of the attached information. Should you require additional information, please contact the County's technical representative, Ben Weink with Tetra Tech, Inc. at 909-382-5120.

Sincerely,

James E. Jenkins
Director of Airports

Enclosures: As Stated

cc: Kavounas, P., Chino Basin Watermaster (1 copy)
Paxton, C., Chino Desalter Authority (1 copy)
Malone, A., Wildermuth Environmental (1 copy)
Alexander, P., SB County Counsel (1 copy)
Weink, B., Tetra Tech (letter only)

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FINAL HUMAN HEALTH AND SCREENING ECOLOGICAL RISK ASSESSMENT
CHINO AIRPORT
SAN BERNARDINO COUNTY, CALIFORNIA

Prepared by:

TETRA TECH

Prepared for:

SAN BERNARDINO COUNTY

County of San Bernardino
Department of Airports
777 East Rialto Avenue
San Bernardino, California 92415-0831

August 2018

Ben Weink, P.G. (8037)
Project Manager

Mathew Horrigan
Principal Risk Assessor

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ACRONYMS AND ABBREVIATIONS

AETL	American Environmental Testing Laboratory
Airport	Chino Airport
amsl	above mean sea level
AOC	area of concern
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
bgs	below ground surface
Cal/EPA	California Environmental Protection Agency
CAO	Cleanup and Abatement Order
CDA	Chino Basin Desalter Authority
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
County	County of San Bernardino Department of Airports
CPT	cone penetrometer test
CPTu	piezocone penetrometer test
CSM	conceptual site model
1,1–DCA	1,1–dichloroethane
1,2–DCA	1,2–dichloroethane
1,1–DCE	1,1–dichloroethene
cis–1,2–DCE	*cis*–1,2–dichloroethene
DEHS	Division of Environmental Health Services, San Bernardino County
DP	direct push
DSITMS	Direct Sampling Ion Trap Mass Spectrometry
DTSC	Department of Toxic Substances Control
DTSC-SL	DTSC-modified screening level
EPCs	exposure point concentrations
ESLs	environmental screening levels
gpm	gallons per minute

HEAST	USEPA Health Effects Assessment Summary Table
HI	hazard index
HHERA	Human Health and Ecological Risk Assessment
HHRA	Human Health Risk Assessment
HQ	hazard quotient
IG	investigation goal
IRIS	Integrated Risk Information System database
MCL	State Water Resources Control Board Division of Drinking Water maximum contaminant level
MDL	method detection limit
µg/kg	microgram per kilogram
µg/L	microgram per liter
$\mu g/m^3$	microgram per cubic meter
mg/kg	milligram per kilogram
PAC	Pacific Airmotive Corporation
PAH	polycyclic aromatic hydrocarbon
PBMZ	Prado Basin Management Zone
PCE	tetrachloroethene
PPRTVs	USEPA Provisional Peer Reviewed Toxicity Values
QA/QC	quality assurance/quality control
RBSLs	risk-based screening levels
RfCs	reference concentrations
RfDs	reference doses
RI	remedial investigation
RME	reasonable maximum exposure
RSL	regional screening level
SARWQCB	Regional Water Quality Control Board, Santa Ana Region
SAIC	Science Applications International Corporation
SAWPA	Santa Ana Watershed Protection Agency
SEACOR	Science & Engineering Analysis Corporation

SERA	Screening Ecological Risk Evaluation
SFBRWQCB	San Francisco Bay Regional Quality Control Board
Strongarm	Strongarm Environmental Services, Inc.
SVOC	semi-volatile organic compound
1,1,1–TCA	1,1,1–trichloroethane
TCE	trichloroethene
TCRA	time-critical removal action
1,2,3–TCP	1,2,3–trichloropropane
Tetra Tech	Tetra Tech, Inc.
THQ	target hazard quotient
TPH	total petroleum hydrocarbons
TPH-d	total petroleum hydrocarbons as diesel
TPH-g	total petroleum hydrocarbons as gasoline
Triad	Triad Environmental, Inc.
UCL_{95}	95% upper confidence level
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USTs	underground storage tanks
UVF	ultraviolet fluorescence
VAP	vertical aquifer profiling
VOC	volatile organic compound
WEI	Wildermuth Environmental, Inc.

EXECUTIVE SUMMARY

On behalf of the County of San Bernardino Department of Airports (County), Tetra Tech, Inc. (Tetra Tech) has prepared this Human Health and Ecological Risk Assessment (HHERA), for the Chino Airport (Airport) located at 7000 Merrill Avenue in Chino, California. The HHERA was conducted to evaluate the potential human health and ecological risks from potential exposures to chemicals detected in soil, soil gas, and groundwater. The HHERA provides technical support to the interim remedial action plan (IRAP) for the Airport, which identifies preferred remedial actions that will protect human health and the environment and meet the remedy selection criteria of the United States Environmental Protection Agency (USEPA) National Contingency Plan as presented in the Code of Federal Regulations (CFR), Title 40, Part 300 *et seq.* (USEPA, 1990). The HHERA is also part of the County's overall effort to comply with Cleanup and Abatement Order (CAO) No. R8-2017-0011 [California Regional Water Quality Control Board (RWQCB) Santa Ana Region, 2008]. Figure ES-1 shows the boundary of the Airport property and the regional vicinity of the Airport, which is located within the boundaries of the Chino Basin in San Bernardino County, California.

Risk Assessment Approach

The risk assessment and management process is based on the principle of decision and action using a systematic approach. The overarching goal of the process is to evaluate data and relevant risk assessment information in a step-wise fashion that allows for advancement along the path towards site or facility closure within the regulatory framework. A key outcome of this approach is that it enables risk assessment professionals to adapt the risk assessment process to best fit the environmental conditions present at a given site. The HHERA is comprised of a human Health Risk Assessment (HHRA) and a screening ecological risk assessment (SERA), which provide an evaluation of the potential human health and ecological risks for current and future conditions. The risk assessment is consistent with guidance developed by the United States Environmental Protection Agency (USEPA), California Environmental Protection Agency (CalEPA), and San Francisco Bay Regional Water Quality Control Board (SFB-RWQCB).

Site Description and History

The Airport lies within the City of Chino, is currently comprised of approximately 1,100+ acres of land, and is bounded by Merrill Avenue to the north, Grove Avenue to the east, Kimball Avenue on the south, and Euclid Avenue on the west (Figure ES-1).

The County has owned the Site since 28 September 1949. Prior to 1940, the Site was primarily used for agriculture purposes. A pilot training school, Cal-Aero Academy, was constructed in 1940 and operated through 1944. In 1941, the academy was transferred to the federal government, which also acquired

adjacent acreage east and south of the academy. The U.S. government made improvements, including expansion or new construction of runways, taxiways, and other site features, prior to the transfer to the County in 1949. The County leased the property to various entities between 1949 and 1961, during which time the property was used mainly for storage, sales, dismantling, salvage, modification, and/or overhauling of military and civilian aircraft.

Since 1961, the County has operated the Site as a public airport for commercial, industrial, and aviation use. Businesses and activities conducted at the Airport have included fixed base operators, two crop dusters, and five aircraft shops for engine overhaul, napalm production, installation, painting, washing, stripping, the mixing and loading of fire retardant chemicals used for fighting forest fires, and a maintenance and operational facility for the United States Forest Service aircraft and aircraft museums.

Previous Investigations and Removal Actions

Between 1989 and 2016, the County completed numerous environmental investigations to investigate 20 areas of concern (AOCs, as shown on Figure ES-2), including drilling and sampling over 280 soil borings, installing and sampling 75 groundwater monitoring wells, and conducting a multitude of cone penetrometer testing, pore pressure dissipation testing, depth-specific groundwater sampling, and soil gas sampling.

In 2016, during the course of performing the feasibility study, Tetra Tech conducted four focused investigations to aid in the evaluation of remedial alternatives and to support activities such as risk assessment and groundwater modeling. These investigations included groundwater sampling and analysis for general water chemistry and biological monitored natural attenuation (MNA) parameters, a survey of the Prado Reservoir lake bottom, an off-site private production well (PPW) survey, and vapor intrusion soil gas confirmation sampling in select on-site and off-site areas (Tetra Tech, 2017b).

Between 1990 and 2010, the County completed three separate removal actions at the Site:

- In September 1991, 10 inactive underground storage tanks – five with gasoline, two with aviation gasoline, one with jet fuel, and two unknown – along with surrounding soil, product lines, and a sump were removed.
- From February through May 1992, 310 drums/containers of hazardous waste were removed and disposed of offsite, including used motor oil, waste oil, urethane, paint sludge, grease sludge, bulk solvent, tetrachloroethene, hydrochloric and phosphoric acid, laurel sulfate-based detergent, and oil sludge and adsorbent.

- In July and August 2010, the County completed a time-critical removal action: a total of 51 drums of a jellied fuel mixture of gasoline and polystyrene, several aluminum canisters, remnants of wood pallets, and associated affected soils were removed and disposed of offsite.

These removal actions have significantly reduced the risks to human health and ecological receptors.

HHRA

The HHRA consists of five main components: 1) identification of chemicals of potential concern (COPCs), 2) identification of exposure pathways, 3) fate and transport analyses, 4) calculation of risk-based screening levels (RBSLs), and 5) characterization of risk. Each of these components has been evaluated in accordance with California Department of Toxic Substances Control (DTSC) and USEPA guidance.

COPCs are chemicals that have been detected in the environment that may adversely affect human receptors. The soil, groundwater, and soil gas site characterization work summarized in *Section 5* have been conducted on a Site-wide basis and can be considered representative of current Site conditions. Thus, the data from these investigations have been used to identify COPCs in soil, groundwater, and soil gas for the HHRA as follows:

- Soil – 29 volatile organic compounds (VOCs), two semi-volatile organic compounds (SVOCs), 10 polycyclic aromatic hydrocarbons (PAHs), two total petroleum hydrocarbons (TPH), and 14 metals;
- Groundwater – 23 VOCs; and
- Soil Gas – 24 VOCs.

Potential Receptors and Exposure Pathways

Currently the Site operates as a public airport for commercial, industrial, and aviation use. The surrounding areas are used for commercial/industrial purposes, residential areas, and recreational/open space areas. Future uses of the Site are expected to remain commercial or industrial consistent with continued airport operations. Thus, the most likely receptors potentially exposed to COPCs detected at the Site are on-site commercial workers. Although residential use is not anticipated at the Site, a hypothetical on-site residential scenario is included to evaluate potential future unrestricted land use. Currently there are no immediate plans for Site development. However, should development occur in the future, construction workers may be exposed to the COPCs at the Site unless proper precautions are taken or controls are put in place.

For this evaluation, soil exposure includes four complete exposure pathways: 1) incidental soil ingestion, 2) dermal contact with soil, 3) airborne dust inhalation, and 4) inhalation of vapors.

VOCs have been detected in soil gas and groundwater at on-site and off-site locations. Based on this finding, on-site and off-site commercial workers and residents were evaluated for potential exposures to VOCs in groundwater and soil gas migrating into indoor air.

Risk Characterization

Risks were estimated for the three groups of human receptors by comparing RBSLs to measured concentrations of COPCs in each environmental medium. RBSLs were calculated using an assumed set of exposure parameters for each receptor group and chemical-specific toxicity values based on DTSC and USEPA guidance. Separate RBSLs and resulting risks were calculated for the carcinogenic and non-carcinogenic effects of each chemical. The ratios of the exposure concentrations and RBSLs were then summed to determine the multi-pathway carcinogenic risk estimate and non-carcinogenic hazard index (HI) for each receptor group.

There are important risk characterization issues associated with this HHRA that need to be considered when reviewing the estimated risks that correspond to baseline risk assessment conditions/assumptions that do not accurately reflect site-specific conditions and when evaluating potential risk management needs. The baseline assumptions used to calculate potential risks in this report are based on potential land use considerations that generally differ from the actual setting of the AOCs being evaluated. For example, the estimated risks presented in this report are based on the assumption that potential receptors will be exposed to bare soils. However, significant portions of many of the AOCs being evaluated are mostly, if not completely, covered by pavement and/or buildings, with such covering minimizing or eliminating any contact with soils, which in turn would minimize or eliminate risks to potential receptors.

The use of conservative baseline assumptions about land use and site conditions that do not reflect current or expected conditions is intended to support the identification of risk management measures (e.g., land use restrictions against residential development). However, the health risks estimated on the basis of conservative baseline risk assessment assumptions that do not reflect current or expected conditions will overstate the potential health risks to receptors. Thus, while the use of such baseline assumptions can have value in supporting risk management decisions, they can diminish the value of the baseline risk assessment as the basis for risk communication. For this reason, any risk communication based on the results in this report should include information regarding the assumptions used and how the use of assumptions that more accurately reflect the site would affect the estimated baseline risk levels.

Overview of Health Risk Results

Table ES-1 presents a summary of the lifetime incremental cancer risks and hazard indices calculated for the potentially exposed populations evaluated for each of the AOCs and off-site areas evaluated in this

HHRA. The risk estimates can be compared to the target risk levels determined for each receptor group: 1×10^{-5} for commercial/industrial and construction workers and 1×10^{-6} for residents. These target risk levels fall within the USEPA (1990) risk management range of 1×10^{-6} to 1×10^{-4}. For non-carcinogenic effects, the USEPA (1989, 1990) considers an HI less than one (1) protective of adverse health effects.

For reasons discussed above, the health risk estimates in this HHRA are characterized as "baseline" health risks. Since they do not take actual land use or the presence of existing features that may prevent or mitigate exposure (e.g., presence of asphalt) into account, the risk estimates summarized in Table ES-1 are likely overestimates and likely do not reflect the actual health risks to potential receptors present in the AOCs.

Commercial Workers

Commercial workers were assumed to contact and incidentally ingest soil, inhale dusts emitted from soil, and inhale vapors emitted to outdoor air from soil. Additionally, commercial workers were assumed to be exposed to vapors migrating into indoor air from groundwater and soil gas. As shown in Table ES-1, all the cumulative risks estimated for commercial workers are below the target risk of 1×10^{-5}. The cumulative risks estimated for soil exposure and exposure to VOCs migrating from groundwater or soil gas into indoor air range from 1×10^{-9} (AOC EE) to approximately 5×10^{-6} (AOC O). Non-carcinogenic HIs calculated for future commercial worker exposures to soil and VOCs migrating from groundwater or soil gas into indoor air are all below the target HI of 1. The estimated HIs range from 0.002 (AOC NN) to 0.7 (AOC LL).

Construction Workers

Construction workers were assumed to contact and incidentally ingest surface and subsurface soil, inhale dusts emitted from soil, and inhale vapors emitted from soil. As shown in Table ES-1, the estimated risks for construction worker exposure to soil are all below the target risk of 1×10^{-5}. The estimated risks range from 3×10^{-12} (AOC JJ) to 4×10^{-8} (AOC N). Non-carcinogenic HIs estimated for construction worker exposure to soil range from 0.00009 to 1.3. Only three AOCs are associated with estimated HIs that slightly exceed the target HI of 1, which include AOC KK (HI = 1.2), AOC LL (HI = 1.1), and AOC MM (HI = 1.3). The primary contributor to the elevated HI is TPH-diesel in shallow soil.

Hypothetical Resident

Risks were only evaluated for a hypothetical on-site residential scenario for Airport management purposes to assess potential health concerns associated with unrestricted Site use. At this time, it is not anticipated that the Site will be used for residential purposes. For this evaluation, hypothetical residents were assumed to be comprised of both children and adults who may contact and incidentally ingest soil, inhale dusts emitted from soil, and inhale vapors emitted to outdoor air from soil. Additionally, hypothetical residents

were assumed to be exposed to vapors migrating into indoor air from groundwater and soil gas. The cumulative risks estimated for hypothetical on-site residents range from 7×10^{-8} to 9×10^{-5}. As shown in Table ES-1, 12 of the 18 AOCs evaluated are associated with an estimated cumulative risk that exceeds the target risk of 1×10^{-6}. The elevated risks are primarily due to estimated risks associated with vapor migration from groundwater into indoor air for which TCE and 1,2,3-TCP are the primary contributors to the estimated risk.

The non-carcinogenic HIs calculated for hypothetical on-site resident exposures to soil and exposure to vapors migrating into indoor air from groundwater and soil gas range from 0.01 to 2. The estimated HIs for seven of the 18 AOCs evaluated exceed the target HI of 1 (AOCs DD, GG, KK, LL, M, MM, and OO). The elevated HIs are primarily due to a combination of assumed exposure to soil and vapor migration from groundwater. Only three of the AOCs with elevated HIs are associated with a single media that exceeds the target HI (AOCs KK, LL, and MM for soil). For the other four AOCs (DD, GG, M, and OO), no single media has an estimated HI that exceed the target HI of 1. The elevated soil HIs are due primarily to TPH-diesel in shallow soil and assumed TCE migration from groundwater to indoor air.

Primary Contributors to Estimated Risks and Hazards for On-Site Receptors

As described above, 1,2,3-TCP and TCE in groundwater and TPH-diesel in soil are the primary contributors to the estimated risks and hazards from potential exposures to soil or groundwater for the three groups of on-site human receptors evaluated in this report. In regard to estimated risks for 1,2,3-TCP and TCE migrating from groundwater to indoor air, it is notable that the vapor migration risk estimated for 1,2,3-TCP and TCE based on shallow soil gas data are roughly 52 to 64-fold lower than the corresponding estimates based on modeling from groundwater in AOCs EE and J-K. Vapor intrusion modeling based on shallow soil gas data is considered to be a more accurate estimate of potential vapor intrusion exposures since shallow soil gas data is more representative of soil gas conditions near the foundations of potential buildings as opposed to vapor intrusion estimates based on modeling from deeper groundwater (e.g., assumed groundwater depth of 44 feet for the site). This comparison suggests that the vapor intrusion modeling based on groundwater data is significantly overestimating potential vapor intrusion risks.

TPH-diesel in soil is a primary contributor to estimated hazards that exceed the target HI of 1. As indicated in the report, most of the elevated TPH-diesel results in shallow soil (1 to 4 feet bgs) appear to be attributable to matrix interference caused by small amounts of PAHs leaching from overlying asphalt into the shallow underlying soils rather than site operations. The ultraviolet fluorescence (UVF) analytical method used to analyze TPH-diesel in shallow soil does not measure TPH directly, it measures the PAHs in a sample and extrapolates TPH concentrations based on known amounts of PAHs in TPH. Thus, small variations in PAH

levels due to the overlying asphalt can give large variations in the extrapolated TPH concentrations (i.e., matrix interference). This means that most of the elevated TPH-diesel results in shallow soil (and the corresponding hazard estimates) are likely overstated due to the overlying asphalt.

Off-Site Commercial Workers

Off-site commercial workers were assumed to be exposed to COPCs detected in the off-site groundwater plume via vapor migration into indoor air. As shown in Table ES-1, the maximum estimated cumulative risk for potential off-site commercial workers (9×10^{-6}) is below the target risk of 1×10^{-5}. The maximum estimated non-carcinogenic HI calculated for potential off-site commercial worker exposures to VOCs migrating from groundwater into indoor air is 0.03, which is below the target HI of 1.

Off-Site Resident

The off-site residential receptor was assumed to be exposed to COPCs detected in the off-site groundwater plume via vapor migration into indoor air. However, soil gas data sampling was conducted in the vicinity of the off-site residence and was used to evaluate potential vapor intrusion risks. As shown in Table ES-1, the estimated cumulative risk for the off-site resident ranged from 4×10^{-7} to 1×10^{-6} at the shallowest soil gas sampling depth of 5 feet bgs that likely provide the most accurate estimates of potential vapor intrusion. These risk estimates range from well below, to equal to, the residential target risk of 1×10^{-6}. The estimated non-carcinogenic HIs calculated for potential off-site resident exposures to VOCs migrating from groundwater into indoor air range from 0.001 to 0.009, which are well below the target HI of 1.

Evaluation of Lead

For exposures to lead in soil, two screening levels were used to evaluate potential lead exposures at the Site. One goal is considered protective of adults, including pregnant women, based on the commercial/industrial DTSC-modified screening level (DTSC-SL) of 320 mg/kg and the other is considered protective of children, based on the residential DTSC-SL of 80 mg/kg (DTSC, 2018).

AOC N

Tables 6-82 and 6-83 show the comparisons of goals protective of commercial and construction workers compared to lead concentrations measured in surface and subsurface soil. As can be observed, the UCL_{95} lead concentrations in surface and subsurface soil within AOC N (16 mg/kg) are well below the health protective criteria for workers (320 mg/kg). Table 6-84, shows the comparisons of the goals protective of residents compared to lead concentrations measured in surface and subsurface soil. As shown in the table, the UCL_{95} lead concentration of 16 mg/kg is well below the health criteria protective of residents (80 mg/kg). None of the detected lead concentrations exceeded the health protective worker criteria. Only the

maximum result of 125 mg/kg detected at boring B91 at a depth of 4 feet exceeded the health criteria protective of residents.

AOC O

Tables 6-92 and 6-93 show the comparisons of goals protective of commercial and construction workers compared to lead concentrations measured in surface and subsurface soil. As can be observed, the UCL_{95} lead concentrations in surface and subsurface soil within AOC O (2.9 mg/kg) are well below the health protective criteria for workers (320 mg/kg). Table 6-94 shows show the comparisons of the goal protective of residents compared to lead concentrations measured in surface and subsurface soil. As shown in the table, the UCL_{95} lead concentration of 2.9 mg/kg is well below the health criteria protective of residents (80 mg/kg). The maximum detected lead concentration of 4.4 mg/kg does not exceed either the worker or residential health criteria for lead.

Screening Ecological Risk Assessment (SERA)

The SERA provides an evaluation of the potential ecological hazards for current and future conditions at the Site. Since a biological characterization has not been performed for the Site, the screening evaluation focused on chemicals of potential ecological concern (COPECs) and an evaluation potentially complete exposure pathways for ecological receptors.

Based on historical operations and characterization data, areas were evaluated to determine where potentially affected areas may exist. Based on this evaluation, the areas adjacent to the Site were defined as the focus of this SERA. Based on aerial photographs and relevant site information, it appears that the Prado Regional Park, located roughly a mile to the southwest of the Site, is the closest area that may be associated with any suitable habitat that may be able to support ecological receptors. The potential for future chemical migration from the on-Site area were also determined to be potential surface water runoff to aquatic habitat and off-site groundwater migration to aquatic habitat.

In addition to open space, Prado Reservoir is located within the regional park. Although it is not known if this area provides enough habitat that would be suitable to support any special status species in the area, a screening evaluation was conducted for two potential chemical migration routes from the site, which include surface water runoff and off-site groundwater migration.

Due to the distance from the Site and the fact that many of the AOCs identified as having soil impacts are either partially or mostly covered by asphalt, which would minimize or eliminate site contaminants associated with surface runoff, potential ecological exposures to COPECs in surface water runoff are considered to be incomplete.

In regard to off-site groundwater migration, it does not appear that groundwater is daylighting into surface water within the Prado Regional Park. Additionally, the depth of groundwater is identified as being below the reservoir. Thus, it is considered unlikely that groundwater is being intercepted by Prado Reservoir. Based on this information, potential ecological exposures to COPECs in groundwater are considered to be incomplete.

TABLE ES-1

Summary of Estimated Risks and Hazards

AOC	Summary of Cumulative Cancer Risk and Noncancer Hazard Quotient																	
	Commercial Worker								Construction Worker		Hypothetical Resident							
	Soil (0-2 ft bgs)		Groundwater (Vapor Intrusion to Indoor Air)		Soil Gas (Vapor Intrusion to Indoor Air)		Cumulative Risk Soil and Vapor Intrusion (0-2 ft bgs)		Soil (0-10 ft bgs)		Soil (0-10 bgs)		Groundwater (Vapor Intrusion to Indoor Air)		Soil Gas (Vapor Intrusion to Indoor Air)		Cumulative Risk Soil and Vapor Intrusion (0-10 ft bgs)	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
On-Site																		
AOC DD – Former Airport Maintenance Shop and Yard	9E-11	0.4	3E-07	0.09	NA	NA	3E-07	0.5	2E-11	0.9	4E-09	0.9	**3.E-06**	0.7	NA	NA	**3E-06**	**2**
AOC EE – Former Cal Aero Restoration Yard	3E-10	0.1	3E-07	0.09	6E-10	0.01	1E-09	0.01	6E-11	0.2	1E-08	0.2	**3.E-06**	0.7	5E-08	0.1	7E-08	0.3
AOC FF – Building A440	8E-11	0.00002	3E-07	0.09	NA	NA	3.E-07	0.09	1E-11	0.00009	5E-09	0.0001	**3.E-06**	0.7	NA	NA	**3E-06**	0.7
AOC G - Former PAC Wash Rack Area	3E-08	0.2	4E-06	0.005	NA	NA	4.E-06	0.2	5E-09	0.4	**3E-06**	0.5	**9.E-05**	0.04	NA	NA	**9E-05**	0.5
AOC GG – Former Aircraft Dismantling Area	1E-09	0.2	3E-07	0.09	NA	NA	3.E-07	0.3	3E-10	0.98	6E-08	0.97	**3.E-06**	0.7	NA	NA	**4E-06**	**2**
AOC H – Former Waste Disposal Ponds	2E-09	0.4	9E-10	0.0004	NA	NA	3.E-09	0.4	3E-10	0.4	7E-08	0.4	1.E-08	0.003	NA	NA	8E-08	0.4
AOC HH – Buildings A230, A235, A340, A435	9E-10	0.001	4E-06	0.005	NA	NA	4.E-06	0.006	2E-11	0.0002	4E-08	0.006	**9.E-05**	0.04	NA	NA	**9E-05**	0.05
AOC JJ – Former UST C-15 and Sump I	2E-11	0.2	4E-06	0.005	NA	NA	4.E-06	0.2	3E-12	0.6	7E-10	0.7	**9.E-05**	0.04	NA	NA	**9E-05**	0.7
AOC J-K – PAC Paint Shop and Paint Shed Areas	7E-09	0.001	4E-06	0.005	2.E-07	0.004	2E-07	0.004	1E-09	0.005	3E-07	0.005	**9.E-05**	0.04	**2.E-06**	0.03	**2E-06**	0.04
AOC KK – Building A270, Yanks Museum	2E-10	0.5	3E-07	0.09	NA	NA	3.E-07	0.6	3E-11	**1.2**	7E-09	**1.2**	**4.E-06**	0.8	NA	NA	**4E-06**	**2**
AOC LL – Former UST C-18	5E-11	0.6	3E-07	0.09	NA	NA	3.E-07	0.7	9E-12	**1.1**	2E-09	**1.2**	**4.E-06**	0.8	NA	NA	**4E-06**	**2**
AOC M – Fuel Dump Area	5E-10	0.2	3E-07	0.09	NA	NA	3.E-07	0.3	8E-11	0.4	2E-08	0.5	**3.E-06**	0.7	NA	NA	**3E-06**	**1.2**
AOC MM – Building A385	2E-10	0.5	8E-09	0.003	NA	NA	8.E-09	0.5	3E-11	**1.3**	8E-09	**1.4**	1.E-07	0.02	NA	NA	1E-07	**1.4**
AOC N – Suspected Landfill	4E-06	0.4	3E-07	0.0007	NA	NA	4.E-06	0.4	4E-08	0.7	2E-07	0.4	**7.E-06**	0.005	NA	NA	**7E-06**	0.4
AOC NN - Former Building 30	7E-11	0.00002	6E-09	0.002	NA	NA	6.E-09	0.002	1E-11	0.0001	3E-09	0.0001	8.E-08	0.01	NA	NA	8E-08	0.01
AOC O – U.S. Forest Service Area/Reported Solid Waste Landfill	5E-06	0.6	2E-08	0.003	NA	NA	5.E-06	0.60	4E-08	0.7	3E-08	0.4	4.E-07	0.02	NA	NA	4E-07	0.5
AOC OO – Former PAC Wash Rack Area Drain	6E-10	0.4	3E-07	0.09	NA	NA	3.E-07	0.5	1E-10	0.5	3E-08	0.5	**4.E-06**	0.8	NA	NA	**4E-06**	**1.3**
AOC Z – Waste Water Discharge from Building A495	2E-10	0.00006	6E-08	0.02	9.E-08	0.003	9E-08	0.003	3E-11	0.0003	8E-09	0.0003	9.E-07	0.2	8.E-07	0.02	8E-07	0.02
Off-Site[1]																		
Off-Site Vapor Migration into Indoor Air	NA	NA	9E-06	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.E-06	0.009	NA	NA

Notes:

ft bgs = feet below ground surface

NA = not applicable

[1] - For the off-site scenario, the resident is not hypothetical.

- exceeds target hazard level of 1.
- exceeds target risk level of 1×10^{-5} for workers or 1×10^{-6} for residents.
- below the target risk level of 1×10^{-5} for workers, 1×10^{-6} for residents, or below taget hazard level of 1.

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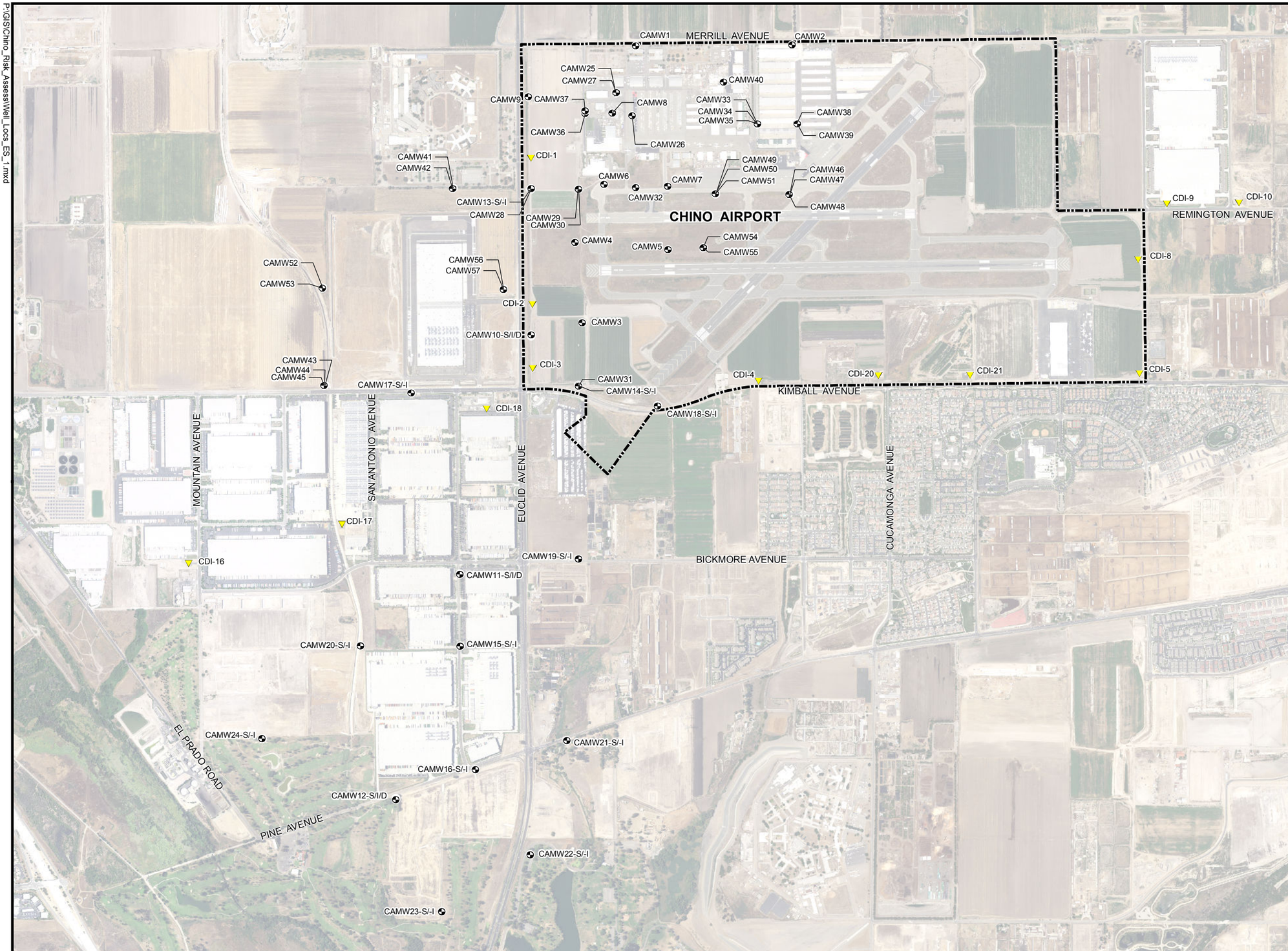

CHINO AIRPORT

Figure ES-1

Site Map Showing Groundwater Monitoring Well Locations

TETRA TECH

April 2018

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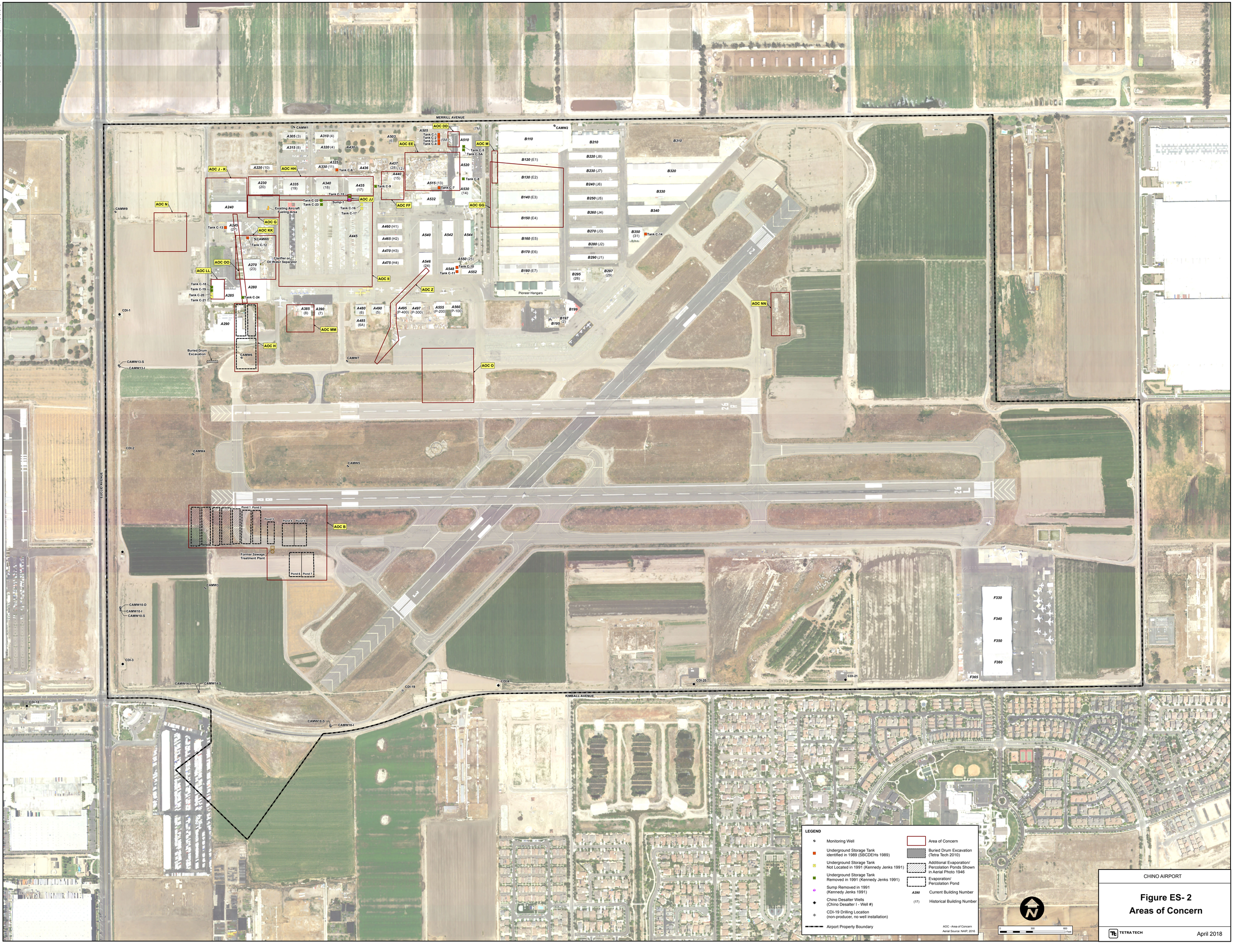

1.0 INTRODUCTION

On behalf of the County of San Bernardino Department of Airports (County), Tetra Tech, Inc. (Tetra Tech) has prepared this Human Health and Ecological Risk Assessment (HHERA), for the Chino Airport (Airport) in Chino, California. The HHERA was conducted to evaluate the potential human health and ecological risks from potential exposures to chemicals detected in soil, soil gas, and groundwater. The HHERA provides technical support to the interim remedial action plan (IRAP) for the Airport, which identifies preferred remedial actions that will protect human health and the environment and meet the remedy selection criteria of the United States Environmental Protection Agency (USEPA) National Contingency Plan as presented in the Code of Federal Regulations (CFR), Title 40, Part 300 *et seq.* (USEPA, 1990). The HHERA is also part of the County's overall effort to comply with Cleanup and Abatement Order (CAO) No. R8-2008-0064 [California Regional Water Quality Control Board (RWQCB) Santa Ana Region, 2008]. Figure 1-1 shows the boundary of the Airport property and the regional vicinity of the Airport, which is located within the boundaries of the Chino Basin in San Bernardino County, California.

1.1 RISK ASSESSMENT APPROACH

The risk assessment and management process is based on the principle of decision and action using a systematic approach. The overarching goal of the process is to evaluate data and relevant risk assessment information in a step-wise fashion that allows for advancement along the path towards site or facility closure within the regulatory framework. A key outcome of this approach is that it enables risk assessment professionals to adapt the risk assessment process to best fit the environmental conditions present at a given site. The HHERA provides an evaluation of the potential human health and ecological risks for current and future conditions. The key components of the HHERA include:

Human Health Risk Assessment (HHRA):

- Identification of chemicals of potential concern (COPCs)
- Identification of Exposure Pathways
- Risk-based Screening Level (RBSL) Calculation Process
- Fate and Transport Analyses
- Risk Characterization.

Screening Ecological Risk Assessment (SERA):

- Site characterization
- Biological characterization
- Identification of chemicals of potential ecological concern (COPECs)
- Exposure pathway assessment

- Risk characterization

The risk assessment is consistent with regulations and guidance developed by the United States Environmental Protection Agency (USEPA), California Environmental Protection Agency (CalEPA), and San Francisco Bay Regional Water Quality Control Board (SFB-RWQCB) listed below:

- *United States Environmental Protection Agency (USEPA) National Contingency Plan as presented in the Code of Federal Regulations (CFR), Title 40, Part 300 et seq. (USEPA, 1990).*
- *Risk Assessment Guidance for Superfund (RAGS)* (USEPA 1989, 1990, 1991, 1992, 1996a, 1996b, 2002, 2009),
- *Preliminary Endangerment Assessment Guidance* (DTSC 2015),
- *Human Health Risk Assessment (HHRA) Note Number 1* (DTSC 2014),
- *Human Health Risk Assessment (HHRA) Note Number 3* (DTSC 2018a),
- *User's Guide: Derivation and Application of Environmental Screening Levels (SFB-RWQCB 2016a,b),*
- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments - Interim Final* (USEPA 1997),
- *Guidelines for Ecological Risk Assessment* (USEPA 1998),
- *Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities* (DTSC 1996a,b).

1.2 REPORT ORGANIZATION

This Human Health and Ecological Risk Assessment Report is organized as follows:

- Section 1—Introduction: Provides an overview of the risk assessment approach, statement of project objectives, and risk assessment organization.
- Section 2—Site Background: Provides a brief site description, history of the site, summary of previous investigations, and description of the groundwater monitoring program.
- Section 3—Environmental Setting: Provides a description of the geologic and hydrogeologic setting of the site and the nature and extent of contamination in soil and groundwater.
- Section 4—Remedial Investigation Methodology: Provides a summary of the methodology and procedures used to conduct the field investigation.
- Section 5—Remedial Investigation Summary: Summarizes the objective and approach of the remedial investigation (RI), discusses the data quality review, and describes the sampling locations associated with the areas of concern (AOCs).

- Section 6 — Human Health Risk Assessment: Provides a description of the risk assessment process, including objectives, scope of work, technical approach, and results of assessing the potential risks to human health.
- Section 7 — Screening Ecological Risk Assessment: Provides a description of the risk assessment process, including objectives, scope of work, technical approach, and results of the ecological evaluation.
- Section 8—References: Provides a list of the documents referenced in this report.

2.0 SITE BACKGROUND

This section presents a summary of the site description, site history, previous investigations, and removal actions performed at the Chino Airport.

2.1 SITE DESCRIPTION

The Airport is located at 7000 Merrill Avenue within the City of Chino. Former names include Cal-Aero Airport, Cal-Aero Academy, Plancor 406, Cal-Aero Flight Academy, Cal-Aero Field, and Cal-Aero Academy Ontario (Science Applications International Corporation, 2002). The Airport property is currently comprised of approximately 1,100+ acres of land and is bounded by Merrill Avenue to the north, Grove Avenue to the east, Kimball Avenue on the south and Euclid Avenue on the west (see Figure 1-1 for regional location of Chino Airport).

2.2 SITE HISTORY

Portions of the Airport property have functioned as an airfield since the early 1940s. Past and present uses consist of a flight academy, aircraft sales and storage, modification of military aircraft, various manufacturing, crop dusting, aircraft restoration and maintenance repair shops, aircraft painting, stripping and washing, mixing and loading of fire retardant chemicals for forest fires and a maintenance and operational facility for the United States Forest Service aircraft and aircraft museums. A detailed site history is documented in the *Historical Assessment Report, Chino Airport Groundwater Assessment* (Tetra Tech, 2013b).

Prior to 1940, the Airport property was primarily used for agriculture purposes. In 1940, 385 acres of land was leased to Cal-Aero from the County with plans to construct a pilot training school, Cal-Aero Academy. In 1941, the Cal-Aero Academy was transferred to an agency of the federal government. In 1942, a War Department directive authorized the acquisition of 294.41 acres of adjoining land located east and south of the Cal-Aero Academy. The United States Government made improvements by expanding the east-west runway, constructing the southwest-northeast runways, taxiways, airplane dispersal revetments, sewage treatment plant, storm drainage system, fencing, and installing three underground storage tanks. Cal-Aero Academy operations continued through 1944.

Between 1946 and 1947, the Aircraft Sales Division of the War Assets Administration used the property under informal permit from the Reconstruction Finance Corporation for storage, sales, dismantling, and salvage of surplus military aircraft. In 1948, the 679.41-acre Airport property was returned to the County, the lease with Reconstruction Finance Corporation was terminated, and the United States-owned land was transferred by quitclaim deed.

The County leased the Airport property to Pacific Airmotive Corporation (PAC) from 1950 to 1961. PAC modified and overhauled military and civilian aircraft. According to the Board of Supervisors Minutes dated January 3, 1961, PAC issued a notification letter dated December 29, 1960, to the County stating that they had elected to terminate the lease agreement effective March 1, 1961.

Since 1961, the County has operated the Airport property as a public airport for commercial, industrial, and aviation use. Businesses and activities conducted at the Airport have included fixed base operators, two crop dusters, and five aircraft shops for engine overhaul, napalm production, installation, painting, washing, stripping, and the mixing and loading of fire retardant chemicals used for forest fires.

2.3 PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS

Following issuance of the July 1989 *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (DEHS, 1989), which identified potential generators of chlorinated solvents and a number of environmental issues at the site) several phases of investigation and/or abatement have been completed. A brief description of each primary phase of assessment/abatement and the scope of work performed at the site since 1989 are presented in this section. For additional information on a specific phase, please refer to the respective referenced report(s). A complete history of site investigation activities can be found in the *Historical Assessment Report* (Tetra Tech, 2013b).

2.3.1 1991 Underground Storage Tanks Closure

In September 1991, a total of 10 inactive underground storage tanks (USTs) were removed with oversight from Kennedy/Jenks Consultants (Kennedy/Jenks, 1991). The table below provides a brief summary of the removal details for each UST.

UST ID	Reported Contents	Excavation Dimensions (length-width-depth)	Sample IDs	Chemical analyses (USEPA Method)	Backfill
C-5	Gasoline	19’x10’x13’	C-5	TPH-g (8015), BTEX (8020)	Excavated soils
C-5A	Gasoline	7’x10’x7’	C-5A	TPH-g (8015), BTEX (8020)	Excavated soils
C-8	Jet Fuel	39’x14’x15’	C-8W, C-8E	TPH-g/d (8015), BTEX (8020)	Excavated soils
C-9	Gasoline	15’x10’x10’	C-9	TPH-g (8015), BTEX (8020)	Not reported
C-15	Gasoline	10’x24’x20’	C-15N, C-15S	TPH-g (8015), BTEX (8020)	Excavated soils & fill
C-18[1]	Unknown	43’x14’x20’	C-18N, C-18S, C-18&19	Purgeable halocarbons (8010), BTEX (8020), TPH (418.1)	Excavated soils & fill
C-19[1]	Unknown	40’x14’x17’	C-19N, C-19S	Purgeable halocarbons (8010), BTEX (8020), TPH (418.1)	Excavated soils
C-22[2]	Aviation gas	10’x32’x14’	C-22N, C-22S	TPH-g (8015), BTEX (8020)	Excavated soils
C-23[2]	Aviation gas	10’x32’x14’	C-23N, C-23S	TPH-g (8015), BTEX (8020)	Excavated soils
C-24	Gasoline	20’x8’x15’	C-24	TPH-g (8015), BTEX (8020)	Not reported

Notes:
1: C-18 and C-19 were removed from a single excavation with approximate total dimensions of 83’x20’
2: C-19 and C-20 were removed from a single excavation with approximate total dimensions of 20’x32’

USEPA: United States Environmental Protection Agency
TPH: total petroleum hydrocarbons
TPH-g: total petroleum hydrocarbons as gasoline
TPH-d: total petroleum hydrocarbons as diesel
BTEX: benzene, toluene, ethylbenzene, xylenes

Two tanks (identified as C-20 and C-21) believed to be present near USTs C-18 and C-19 were never located; however, C-18 and C-19 were twice as large as reported in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989*)*. The following actions were also performed in conjunction with the UST removals:

- The product lines associated with UST C-15 were removed and soils beneath them were excavated to a depth of approximately 2.5 feet. One soil sample (C-15P-1) was collected and analyzed for TPH-g using USEPA Method 8015 and for BTEX using USEPA Method 8020.
- The product lines associated with USTs C-22 and C-23 were removed. No soil samples were collected from this area.
- A sump (4'x4'x4') located south of UST C-15 was removed. One soil sample (SUMP-1) was collected from beneath the sump and analyzed for TPH-g and TPH-d using USEPA Method 8015 and USEPA Method 418.1.

2.3.2 1992 Drum and Container Removal

In February through May 1992, Kennedy/Jenks oversaw the removal and disposal of 310 drums/containers of hazardous waste collected from various locations at the Airport (Kennedy/Jenks, 1992). The contents of the drums/containers were characterized as follows:

- 3,950 gallons of used motor oil with less than 1,000 ppm halide content and more than 50% water (172 drums/containers)
- 260 gallons of waste oil with less than 10% water (23 drums/containers)
- 100 gallons of urethane and lacquer based paint sludge and grease sludge (43 drums/containers)
- 500 gallons of bulk solvent with 75% Stoddard solvent, 1% 1,1,1-tricloroethane (1,1,1-TCA), 20% oil and 4% water (39 drums/containers)
- 40 gallons of tetrachloroethene (PCE) (1 drum/container)
- 100 gallons of hydrochloric and phosphoric acid (8 drums/containers)
- 40 gallons of laurel sulfate based detergent, pH-12.5 (2 drums/containers)

- 50 gallons of oil sludge and adsorbent (2 drums/containers)

2.3.3 1992 Preliminary Assessment of VOCs

In February through May 1992, Science & Engineering Analysis Corporation (SEACOR) conducted a preliminary assessment of 12 priority areas identified in the *Report of Preliminary Assessment of TCE/PCE Contamination* (SEACOR, 1992a). A total of 74 soil borings, 11 soil gas probes, 21 sludge samples, and a magnetic survey were used to initially assess Area B; Area AA; Area H; Area Y; Area CC; Area Z and Building 24; Building 30; Area S; Building 15; Areas J and G; Area P; and Area F. A brief summary of the scope of work performed in each area is described in the following table. Trichloroethene (TCE) concentrations ranging from 5 to 12 micrograms per kilogram (µg/kg) were detected in soil samples collected from areas Area Z, Building 15, Area J, and Area G at depths between 20 and 50 feet bgs. The report concluded that a significant source of PCE or TCE was not identified at the 12 suspected source areas.

Area/ Building ID	Scope of Work	Number of Samples Analyzed by Media	Summary of Chemical Analyses
Area B	7 HA borings (5'-20')	18 soil, 6 soil gas	All soil, soil gas, and sludge samples were analyzed using USEPA Method 8010. One soil sample and two soil gas samples were also analyzed using USEPA Method 8240.
	1 HSA boring (50')	5 soil	
	Sludge Pond sampling	21 sludge	
Area AA	6 HSA borings (20'-50')	25 soil, 3 soil gas	All soil and soil gas samples were analyzed using USEPA Method 8010. The three soil gas samples were also analyzed using USEPA Method 8240.
Area H	4 HSA borings (20'-50')	17 soil, 3 soil gas	All soil and soil gas samples were analyzed using USEPA Method 8010.
Area Y	3 HSA borings (20'-50')	19 soil	All soil samples were analyzed using USEPA Method 8010. Three soil samples were also analyzed using USEPA Method 8240 and one analyzed using USEPA Method 418.1. The soil gas sample was analyzed using USEPA Methods 8010 and 8240.
	1 soil gas probe (5')	1 soil gas	
Area CC	3 HSA borings (20'-50')	13 soil	All soil samples were analyzed using USEPA Method 8010.
Area Z/ Building 24	10 HSA borings (20'-50')	40 soil, 6 soil gas	All soil and soil gas samples were analyzed using USEPA Method 8010. The soil gas sample collected from the probe was also analyzed using USEPA Method 8240.
	1 soil gas probe (5')	1 soil gas	
Building 30	5 HSA borings (20'-50')	21 soil, 3 soil gas	All soil and soil gas samples were analyzed using USEPA Method 8010. The soil gas sample collected from the probe was also analyzed using USEPA Method 8240.
	1 soil gas probe (5')	1 soil gas	
Area S	3 HSA borings (20'-50')	13 soil, 1 soil gas	All soil and soil gas samples were analyzed using USEPA Method 8010. The soil gas sample collected from the probe was also analyzed using USEPA Method 8240.
	1 soil gas probe (5')	1 soil gas	

Area/ Building ID	Scope of Work	Number of Samples Analyzed by Media	Summary of Chemical Analyses
Building 15	5 HSA borings (20'-50')	23 soil, 3 soil gas	All soil and soil gas samples were analyzed using USEPA Method 8010. Four soil samples and the soil gas sample collected from the probe were also analyzed using USEPA Method 8240.
	1 soil gas probe (5')	1 soil gas	
Areas J & G	12 HSA borings (20'-50')	56 soil, 4 soil gas	All soil and soil gas samples were analyzed using USEPA Method 8010. The five soil gas samples collected from the probes were also analyzed using USEPA Method 8240.
	5 soil gas probes (5'-20')	5 soil gas	
Area P	Magnetic survey	N/A	N/A
Area F	4 HA borings (18'-20')	8 soil	The soil samples collected from the four HA borings were analyzed for CAM metals. The remaining soil samples and all the soil gas samples were analyzed using USEPA Method 8010. The soil gas sample collected from the probe was also analyzed using USEPA Method 8240.
	11 HSA borings (20'-50')	25 soil, 9 soil gas	
	1 soil gas probe (5')	1 soil gas	

Notes:
HSA: hollow stem auger boring
HA: hand-auger boring
CAM: California Assessment Manual
USEPA Method 8010: analysis for halogenated volatile organic compounds
USEPA Method 8240: analysis for volatile organic compounds
USEPA Method 418.1: analysis for total petroleum hydrocarbons

2.3.4 1992-2001 Continuing Assessment of VOCs and Subsurface Investigations

In November 1992, SEACOR drilled and sampled a total of seven soil borings in Area Z/Building 24, Building 15, and Areas J & G (SEACOR, 1992b). Two borings (A15-7 and J-6) were drilled to a depth of approximately 50 feet. The remaining five borings (A15-6, G-11, G-12, Z-10, and Z-11) were drilled to a depth of approximately 30 feet. Soil samples were collected from the mid-point and base of each boring and analyzed for volatile organic compounds (VOCs) using USEPA Method 8010. In 1994, Kennedy/Jenks investigated subsurface soils at the wastewater treatment plant to evaluate proper closure of the former plant and disposal ponds. Soil samples were collected at depths of 1, 5, and 10 feet bgs at 39 locations and no VOCs (including TCE and PCE) were detected in the 1- and 5-foot samples, so no 10-foot samples were collected. Then in 2001, Clark Seif Clark conducted a limited subsurface investigation to determine the location, aerial extent, approximate depth and volume, and the potential environmental impact of fertilizer placed in the former evaporation ponds. Analytical results confirmed the presence of naturally occurring lead and nitrate at concentrations above the action level for groundwater. It was recommended to excavate and dispose of the fertilizer at a landfill.

2.3.5 2003 Groundwater Assessment

In June and July 2003, Tetra Tech installed five monitoring wells (CAMW1 through CAMW5) to conduct an initial assessment of groundwater beneath the Airport (Tetra Tech, 2003). The wells were installed to depths between approximately 89 to 118 feet at various locations within the Airport property, primarily in the western and northwestern areas. A groundwater monitoring program was initiated at the site following

the installation of the wells. The initial groundwater samples collected from the wells were analyzed for VOCs using USEPA Method SW8260B and for common major cations and anions using USEPA Method 300.0, SM2320B, and USEPA Method SW6010B.

2.3.6 2004-2005 Well Installation and Soil Gas Survey

In December 2004 and January 2005, Tetra Tech installed a total of 14 dual completion soil gas probes at the Airport (Tetra Tech, 2005a). The soil gas probes were installed to depths up to 40 feet in 8 potential source areas identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport*. Soil gas samples collected from the probes in February 2004 were analyzed for VOCs using USEPA Method SW8260B. Soil gas samples could not be collected from soil gas probes located in the areas designated as Building 15, Z1, and Z2 due to no-flow conditions believed to be the result of low permeability or saturated soils.

In March 2005, four groundwater monitoring wells (CAMW6 through CAMW9) were installed by Tetra Tech (Tetra Tech, 2005a). The wells were installed to depths between approximately 80 to 100 feet within the Airport property. Following development, the wells were incorporated into the ongoing groundwater monitoring program for the Site.

2.3.7 2007 Downgradient Plume Characterization

In February 2007, following the successful completion of a cone penetrometer test (CPT) pilot test in October 2005, Tetra Tech advanced nine CPT (K1 to K3, B1 to B3, and P1 to P3) and 14 direct push borings (E4, E5, K8, K10, K13, F1, F3, S1, S3, B7, B8, B11, B12 and B15) within the suspected downgradient plume area (Tetra Tech; 2005b, and 2007). E4 and E5 were advanced to depths of 116 and 80 feet, respectively, along Euclid Avenue adjacent to the western boundary of the site. K1 to K3, K8, K10, and K13 were advanced to depths between 105 and 147 feet along Kimball Avenue immediately south and west of the site. F1 and F3 were advanced along Fern Avenue and S1 and S3 were advanced along San Antonio Avenue southwest of the site to depths between 125 and 140 feet. B1 to B3, B7, B8, B11, B12 and B15 were advanced to depths between 54 and 142 feet along Bickmore Avenue between Moonflower Avenue on the east and Mountain Avenue on the west. P1 to P3 were advanced to depths between 50 and 85 feet along Pine Avenue between Euclid Avenue on the east and El Prado Road on the west. A total of 60 depth-discrete groundwater samples were collected at varying intervals from the 23 locations and analyzed for VOCs using USEPA Method SW8260B.

2.3.8 2008 Characterization of Vertical Extent of Plume

Between October and December 2008, Tetra Tech installed three sets of clustered groundwater monitoring wells, with three wells in each cluster (CAMW10-S/I/D; CAMW11-S/I/D; CAMW12-S/I/D), along the approximate centerline of the solute plume (Tetra Tech, 2009). Up to 14 depth-discrete groundwater samples were first collected from the deepest boring at each well cluster and analyzed for VOCs using USEPA Method SW8260B. The samples were collected at varying intervals between approximately 37 to 302 feet. Based on the results: CAMW10-S, CAMW11-S, and CAMW12-S were installed to depths of approximately 70, 95, and 54 feet, respectively; CAMW10-I, CAMW11-I, and CAMW12-I were installed to depths of approximately 135, 145, and 100 feet, respectively; and, CAMW10-D, CAMW11-D, and CAMW12-D were installed to depths of approximately 305, 233, and 225 feet, respectively. The deepest boring at each well cluster was continuously cored to the total depth drilled. In addition to the groundwater samples, five unsaturated soil samples were submitted for petrophysical analyses including moisture content using American Society for Testing and Materials (ASTM) D2216, moisture and dry density using ASTM D2937, total porosity, total organic carbon using Walkley-Black, and air permeability using American Petroleum Institute (API) RP40. Following development, the wells were incorporated into the ongoing groundwater monitoring program for the site.

2.3.9 2010 Time-Critical Removal Action

In July and August 2010, a time critical removal action (TCRA) was performed under the supervision of Tetra Tech following the discovery of three buried drums during trenching activities for a storm water pipeline south of Building A290 (Tetra Tech, 2010). A total of 51 drums of a jellied fuel mixture of gasoline and polystyrene, several aluminum canisters, remains of wood pallets, and associated affected soils were removed and disposed of as part of the TCRA. A total of 20 confirmation soil samples were collected from the excavation and analyzed for VOCs using USEPA Method SW8260B, semi-volatile organic compounds (SVOCs) using USEPA Method SW8270C, TPH C^6-C^{40} using USEPA Method SW8015B[M], CAM17 metals using USEPA Method SW6010B/7000 and moisture content using ASTM Method D266.

2.3.10 2010 Additional Plume Characterization

From September to December 2010, five additional sets of clustered wells, with two wells in each cluster (CAMW13-S/I through CAMW17-S/I) were installed by Tetra Tech (Tetra Tech, 2011). Up to 10 depth discrete groundwater samples were first collected from the deepest boring at each well cluster location and analyzed for VOCs using USEPA Method SW8260B. The samples were collected at varying intervals between approximately 30 and 205 feet. Based on the results of the depth-discrete sampling, CAMW13-S through CAMW17-S were installed to depths between approximately 48 and 75 feet and CAMW13-I

through CAMW17-I were installed to depths between approximately 94.5 and 140 feet. Following development, the wells were incorporated into the ongoing groundwater monitoring program for the site.

2.3.11 2012 Additional Plume Characterization

From May to July and September to December 2012, seven additional sets of clustered monitoring wells, with two wells in each cluster (CAMW18-S/I through CAMW24-S/I), were installed by Tetra Tech (Tetra Tech; 2012, and 2013a). Up to 12 depth discrete groundwater samples were first collected from the deepest boring at each well cluster location and analyzed for VOCs using USEPA Method SW8260B. The samples were collected at varying intervals between approximately 20 and 250 feet. Based on the results of the depth-discrete sampling, CAMW18-S through CAMW24-S were installed to depths between approximately 44 and 82 feet and CAMW18-I through CAMW24-I were installed to depths between approximately 140 and 184 feet. Following development, the wells were incorporated into the ongoing groundwater monitoring program for the site.

2.3.12 2014 Soil Remedial Investigation

A Soil Remedial Investigation (RI) was performed at the Airport from May to October 2014 to obtain additional data in the area of concern (AOC) as identified in the Historical Assessment Report (Tetra Tech 2013b), to characterize the soil and soil gas at each of these AOCs, and complete the delineation of previously detected chemicals in soil at the Airport (Tetra Tech, 2014). A secondary objective was to collect a background data set for metals to perform a metals evaluation in areas where soil samples were collected and analyzed. During the Soil RI, 18 AOCs (AOC-DD, -EE, -FF, -G, -GG, -H, -HH, -JJ, -J-K, -KK, -LL, -M, -N, -NN, -O, -OO, and AOC-Z) were investigated, 163 soil borings were completed with 1,868 samples analyzed for VOCs, 1,357 samples analyzed for TPH, 80 samples analyzed for semi-volatile organic compounds (SVOCs) and 90 samples analyzed for metals. A total of 23 soil gas probes were installed in AOCs J-K and Z with 22 samples analyzed for VOCs. Soil borings were completed to depths between 19 and 78 feet using direct push drilling technology. A brief summary of the scope of work performed in each area appears in the following table. The location of the AOCs is shown on Figure 2-1.

Area/ Building ID	Scope of Work	Number of Samples Analyzed by Media	Summary of Chemical Analyses
Area DD	6 borings (20')	46 soil	All soil samples were analyzed using DSITMS and UVF-3100. Four samples were analyzed using USEPA Method SW8260B and SW8015B.
Area EE	15 borings (34.5'-66.5')	222 soil	All soil samples were analyzed using DSITMS and UVF-3100. Nineteen samples were analyzed using USEPA Method SW8260B and SW8015B.
Area FF	4 borings (20')	33 soil	All soil samples were analyzed using DSITMS. Four samples were analyzed using USEPA Method SW8260B.

Area/ Building ID	Scope of Work	Number of Samples Analyzed by Media	Summary of Chemical Analyses
Area G	20 borings (33.5'-69')	346 soil	All soil samples were analyzed using DSITMS. Three-hundred seventeen samples were analyzed using UVF-3100. Fifty-one samples were analyzed using USEPA Method SW8260B. Thirty-five samples were analyzed using USEPA Method SW8015B.
Area GG	11 borings (20')	108 soil	All soil samples were analyzed using DSITMS and UVF-3100. Twelve samples were analyzed using USEPA Method SW8260B and SW8015B.
Area H	10 borings (20'-56')	150 soil	All soil samples were analyzed using DSITMS and UVF-3100. Thirteen samples were analyzed using USEPA Method SW8260B and SW8015B.
Area HH	8 borings (20'-34')	65 soil	All soil samples were analyzed using DSITMS. Nine samples were analyzed using USEPA Method SW8260B.
Area JJ	5 borings (30')	49 soil	All soil samples were analyzed using DSITMS and UVF-3100. Six samples were analyzed using USEPA Method SW8260B and SW8015B.
Area J-K	14 borings (36'-78')	245 soil, 4 soil gas	All soil samples were analyzed using DSITMS. Twenty five samples were analyzed using USEPA Method SW8260B. All soil gas samples were analyzed using USEPA Method TO-15.
Area KK	7 borings (20'-57.2')	72 soil	All soil samples were analyzed using DSITMS and UVF-3100. Eight samples were analyzed using USEPA Method SW8260B and SW8015B.
Area LL	2 borings (32')	23 soil	All soil samples were analyzed using DSITMS and UVF-3100. Two samples were analyzed using USEPA Method SW8260B and SW8015B.
Area M	4 borings (20')	28 soil	All soil samples were analyzed using DSITMS and UVF-3100. Four samples were analyzed using USEPA Method SW8260B and SW8015B.
Area MM	7 borings (40'-52')	100 soil	All soil samples were analyzed using DSITMS and UVF-3100. Eleven samples were analyzed using USEPA Method SW8260B and SW8015B.
Area N	9 borings (30'-92')	85 soil	All soil samples were analyzed using DSITMS and UVF-3100. Eight samples were analyzed using USEPA Method SW8260B and SW8015B. Fifty-two samples were analyzed using USEPA Method SW8270C and SW6010B/7471A.
Area NN	10 borings (20')	74 soil	All soil samples were analyzed using DSITMS. Five samples were analyzed using USEPA Method SW8260B.
Area O	5 borings (25' and 30')	48	All soil samples were analyzed using DSITMS and UVF-3100. Four samples were analyzed using USEPA Method SW8260B and SW8015B. Twenty-eight samples were analyzed using USEPA Method SW8270C and SW6010B/7471A.
Area OO	10 borings (34'-55.5')	136	All soil samples were analyzed using DSITMS. One-hundred-nine samples were analyzed using UVF-3100. Eighteen samples were analyzed using USEPA Method SW8260B. Nine samples were analyzed using USEPA Method SW8015B.
Area Z	9 borings (20')	38 soil, 18 soil gas	All soil samples were analyzed using DSITMS. Eight samples were analyzed using USEPA Method SW8260B. All soil gas samples were analyzed using USEPA Method TO-15.
Background Metals	2 borings (20')	10	All soil samples were analyzed using USEPA Method SW6010B/7471A.

Notes:
DSITMS: analysis for volatile organic compounds in soil
UVF-3100: analysis for total petroleum hydrocarbons as gasoline and diesel

USEPA Method SW8260B: analysis for volatile organic compounds in soil
USEPA Method SW8015B: analysis for total petroleum hydrocarbons
USEPA Method SW8270C: analysis for semi-volatile organic compounds in soil
USEPA Method SW6010B/7471A: analysis for metals in soil
USEPA Method TO-15: analysis for volatile organic compounds in soil gas

2.3.13 2013-2015 Groundwater Remedial Investigation

Tetra Tech conducted a Groundwater RI between October 2013 and April 2015 to complete the groundwater plume characterization in support of refining the groundwater CSM and developing and evaluating mitigation alternatives. Between October 2013 and September 2014, 50 CPT borings were advanced to depths ranging from 80 feet to 180 feet bgs to obtain stratigraphic data and identify zones for vertical aquifer profiling (VAP). At all but one location, one to eight pore pressure dissipation tests (PPDTs) were conducted to estimate groundwater potentiometric head pressure at various depths or the *in situ* hydraulic conductivity of soils at a given interval.

Based on the CPT results, 40 VAP borings were advanced to depths ranging from 119 feet to 180 feet bgs for collection of depth-discrete groundwater samples and evaluation of distribution of site-related solutes in the subsurface. Between two and nine groundwater samples were collected from each VAP boring and analyzed for VOCs using USEPA Method SW8260B. If 1,2,3-trichloropropane (1,2,3-TCP) was not detected above the method detection limit (MDL), the sample was analyzed for 1,2,3-TCP using USEPA Method E524.2 SIM (selected ion monitoring) or SW8260B SIM.

Between September 2014 and February 2015, a total of 33 groundwater monitoring wells, CAMW25 through CAMW57, were installed to depths ranging from 80 feet to 297 feet bgs. At 11 locations, depth-discrete groundwater samples were collected prior to well installation to aid in the final well design. All groundwater samples collected from the borings and monitoring wells were analyzed for VOCs using USEPA Method SW8260B and (if the result for 1,2,3-TCP was below the MDL) for 1,2,3-TCP using USEPA Method E524.2 SIM or SW8260B SIM.

2.4 GROUNDWATER MONITORING PROGRAM

The groundwater monitoring program was initiated in 2003. Currently 75 monitoring wells are monitored at various frequencies (quarterly, semiannually, annually, or biennially) depending upon the wells' location and purpose. Water level measurements have been collected on a quarterly basis at the Site since 2005.

3.0 ENVIRONMENTAL SETTING

The following section briefly describes the conceptual site model, including the physical setting, geology, and hydrogeology in the vicinity of the Site, based upon results from previous investigations and sampling activities conducted at the Site and downgradient areas. A brief discussion of the nature and extent of contamination and results of the groundwater modeling is also included.

3.1 PHYSICAL SETTING

Land use surrounding the Airport is predominantly agricultural and industrial, with the Prado Basin Management Zone (PBMZ), which includes Prado Regional Park, the Prado Reservoir, and the Prado Flood Control Basin farther to the south. Land uses immediately bordering the Site are agricultural on the north, dairy/agricultural on the east, mixed commercial/agricultural and residential on the south, and mixed industrial/agricultural on the west (Figure 3-1).

3.2 GEOLOGY

The Site is located within the Chino Basin, and the closest fault to the Airport is the Central Avenue Fault, approximately 2 miles to the southwest. Regionally, the Chino Basin stratigraphy generally consists of a basement bedrock complex composed of granodiorite and associated plutonic rocks, overlain by sedimentary rocks and shallower alluvium. In general, neither the basement complex nor the sedimentary rock sequence transmits water; therefore, the sedimentary rocks are considered the base of the aquifer.

Geologic cross sections were generated for the shallow alluvium (0-300 feet bgs) based on lithologic and geophysical data from previous investigations at and near the Site that showed alternating beds of relatively permeable (sand and gravel) and relatively impermeable (clay and silt) alluvium underlain by sedimentary bedrock (Montgomery Watson, 1999a). Figure 3-2 identifies the cross-section locations, and Figures 3-3, 3-4, and 3-5 show the generalized cross-sections B-B’ and C-C’; D-D’; and F-F’ and G-G’, respectively. Sediments observed during drilling consisted primarily of silts, sandy silts, and clays at shallow depths with intermittent higher-permeability lenses consisting of sand, gravel, and cobbles with varying amounts of fines. None of the Site-related borings encountered bedrock; however, discontinuous cemented layers have been encountered. Individual lithostratigraphic layers do not appear to be continuous across the plume in the vicinity of the Site. The geologic units appear to pinch out, becoming thinner and shallower from the Airport toward the Prado Reservoir.

3.3 HYDROGEOLOGY

Groundwater generally moves from northeast to southwest within the unconsolidated alluvium and becomes progressively shallower toward the Prado Dam (French, 1972). Groundwater in Site-related wells

is generally observed at progressively shallower depths from the northern boundary of the Airport to the farthest extent of the existing well network (approximately 2.5 miles to the south), with groundwater elevations ranging from approximately 2 feet bgs (about 1 mile south of the Airport) to 87 feet bgs (at the northern boundary of the Airport) (Tetra Tech, 2017a). Corresponding groundwater elevations ranged from about 576 feet above mean sea level (amsl) along the northern Site boundary to 521 feet amsl west of Prado Reservoir, as shown on Figure 3-6. The geologic units appear to pinch out, becoming thinner and shallower toward Prado Reservoir.

Groundwater elevations at the Airport fluctuate seasonally and appear to coincide with seasonal rainfall and changes in local groundwater pumping. Groundwater levels increased an average of approximately 18 feet between 2003 and 2011, and decreased an average of approximately 6 feet between 2011 and 2015 (Tetra Tech, 2017a).

Shallow groundwater gradients average about 0.003-0.006 foot per foot, and vertical gradients appear fairly neutral for most intermediate-shallow well pairs and downward for deep-intermediate pairs. Downward gradients are predominantly the result of groundwater pumping from nearby Chino Basin Desalter Authority (CDA) wells, which are screened at various depths between approximately 230 and 525 feet bgs (Tetra Tech, 2017a).

On-site groundwater and the majority of the off-site groundwater plume are within the Chino North Groundwater Management Zone, as designated in the Water Quality Control Plan for the Santa Ana River Basin. There is no natural surface water exposed on the Site; however, several surface drainage creeks are located south of the Site and flow into the Prado Flood Control Basin, part of the larger PBMZ. The PBMZ is essentially a flood plain created behind the Prado Dam. The PBMZ also encompasses Prado Regional Park, the Prado Reservoir, the Prado Flood Control Basin (a created wetlands), and the Orange County Water District's wetlands ponds. The PBMZ is generally defined by the 566-foot amsl surface elevation contour (SARWQCB, 2008/2014/2016); this boundary separating the PBMZ (to the south) from the Chino North Groundwater Management Zone (to the north) can be seen on Figure 3-1.

3.4 NATURE AND EXTENT OF CONTAMINATION

This section provides an overview of the nature and extent of contamination detected by media based on data from previous investigations conducted in direct relation to the Airport.

3.4.1 Soil

The following constituents were detected above screening-level criteria in one or more localized areas of the Airport during the 2014 soil remedial investigation (Tetra Tech, 2014):

- Four volatile organic compounds (VOCs) including trichloroethene (TCE), 1,2,3-trichloropropane (1,2,3-TCP), total dichloroethene (DCE), and 1,2-dichloroethane (1,2-DCA)
- Three semi-volatile organic compounds including dimethyl phthalate, 2-methylnaphthalene, and naphthalene
- Three metals (cadmium, copper, and lead) that were not considered laboratory contaminants or background constituents

Based on further evaluations of the data, the four VOCs and lead were retained as chemicals of potential concern (COPCs) for risk screening evaluation (Tetra Tech, 2014).

3.4.2 Soil Gas

VOCs were detected in one or more soil gas samples collected during previous investigations in 2004/2005, the 2014 RI, and January 2016 sampling. The 2004/2005 sampling was mainly from deeper depths (20 to 40 feet bgs), while the 2014 and 2016 soil gas sampling was mainly from shallower depths to obtain current data more representative of vapor intrusion risk. Even though none of the 21 compounds detected during the 2014 Soil RI exceeded their screening levels, all were retained as COPCs for risk screening.

3.4.3 Groundwater

The investigations have identified two groundwater plumes that originate at the Site. These plumes, referred to as the West Plume and the East Plume, are described as follows:

- The West Plume (TCE, *cis*-1,2-DCE, 1,2-DCA, and 1,2,3-TCP) extends from AOC G to the south-southwest, terminating downgradient of the Site, about 2.2 miles from the primary source area
- The East Plume (TCE, 1,2-DCA, and 1,2,3-TCP) extends from the area around AOCs EE and GG south/southwest approximately 0.6 miles and currently terminates onsite

Figures 3-7 through 3-10 show the spatial and/or vertical distribution of TCE and 1,2,3-TCP in groundwater from the Second Quarter (April/May) 2017 groundwater sampling event. The *cis*-1,2-DCE and 1,2-DCA plumes are not shown because they are fully contained within the extent of the TCE plume, suggesting natural degradation within the western TCE plume. Monitoring trends indicate that the plumes have been

adequately defined in their current state, and that the plumes are not expanding crosswise or at the downgradient leading edge. However, the West Plume is being drawn down deeper by CDA pumping activities in the vicinity of their wells CDI-1, CDI-2, and CDI-3, thus increasing the vertical thickness of the TCE and 1,2,3-TCP plumes by 100 feet or more. Monitoring results indicate that vertical migration is continuing. Additionally, the East Plume is currently being drawn toward CDA pumping wells CDI-4 and CDI-20, and modeling shows that without any action, the East Plume would eventually be drawn into those wells and potentially to off-site receptors.

The West Plume extends into the PBMZ, although much of this area is industrial-zoned with large warehouse buildings (Figure 3-1). The downgradient leading edge of the groundwater plume in the shallow, intermediate, and deep zone is shown on Figure 3-11 with respect to the Prado Reservoir, the nearest body of surface water.

3.5 GROUNDWATER FLOW AND CAPTURE MODELING

As part of the feasibility study, a MODFLOW-2000 groundwater flow model ((Harbaugh et al., 2000) was applied to assess the viability of using groundwater extraction (pump-and-treat) as a means of hydraulic containment to control plume migration for one or both of the impacted plumes. A portion of an existing regional groundwater model developed for the Chino Basin Watermaster (WEI, 2014) was extracted, and then the grid and layers were refined to more closely represent the geologic conditions and lithology observed at the Site. Recent groundwater elevation data, pumping rates from nearby wells, stream flow, and similar data were used to recalibrate the model to current conditions in the immediate vicinity of the Site. Details of model construction and calibration are provided in the *Final Feasibility Study* (*Final Feasibility Study* (Tetra Tech, 2017b). Because the model was calibrated in steady state mode without the benefit of site-specific pumping test data, the modeling results below are approximations intended for conceptual remedy design; results from a planned aquifer pumping test would be used to refine the rates and well spacing below:

- The on-site West Plume required three wells with a combined pumping rate of about 350 gallons per minute (gpm) to obtain capture.
- The on-site East Plume required two more wells with a combined pumping rate of about 150 gpm to achieve capture.
- The off-site West Plume north of Kimball Avenue required two more wells with a combined rate of 200 gpm to obtain capture.

- The off-site West Plume south of Kimball Avenue required three more wells with a combined rate of 200 gpm to obtain capture.

Thus, model results indicated that approximately 900 gpm of groundwater extraction distributed among 10 extraction wells (plus 180 gpm of groundwater extraction from CDA well CDI-18) would be a reasonable estimate of the magnitude of pumping required to achieve capture of the existing Site plumes. In addition to the hydraulic containment capture modeling, the model was also used to verify potential reinjection rates and injection well locations for treated groundwater, if needed.

4.0 REMEDIAL INVESTIGATION METHODOLOGY

The following subsections describe the soil and groundwater field investigation and data collection/analytical methods utilized at the Airport. Work was performed in general conformance with the procedures and methodologies detailed in the Work Plan *for Additional Characterization* (Tetra Tech, 2013c). All field work was performed under the direct supervision of a California licensed Professional Geologist.

4.1 TECHNICAL APPROACH

Soil

The soils phase of the remedial investigation utilized a Triad framework for collection and chemical analyses of soils in 18 AOCs (Figure 2-1) and soil gas samples in select locations. Collected samples were analyzed using a combination of real-time onsite methods and offsite fixed base laboratories. The soil analytical data obtained were compared to site-specific investigation goals (IGs) established in the Work Plan for VOCs, petroleum hydrocarbons, metals and SVOCs. The site-specific IGs were used in conjunction with the approved decision flow processes presented in the Work Plan to determine if the vertical and lateral extents of COPCs in soil were adequately defined.

Groundwater

The groundwater phase of the remedial investigation also utilized a Triad framework for collection and chemical analyses of groundwater samples. Collected samples were submitted to State certified fixed based laboratories for chemical analyses. The groundwater analytical data obtained were compared to site-specific IGs established in the Work Plan (Tetra Tech, 2013a) to determine if the vertical and lateral extents of site-related solutes in groundwater were adequately defined.

Additional details of the soil and groundwater characterization activities are provided in the following subsections.

4.2 SOIL CHARACTERIZATION

This section describes the procedures used in the AOC soil characterization activities. Field procedures were performed in general accordance with the Field Drilling and Sampling Methods described in Appendix A of the Work Plan (Tetra Tech, 2013c).

4.2.1 Soil Borings

A total of 158 soil borings were drilled and sampled from May 2014 to October 2014 using the procedures detailed in the Work Plan. Drilling was performed by Strongarm Environmental Services, Inc. (Strongarm)

(California C-57 license 766463) of Norwalk, California, using one truck-mounted 6000 series and one track-mounted 6000 series Geoprobe direct-push drilling rig. Drilling was observed onsite by a Tetra Tech geologist or engineer.

Soil samples were analyzed onsite and in real time by Triad Environmental, Inc. of Durham, North Carolina. Samples provided to Triad were analyzed for VOCs using USEPA Method 8265 (Direct Sampling Ion Trap Mass Spectrometry [DSITMS]). Samples from select AOCs were also analyzed for TPH-g and TPH-d using a *site*Lab ultraviolet fluoresence-3100 (UVF-3100). Analytical runs using these methods allowed for throughputs as high as 80 samples per day. USEPA Method 8265 DSITMS has certain limitations which should be noted. Normal operating procedures for EPA Method 8265 include quantitative calibration of a limited, site specific list of compounds, based on past experience at the site. However, since the technique is based on mass spectrometry, if compounds are present in samples for which the DSITMS has not been quantitatively calibrated, the mass spectra of the new compounds can be used qualitatively to identify them. In this case, quantitative calibration standards of the new compounds can be made and the DSITMS calibrated for their analysis. The site-specific target compounds for this investigation were 1,2-DCA, vinyl chloride, total dichloroethenes, TCE, PCE, 1,2,3-TCP, and 1,1,1-TCA. In addition, because the method uses mass spectrometry for quantitation, compounds which do not have fragments with unique masses cannot be independently quantitated. Thus, 1,1-DCE, cis-1,2-DCE, and trans-1,2-DCE, which are all quantitated using the same fragment, are reported together as total dichloroethenes. Also 1,2-DCA and vinyl chloride are reported together for the same reason. However, the compounds of greatest interest for this investigation, TCE and 1,2,3-TCP, have fragments with unique masses, which allow these compounds to be reported independently. Further, as cis-1,2-DCE and trans-1,2-DCE were not detected in any of the 211 samples analyzed using SW8260B, all DSITMS DCE results are interpreted to be 1,1-DCE.

Duplicate samples were collected at a rate of at least 10% and analyzed for VOCs using USEPA Method SW8260B and/or TPH (as gasoline and diesel) using USEPA Method SW8015B by Eurofins Calscience in Garden Grove, California. Eurofins Calscience is a California Department of Public Health Environmental Laboratory Accreditation Program (ELAP) certified laboratory. Soil samples from selected AOCs were analyzed by Eurofins Calscience for metals and SVOCs using USEPA Method SW6010B/7471A and USEPA Method SW8270C, respectively.

The number of samples collected for analysis using the above named methods are listed below and are summarized by AOC in Table 4-1. Sampling information by individual boring is provided in Table 4-2.

- DSITMS: 1,868 samples

- Method SW8260B: 211 samples
- *site*lab UVF-3100: 1,357 samples
- Method SW8015B: 135 samples
- Method SW8270C: 80 samples
- Method SW6020B/7174A: 90 samples

4.2.2 Soil Gas Sampling and Analysis

A total of 22 soil gas samples were collected from soil gas probes installed in 14 soil borings. The soil gas probes were installed by Strongarm using a direct push drilling rig and directly overseen by a Tetra Tech geologist or field technician. Soil gas probe installation and sampling were conducted in accordance with the California Environmental Protection Agency *Advisory – Active Soil Gas Investigations* guidance document, dated April 2012 (Cal/EPA, 2012) and the California Department of Toxic Substances Control *Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (DTSC, 2011). Details of the soil gas probe installation and sampling activities are described in the RI (Tetra Tech, 2014). Details on the location and depth of each soil gas probe and associated boring are provided in Table 4-3.

Soil gas samples collected were analyzed for VOCs and oxygenate compounds using USEPA Method TO-15. The analyses were performed off-site by American Environmental Testing Laboratory (AETL), a California Department of Public Health-certified laboratory.

4.2.3 Groundwater Sampling and Analysis

Between October 14, 2013 and February 14, 2015 groundwater samples were collected and analyzed for VOCs using USEPA Method SW8260B. If 1,2,3-TCP was not detected above the MDL for SW8260B, the sample was analyzed for 1,2,3-TCP using USEPA Method E524.2 selected ion monitoring (SIM) (E.S. Babcock) or USEPA Method SW8260B SIM (Eurofins Calscience).

Field duplicate samples were collected at a frequency of at least 10% (one duplicate for every 10 parent samples). Additional quality assurance/quality control (QA/QC) samples consisted of trip blanks in each container used for sample transport to the laboratory, equipment blanks collected at a frequency of once per day per drilling rig, and site specific matrix spike/matrix spike duplicate (MS/MSD) samples collected at a frequency of approximately 5% (one MS/MSD for every 20 non-duplicate samples). All QA/QC samples were analyzed for VOCs using USEPA Method SW8260B.

The number of samples, not including trip blanks or equipment blanks, collected and analyzed in conjunction with groundwater sampling activities are listed below by analytical method:

- Method SW8260B: 359 samples (327 primary, 32 duplicate samples)
- Method E524.2 SIM: 20 samples (17 samples, 3 duplicate samples)
- Method SW8260B SIM: 272 samples (249 samples, 23 duplicate samples)

Copies of the laboratory analytical reports and chain-of-custody documentation are included in the RI (Tetra Tech, 2014).

5.0 REMEDIAL INVESTIGATION SUMMARY

This section describes the soil characterization for the areas investigated at the Airport.

5.1 SOIL CHARACTERIZATION IN AOCS

The following sections summarize the soil characterization results for each AOC. Figure 2-1 shows the locations of each AOC.

5.1.1 Objective and Approach

The objective of the soil characterization was to define the lateral and vertical extent of COPCs in soil based on previous investigations and groundwater hot spots and determine the presence or absence of COPCs in AOCs identified in the *Historical Assessment Report* (Tetra Tech 2013a).

Work performed during the field investigation included drilling and sampling of 158 soil borings. Between 4 and 33 samples were collected for chemical analysis from each boring, for a minimum average sampling density of approximately one sample per 2.2 feet of core. The soil boring locations are shown on Figures 5-1 to 5-18; details on the location and depth of the each boring, and number of samples for analysis from each boring are provided in Table 4-2. Copies of the soil boring logs are provided in the RI (Tetra Tech, 2014).

To support high-density soil sampling and real-time decision making, soil samples were analyzed in an onsite laboratory using USEPA Method 8265 DSITMS for VOCs and *site*LAB UVF-3100 for TPH-g and TPH-d.

Soil samples in select AOCs were analyzed by Eurofins Calscience for SVOCs using EPA Method 8270C and metals using EPA Method 6010B/7471A.

5.1.2 Data Quality Review

A total of 1,868 soil samples were analyzed by Triad for VOCs using USEPA Method 8265 and 1,357 soil samples were analyzed for TPH-g and TPH-d using UVF-3100. Level II data validation was performed to assess the usability of the data. No quality assurance or quality control (QA/QC) errors were noted in the results, and the data were found usable for the intended purpose.

While no QA/QC errors were noted in the on-site mobile lab data, the methodology used by Triad to analyze for TPH-g and TPH-d in soil at the Airport was based on UVF technology. The UVF technique does not measure TPH directly; instead the method measures the polycyclic aromatic hydrocarbons (PAHs) contained in the sample extract and extrapolates TPH concentrations from known amounts of PAH in TPH.

Because the fluorescence method is quite sensitive to the PAH concentrations, small variations in the PAH concentrations can give large variation in the extrapolated TPH concentrations.

The majority of AOCs investigated as part of this RI were covered by asphalt. Asphalt is known to contain relatively large concentrations of PAH compounds. Over time, slightly acidic and repeated rain water can make mobile small amounts of PAH compounds such that the PAH compounds will infiltrate into the uppermost portions of the underlying soils. Because of the small amounts of PAH compounds which leached into the soil, when the sample is analyzed by fluorescence, the PAH contamination (from intrusion) will be additive to any native PAHs, and will give an exaggerated TPH concentration. Therefore, for the 1- and 4- foot level, the TPH-g and TPH-d concentrations reported for some samples have overstated results. This interpretation is further supported by the 8015M data which showed that of the 15 samples collected at depths up to 4 feet from AOCs EE, G, GG, MM, and OO, all but four samples were below the IGs for TPH-g and TPH-d. The four samples with TPH concentrations greater than the IGs were determined to be the result of cross contamination as the detections were less than five times the concentration detected in the corresponding blank. A copy of the data validation memorandum prepared by the project chemist is provided in Appendix D.

A subset of 211 duplicate samples (11%) was analyzed by Eurofins Calscience for a more complete list of VOCs using USEPA Method SW8260B and to verify the results of the USEPA Method 8265. Similarly, 135 duplicate samples (10%) were analyzed by Eurofins Calscience for TPH-g and TPH-d using USEPA Method SW8015B. Level II data validation was performed to assess the usability of the subset data.

A total of 80 soil samples were analyzed by Eurofins Calscience for SVOCs using USEPA Method SW8270C and 90 soil samples were analyzed for metals using USEPA Method SW6010B/7471A. Twelve duplicate samples were collected for QA/QC purposes. Level II data validation was performed to assess the usability of the data. For CAM 17 Metals by Method SW6010B/SW7471A, no QA/QC errors were noted in the results, and the data were found usable for site evaluation purposes. For SVOCs by Method SW8270C, method blank contamination by diethyl phthalate qualified one result out of 6,532 (0.015%) as estimated because of uncertainty with the blank. No other QA/QC errors were noted in the results and all of the data were found usable for site evaluation purposes.

5.1.3 AOC Soil Sampling Locations

Figures illustrating the boring locations, number of samples collected, and sampling depths in which samples were collected for laboratory analysis at each AOC are shown on Figures 5-1 through 5-18.

5.1.3.1 AOC B – Sewage Treatment Ponds

AOC B is located in the southwest quadrant of the Airport property approximately 1,300 feet south of AOC H (Figure 2-1). This AOC has been used as sewage treatment ponds between the early 1940's and the early 1990's. In total, the AOC encompasses an area approximately 12,000 feet by 700 feet in size. During this investigation, no soil samples were collected in AOC B. As proposed in the Work Plan, groundwater samples and data gathered from the CPTu/VAP transect that cross-cuts the central portion of the AOC were used to characterize AOC B.

5.1.3.2 AOC DD – Former Airport Maintenance Shop and Yard

AOC DD, located north of AOC EE, has been utilized as a maintenance and storage yard since the 1970's (Figure 5-1). The AOC is approximately 120 feet by 120 feet in size. Photographic documentation obtained from County inspections in 1988 show a large number of drums stored in the area. No prior characterization activities had been conducted in AOC DD. During the RI investigation, six borings (B101, B102, B103, B104, B105 and B106) were completed to depths of 20 feet. A total of 46 soil samples were collected (8 samples per boring) and analyzed for VOCs and TPH.

5.1.3.3 AOC EE – Former Cal Aero Restoration Yard

AOC EE, located to the east of AOC FF, consists of Building 515 and the open area (approximately 350 feet by 200 feet in size) to the north and west of the building (Figure 5-2). In the past, this area was used by Cal Aero for the restoration and dismantling of aircraft. Samples collected from 2 previous soil gas probes installed to depths of 20 and 40 feet near the center of the AOC had detectable concentrations of several VOCs including TCE, 1,1,1-TCA, 1,1-DCE, and 1,1-DCA (Tetra Tech, 2005a).

During this investigation, 15 borings (B93, B94, B95, B98, B99, B100, B107, B108, B109, B110, B111, B112, B121, B122 and B123) were completed in AOC EE to depths ranging from 34.5 to 66.5 feet. Soil samples were collected at depths ranging from 1 to 66.5 feet with a total of 222 soil samples collected (9 to 22 samples per boring) and analyzed for VOCs and TPH.

5.1.3.4 AOC FF – Building A440

AOC FF, located nearly adjacent to AOC EE to the southwest, consists of Building A440 and the immediate surrounding area (Figure 5-3). Stripping and painting of aircraft have been performed at this facility and the rinse water from these activities was reportedly collected in four bermed areas on the concrete adjacent to the building (Kennedy/Jenks, 1991a). Prior investigations in this area have detected various VOCs,

including TCE, methylene chloride, 1,1,1-TCA, 1,1-DCE, acetone, and toluene, in soil and/or soil gas at depths up to approximately 20 feet (SEACOR, 1992a).

During this investigation, four borings (B136, B137, B138, and B139) were completed in AOC FF to depths of 20 feet. Soil samples were collected at depths ranging from 1 to 20 feet with a total of 33 soil samples collected (approximately 8 samples per boring) and analysis for VOCs.

5.1.3.5 AOC G – Former PAC Wash Rack Area

AOC G, located immediately south and southeast of AOC J-K, consists of the area identified as the former PAC aircraft wash rack area and the area immediately south of it (Figure 5-4). In total, the AOC encompasses an area approximately 300 feet by 200 feet in size. Prior investigations in this area have detected various VOCs, including TCE, 1,1,1-TCA, 1,1-DCE and 1,2-DCA in soil and/or soil gas at depths up to approximately 50 feet (SEACOR, 1992a; Tetra Tech, 2005a).

During this investigation, 20 borings were completed in AOC G to depths of 33.5 to 69 feet. A total of 346 soil samples (11-25 samples per boring) were collected and analyzed for VOCs. In addition, 317 of these samples were also analyzed for TPH.

5.1.3.6 AOC GG – Former Aircraft Dismantling Area

AOC GG, located approximately 300 feet east of AOC EE, was formerly utilized as an aircraft dismantling area (Figure 5-5). Based on the 1946 aerial image, dismantling and cleaning operations took place in an area roughly 600 feet by 500 feet where Buildings B130, B140, and B150 now exist. Aircraft parts and engines appear to have been staged in the southwestern portion of the AOC, cleaned in the southeastern portion of the AOC, and then subsequently staged on racks in the northern portion of the AOC. No prior characterization activities have been conducted in AOC GG.

During this investigation, 11 borings (B74, B75, B113, B114, B115, B116, B117, B124, B125, B131, and B132) were completed in AOC GG to depths of 20 feet. Soil samples were collected at depths ranging from 1 to 20 feet with a total of 108 soil samples collected (approximately 8 samples per boring) for analysis of VOCs and TPH.

5.1.3.7 AOC H – Former Waste Disposal Ponds

AOC H, located immediately south of AOC KK, consists of three former waste disposal ponds (Figure 5-6). The ponds received waste water discharge from the former PAC wash rack area (AOC G) via piping (AOC OO). Based on the 1955 aerial image where the ponds are readily identifiable, the AOC encompasses an area approximately 200 feet by 650 feet. No VOCs were detected in samples from prior characterization

activities in AOC H; however, these activities were relatively limited in scope and were restricted to the northernmost ponds.

During this investigation, 10 borings (B97, B140, B141, B150, B155, B156, B157, B158, B161 and B162) were completed in AOC H to depths ranging from 20 to 56 feet (Figure 5-10). Soil samples were collected at depths from 1 to 56 feet with a total of 150 soil samples collected (ranging from 7 to 21 samples per boring) and analyzed for VOCs and TPH.

5.1.3.8 AOC HH – Buildings A230, A235, A340, A435

AOC HH, located east of AOC J-K, is comprised of Buildings A230, A235, A340, and A435 (Figure 5-7). These buildings were utilized by PAC from approximately 1950 to 1959 for aircraft modification. Additional prior operations in these buildings included aircraft maintenance and restoration. No prior characterization activities have been conducted in AOC HH. A total of eight borings (B118, B119, B120, B126, B127, B128, B129 and B130) were completed in AOC HH to depths ranging from 20 to 34 feet. Soil samples were collected at depths ranging from 1 to 34 feet with a total of 65 soil samples collected (ranging from 6 to 15 samples per boring) for analysis of VOCs.

5.1.3.9 AOC II – Aircraft Tiedown Area

AOC II, located south of AOC HH and east of AOC G, is presently utilized as an aircraft tie down area (Figure 2-1). The AOC encompasses an area approximately 1000 feet by 1050 feet in size. Aerial images from 1941 through 2005 show relatively ephemeral discoloration/staining at various locations across the AOC. During this investigation, no soil samples were collected in AOC II; however, groundwater samples and data gathered from the CPTu/VAP transect that cross-cuts the central portion of the AOC were used to characterize AOC II.

5.1.3.10 AOC JJ – Former UST C-15 and Sump I

AOC JJ, located approximately 17 feet south of AOC HH Building A435, is comprised of the former UST C-15 excavation area and the sump identified immediately south of it (Figure 5-8). In total, the AOC is approximately 50 by 15 feet in size. Additional assessment was recommended following the removal of the UST in 1992 to delineate suspected petroleum hydrocarbons in soils beneath the UST (Kennedy/Jenks, 1991); however no further characterization had been performed prior to the current investigation.

During this investigation, a total of five borings (B41, B42, B49, B50 and B51) were completed in AOC JJ to a depth of 30 feet. Soil samples were collected at depths from 1 to 30 feet with a total of 49 soil samples collected (approximately 10 samples per boring) for analysis of VOCs and TPH.

5.1.3.11 AOC J-K – PAC Paint Shop and Paint Shed Areas

AOC J-K, located immediately east of AOC N, consists of the PAC paint shop (Area J) and paint shed (Area K), Building A240, and the open area between these buildings and Building A230 (Figure 5-9). In total the AOC encompasses an area approximately 350 feet by 300 feet. Prior investigations in this area have detected various VOCs, including chloroform, PCE, TCE, and carbon tetrachloride, in soil and/or soil gas at depths up to approximately 50 feet (SEACOR, 1992a; Tetra Tech, 2005a).

During this investigation, a total of 14 borings (B06, B07, B08, B09, B10, B11, B12, B13, B14, B19, B20, B21, B22 and B23) were completed in AOC J-K to depths ranging from 36 feet to 78 feet. Soil samples were collected at depths from 1 to 78 feet with a total of 245 soil samples collected (13 to 33 samples per boring) for analysis of VOCs.

5.1.3.12 AOC KK – Building A270, Yanks Museum

AOC KK, located approximately 150 feet south of AOC G, is comprised of Building A270 and the paved area around the building (Figure 5-10). In total, AOC KK is approximately 350 feet by 350 feet in size. From 1968 to the mid 1970's, American Electric produced and stored napalm at the facility. The AOC has been occupied by Yanks Air Museum since 1984 and has been used since then for the restoration and display of aircraft. No previous characterization activities have been conducted in AOC KK. During this investigation, a total of 7 borings (B57, B58, B59, B61, B62, B63 and B64) were completed in AOC KK to depths ranging from 20 to 57.2 feet. Soil samples were collected at depths from 1 to 78 feet with a total of 245 soil samples collected (7 to 22 samples per boring) for analysis of VOCs and TPH.

5.1.3.13 AOC LL – Former UST C-18

AOC LL, located approximately 120 feet southwest of AOC KK, consists of the area on the west side of Building A285 where former USTs C-18 and C-19 were located (Figure 5-11). The AOC is approximately 125 feet by 175 feet in size. A limited investigation of the area around UST C-18 was recommended but never performed (Kennedy/Jenks, 1991). During this investigation, two angle borings (B133 and B134) were completed in AOC LL to a depth of 32 feet. Soil samples were collected at depths from 1 to 32 feet with a total of 23 soil samples collected (11 to 12 samples per boring) for analysis of VOCs and TPH.

5.1.3.14 AOC M – Fuel Dump Area

AOC M, which overlaps the northwestern corner of AOC GG, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as an area near Building E2 (currently identified as Building B130) used by PAC as a JP-4 fuel dump area (Figure 5-12). Because there were no

distinguishing features visible in the aerial images which could identify the exact location of the AOC, a conservative estimate of its size and general location was developed by Tetra Tech based on the available historical reports. No previous characterization activities have been conducted in AOC M.

During this investigation, four borings (B65, B71, B72 and B73) were completed in AOC M to a depth of 20 feet. Soil samples were collected at depths from 1 to 20 feet with a total of 28 soil samples collected (7 samples per boring) for analysis of VOCs and TPH.

5.1.3.15 AOC MM – Building A385

AOC MM, located to the east of AOC H, is comprised of Building A385, the paved area immediately west of the building, and a portion of the open area to the south of the building (Figure 5-13). In total the AOC encompasses an area approximately 275 feet by 275 feet. Inspection reports indicated that oil and organic solvents were used in the past at the AOC and that spillage/disposal may have occurred. No previous characterization activities have been conducted in AOC MM.

During this investigation, seven borings (B32, B33, B34, B35, B36, B37 and B38) were completed in AOC MM to depths of 40 feet and 52 feet. Soil samples were collected at depths from 1 to 52 feet with a total of 100 soil samples collected (12 to 20 samples per boring) for analysis of VOCs and TPH.

5.1.3.16 AOC N – Suspected Landfill

AOC N, located near the northwestern corner of the Airport, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as an alleged solid waste landfill (Figure 5-14). Based on the 1955 aerial image which shows an apparent bermed area, AOC N is approximately 300 feet by 300 feet in size. No prior characterization activities have been conducted in this area.

During this investigation, a total of nine borings (B70, B86, B87, B88, B89, B90, B91, B92, and B96) were completed in AOC N to depths of 30 feet and 92 feet. Soil samples were collected at depths from 1 to 30 feet with a total of 85 soil samples collected (8 to 10 samples per boring) and analyzed for VOCs (85 samples), TPH (85 samples), SVOCs (52 samples), and metals (52 samples).

5.1.3.17 AOC NN – Former Building 30

AOC NN, located south of runway 21 in the northeastern quadrant of the Airport, consists of former Building 30 and the open area immediately surrounding it and to the south (Figure 5-15). The AOC was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as being used for aircraft stripping, painting, and crop dusting activities. In 1988, a 2,000 gallon spill of an

unknown chemical and discharges of unknown substances from barrels to the north of the building were reported in this area. Prior characterization activities have been focused around the footprint of the former building and have not assessed the area to the south.

During this investigation, 10 borings (B76, B77, B78, B79, B80, B81, B82, B83, B84, and B85) were completed in AOC NN to a depth of 20 feet. Soil samples were collected at depths from 1 to 20 feet with a total of 74 soil samples collected (7 to 8 samples per boring) for analysis of VOCs.

5.1.3.18 AOC O – United States Forest Service Area/Reported Solid Waste Landfill

AOC O is located approximately 300 feet southeast of AOC Z near the central portion of the Airport property (Figure 5-16). The AOC was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as being used by the United States Forest Service for the mixing and loading of chemical fire retardants and later reportedly used as a solid waste landfill. No previous characterization activities have been conducted in this area.

During this investigation, five borings (B39, B40, B46, B47, and B48) were completed in AOC O to depths of 25 feet and 30 feet. Soil samples were collected at depths from 1 to 30 feet with a total of 48 soil samples collected (9 to 10 samples per boring) for analysis of VOCs (48 samples), TPH (48 samples), SVOCs (28 samples) and metals (28 samples).

5.1.3.19 AOC OO – Former PAC Wash Rack Area Drain

AOC OO, located on the western side of AOC G, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as discharge piping for waste water from the former PAC wash rack area (Figure 5-17). The piping, visible in the 1955 aerial image, runs in a southeast orientation from AOC G to a series of former drainage ponds (AOC H) south of Building A280. No prior characterization activities have been conducted in AOC OO.

During this investigation, a total of 10 borings (B43, B44, B45, B52, B53, B54, B55, B56, B68 and B69) were completed in AOC OO to depths of 34 feet and 55.5 feet. Soil samples were collected at depths from 1 to 55 feet with a total of 136 soil samples collected (11 to 18 samples per boring) for analysis of VOCs (136 samples) and TPH (109 samples).

5.1.3.20 AOC Z – Waste Water Discharge from Building A495

AOC Z, located approximately 650 feet east of AOC MM, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as a runoff area for discharge of waste water from Building A495 where aircraft maintenance, repair, stripping and painting have occurred (Figure

5-18). The AOC is oriented generally to the southwest from Building A495 and encompasses an area approximately 1,000 feet by 50 feet in size. Prior investigations have identified various VOCs, in particular TCE, 1,1,1-TCA and 1,1-DCE, in shallow soils and/or soil gas within the AOC (SEACOR, 1992a; Tetra Tech, 2005a). A perched water layer was also identified during the 1992 SEACOR investigation at depths ranging from 4 to 13 feet within the area.

During this investigation, nine borings (B135, B142, B143, B144, B145, B146, B147, B151 and B152) were completed in AOC Z to a depth of 20 feet. Soil samples were collected at depths from 1 to 20 feet with a total of 38 soil samples collected (1 to 7 samples per boring) for analysis of VOCs.

5.2 SOIL GAS CHARACTERIZATION IN AOCS

The following sections summarize the soil gas characterization efforts for the Chino Airport.

5.2.1 Objective and Approach

The objective of the soil gas sampling was to complete a Tier I evaluation of potential health risks associated with the vapor intrusion pathway near Building A240 and to characterize the distribution of VOCs in AOC J-K and AOC Z.

Work performed during the field investigation consisted of installing 23 soil gas probes in 14 of the borings drilled for the soil characterization. One of the probes from AOC J-K (P-D12) could not be purged due to low-flow conditions, so only 22 soil gas samples were collected and analyzed. The soil gas probe locations are shown on Figures 5-19 and 5-20; details on the location and construction of each probe are provided in Table 4-3.

5.2.2 Data Quality Review

A total of 23 soil gas samples (including 3 trip blanks) were analyzed by AETL for VOCs using USEPA Method TO-15. Level II data validation was performed to assess the usability of the data. No QA/QC errors were noted in the results, and the data were found usable for evaluation purposes. A copy of the data validation memorandum prepared by the project chemist is provided in the RI (Tetra Tech, 2014).

5.2.3 AOC Soil Gas Sampling Locations

Soil gas sampling locations and sampling depths are shown in Figures 5-19 and 5-20 and described briefly below.

5.2.3.1 AOC J-K – PAC Paint Shop and Paint Shed Areas

As shown in Figure 5-19, a total of five soil gas probes were installed in two borings to 5 feet bgs and three borings to 12 feet bgs. Three borings, B162, B163 and B164, were installed at a 20% angle adjacent to Building A240.

5.2.3.2 AOC Z – Waste Water Discharge from Building A495

As shown in Figure 5-20, a total of 18 soil gas probes were installed in nine borings at various depths from 5 feet to 19.5 feet.

5.3 GROUNDWATER CHARACTERIZATION

The following sections summarize the groundwater characterization efforts for the Chino Airport.

5.3.1 Objective and Approach

The groundwater phase of the remedial investigation utilized a Triad framework for collection and chemical analyses of groundwater samples. The groundwater analytical data obtained were used to determine if the vertical and lateral extents of site-related solutes in groundwater were adequately defined.

5.3.2 Data Quality Review

A total of 359 samples (including 32 duplicate samples) were analyzed for VOCs using USEPA Method SW8260B. A total of 292 of these samples were also analyzed for 1,2,3-TCP using either USEPA Method SW8260B SIM (249 non-replicate samples and 23 duplicate samples) or USEPA Method E524.2 (17 non-replicate samples and 3 duplicate samples). Level II data validation was performed and showed that the laboratories analyzed all samples in accordance with method guidelines and the data was usable for site evaluation purposes.

5.3.3 Groundwater Sampling Locations

Groundwater sampling locations associated with the site investigation are shown in Figure 5-21.

6.0 HUMAN HEALTH RISK ASSESSMENT

This section presents the human health risk assessment (HHRA) of the Site. The process followed for the HHRA consists of two main steps: (1) calculation of risk-based screening levels (RBSLs) and (2) comparison of chemical concentrations measured in environmental media to the RBSLs. The RBSLs were developed to be protective of human health and to determine the need for any Site remediation efforts. Factors considered in determining RBSLs include receptor contact with COPCs in impacted environmental media. All of the RBSLs were developed in accordance with United States Environmental Protection Agency (USEPA) (1991) and California Department of Toxic Substances Control (DTSC) (2018a) guidance for developing risk-based screening levels.

This HHRA consists of the following five main components:

- Identification of Chemicals of Potential Concern
- Identification of Exposure Pathways
- RBSL Calculation Process
- Fate and Transport Analyses
- Risk Characterization

6.1 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

COPCs are chemicals that have been detected in the environment that may adversely affect human receptors. The HHRA examines potential health risks for individuals potentially exposed to past chemical releases based on current and future Site land uses. As described in Section 2.0, chemical releases may have occurred during the more than 75 (i.e., early 1940s to present) when the Site functioned as an airfield with additional past and present uses consisting of the following: a flight academy; aircraft sales and storage; modification of military aircraft; various manufacturing; crop dusting; aircraft restoration and maintenance repair shops; aircraft painting; stripping and washing; mixing and loading of fire retardant chemicals for forest fires; maintenance and operational facility for the United States Forest Service aircraft; and aircraft museums. Section 2.0 and Section 5.0 describe the past investigations and removal actions that have been performed at the Site since 1991. The soil, groundwater, and soil gas site characterization work summarized in Section 5.0 have been conducted on a Site-wide basis and can be considered representative of current Site conditions. Thus, the data from these investigations have been used to characterize COPCs in soil, groundwater, and soil gas for the HHRA. The analytical summary tables for soil and soil gas are provided in Appendix E.

The soil and groundwater investigations have identified several groups of chemicals that could potentially be related to releases that may have occurred at the Site, including PAHs, SVOCs, VOCs, TPH (gasoline and diesel ranges), and metals.

Summaries of the chemicals detected in soil, groundwater, and soil gas are presented in Tables 6-1 through 6-4, respectively. These tables also provide the number of samples collected in the three environmental media, the frequency of detection, and the range of concentrations of each detected chemical. As shown in Table 6-5, the chemicals detected in soil or groundwater consist of PAHs, metals, VOCs, and total petroleum hydrocarbons while those detected in soil gas consist of VOCs.

6.1.1 Chemicals of Potential Concern in Soil

COPCs in soil were based on the most recent data available for characterizing conditions across the Site supported by appropriate QA/QC information demonstrating that they are acceptable for risk assessment purposes. These data include investigation results collected as part of the RI from May 2014 through October 2014.

All organic compounds detected in soils, including petroleum hydrocarbons, were identified as COPCs. For soils, each COPC is shown in terms of the depths corresponding to the depth intervals considered relevant for potential exposures, i.e., surface (0-2 feet bgs) and surface plus subsurface (0-10 feet bgs). As shown in Tables 6-1 and 6-2, 29 VOCs, two SVOCs, 10 PAHs, two TPH fractions, and 14 metals were detected in soil.

A key aspect of the COPC identification process is the identification of metals that may be elevated above background. Consistent with risk assessment guidance (DTSC, 1997), all metals detected in soil were identified as COPCs and included in the evaluation. Depending on estimated risks and hazards, background evaluations were conducted for certain metals to determine if they were present at levels that differed from naturally occurring background levels.

6.1.2 Chemicals of Potential Concern in Groundwater

Groundwater sampling has been conducted at the Site to define impacts to groundwater due to various chemical releases. To characterize current Site conditions, data associated with sampling events conducted from April 2013 through May 2017 were used to identify COPCs in groundwater. Chemicals detected in on-site and off-site groundwater monitoring wells were identified as COPCs and are summarized in Table 6-3. As explained in more detail below, only VOCs detected in groundwater were identified as COPCs as

it was determined that potential inhalation of vapors migrating from groundwater was the only complete exposure pathway for potential receptors.

6.1.3 Chemicals of Potential Concern in Soil Gas

As described in Section 4.2.2, soil gas sampling has been conducted at the Site to evaluate the presence of contaminants that may volatize from soil or groundwater and migrate through the vadose zone into indoor air. All volatile compounds detected in soil gas were identified as COPCs and are shown in Table 6-4. Table 6-5 provides a summary of COPCs identified in each environmental media.

6.2 IDENTIFICATION OF EXPOSURE PATHWAYS

The identification of exposure pathways is key to developing health-protective RBSLs. An exposure pathway describes the course that a chemical takes from a source to an exposed individual. Based on our current understanding of Site conditions, the chemical exposures that could potentially occur at the Site were identified by considering the following four factors:

- Sources of COPCs
- Environmental media in which COPCs have been detected (e.g., soil)
- Exposure or contact points with the environmental media (e.g., direct soil contact)
- Exposure routes for chemical intake by a receptor (e.g., ingestion)

The exposure pathways identified for the Site were based on evaluations of the likelihood of receptors directly contacting COPCs and the mechanisms governing the fate and transport of the COPCs They are presented in Figure 6-1.

6.2.1 Receptors and Exposure Pathways

Currently the Site operates as a public airport for commercial, industrial, and aviation use. The surrounding areas are used for commercial/industrial purposes, residential areas, and recreational/open space areas. Future uses of the Site are expected to remain commercial or industrial consistent with continued airport operations. Thus, the most likely receptors potentially exposed to COPCs detected at the Site are on-site commercial workers. Although residential use is not anticipated at the Site, a hypothetical on-site residential scenario is included to evaluate potential future unrestricted land use.

For this evaluation, soil exposure includes four complete exposure pathways: 1) incidental soil ingestion, 2) dermal contact with soil, 3) airborne dust inhalation, and 4) inhalation of vapors.

Currently there are no immediate plans for Site development. However, should development occur in the future, construction workers may be exposed to the COPCs at the Site. Construction workers are assumed

to be involved in soil excavation activities and, therefore may be exposed to COPCs in surface and subsurface soil via incidental ingestion, dermal contact, and the inhalation of airborne dust. Construction workers are also assumed to inhale vapors emitted from soil to the atmosphere.

Groundwater at the Site may be used for domestic water supply purposes. However, the groundwater is treated for VOCs before it is supplied to members of the Chino Desalter Authority. Thus, the exposure pathways related to the potable use of groundwater (i.e., dermal contact during showering/bathing, ingestion, and the inhalation of volatiles emitted during showering) are assumed to be incomplete and were not evaluated.

The results of groundwater investigation activities have indicated that COPCs in groundwater have migrated off-site to the southwest. The off-site groundwater plume is located in areas zoned for general industrial, agricultural, or open space use. The closest residential boundary is roughly 1,650 feet to the east (i.e., cross gradient) of the off-site groundwater plume and south of the Site. However, it was discovered that one older residential property is still located in the industrial-zoned area within the off-site plume area southwest of the Site on Euclid avenue, approximately 1,000 feet north of monitoring well CAMW-11B and roughly 500 feet east of sampling location F3B (Figure 6-2). Based on the location of the off-site groundwater plume beneath industrial zoning and beneath a lone residence, an off-site commercial worker and off-site residential scenario were also included in the HHRA. Both of these populations are assumed to be potentially exposed to COPCs via vapor migration into indoor air.

Surface water is not present within the Site boundaries, and no surface water bodies are present within a 0.5 mile radius. Therefore, surface water exposure pathways are assumed to be incomplete.

6.2.2 Potentially Complete Exposure Pathways

Each potentially complete exposure pathway is shown in the CSM (Figure 6-1) and these are summarized in the table below.

Summary of Potentially Complete Exposure Pathways

Receptor	Medium	Exposure Route
On-Site Commercial Worker	Soil	Incidental Ingestion Dermal Contact Dust Inhalation Outdoor Vapor Inhalation
	Groundwater	Indoor Vapor Inhalation
	Soil Gas	Indoor Vapor Inhalation

Receptor	Medium	Exposure Route
On-Site Construction worker	Soil	Incidental Ingestion Dermal Contact Dust Inhalation Outdoor Vapor Inhalation
Hypothetical future on-site resident[1]	Soil	Incidental Ingestion Dermal Contact Dust Inhalation Outdoor Vapor Inhalation
	Groundwater	Indoor Vapor Inhalation
	Soil Gas	Indoor Vapor Inhalation
Off-Site Commercial Worker	Groundwater	Indoor Vapor Inhalation
Off-Site Resident	Groundwater	Indoor Vapor Inhalation

Note[1]: Hypothetical future on-site resident is for unrestricted Site use determination

6.3 DERIVATION OF RISK-BASED SCREENING LEVELS

RBSLs are chemical-specific concentrations that correspond to a specific target risk or target noncarcinogenic hazard quotient (HQ) for a particular receptor. RBSLs were calculated to be protective of each of the receptor groups (commercial workers, construction workers, and hypothetical future on-site residents), for each of the complete exposure pathways identified above (Section 6.2.2). The equations used to calculate the risk-based remedial goals were developed by rearranging the equations provided by the USEPA (1989) for calculating risks. The parameters used in the calculation of the risk-based goals consist of four main components, including the following:

1. A set of assumed exposure parameters for each receptor group (e.g., soil ingestion rates)
2. CalEPA- or USEPA-approved toxicity values (e.g., cancer slope factors/unit risk factors and noncancer reference doses)
3. Specified target risk levels
4. Inter-media transfer factors that reflect the transport of COPCs between environmental media (e.g., from soil to air)

Each of these components used in the RBSL derivation process is described below.

6.3.1 Quantitative Exposure Analysis

Quantitative exposure analysis consists of estimates of the type, timing, and magnitude of exposures that human receptors may experience at the Site. To calculate risk-based concentrations protective of potential receptors, exposure parameters were determined for on-site commercial workers and on-site construction

workers potentially exposed to COPCs at the Site via the complete exposure pathways identified in Section 6.2.2 based on DTSC (2014) and USEPA (1989) guidance. The exposure parameters for each receptor group are described below and provided in Tables 6-6 through 6-9.

Current and future commercial workers are assumed to be 80-kilogram (kg) adults who work 8 hours per day (hrs/day), 5 days per week (days/week), for 250 days per year (DTSC, 2014) over 25 years (Table 6-6). Following guidance (DTSC 2014), the commercial worker was assumed to ingest soil at a rate of 100 milligrams per day (mg/day). Although commercial workers may dermally contact soil, it was assumed that clothing would provide partial protection such that 6,032 square centimeters (cm^2) of skin is available for dermal contact with soils. The soil-to-skin adherence factor is assumed to be 0.2 milligrams per square centimeter (mg/cm^2) (DTSC, 2014).

Future construction workers are assumed to be 80-kg adults who work 8 hours per day, 5 days per week, for 250 days per year over the course of a year (DTSC 2014) (Table 6-6). The construction worker is assumed to have a soil ingestion rate of 330 mg/day, although it is unlikely that intensive soil contact associated with soil excavation activities would last an entire year. Clothing is assumed to provide partial protection to construction workers from dermal exposure to soil such that 6,032 cm^2 of skin is available for dermal contact. Based on DTSC (2014) guidance, the soil-to-skin adherence factor is assumed to be 0.8 mg/cm^2. On-site construction workers are assumed be exposed to airborne dusts and vapors emitted from soils.

To evaluate future unrestricted Site use, a hypothetical future on-site residential scenario was evaluated. These hypothetical future on-site residents were assumed to reside at the Site for 26 years, 6 years as a child and 20 years as an adult (DTSC, 2014 (Table 6-7). Future on-site residents were assumed to have soil ingestion rates of 100 mg/day for an adult and 200 mg/day for a child (DTSC 2014). Although future on-site residents may dermally contact soil, it was assumed that clothing could provide partial protection, with contact potentially occurring over approximately 25 percent (%) of the body or a surface area of 6,032 cm^2 for an adult and 2,900 cm^2 for a child. The soil-to-skin adherence factors were assumed to be 0.07 mg/cm^2 for an adult and 0.2 mg/cm^2 for a child. Lastly, it was assumed that residential exposures could occur every day of the week, excluding a two-week vacation each year, for a total of 350 days per year (DTSC 2014).

Commercial workers and hypothetical future residents are also assumed to be exposed to vapors migrating from soil gas (Table 6-8) and groundwater into indoor air (Table 6-9).

6.3.2 Toxicity Analysis

Toxicity analysis is the process of identifying the relevant and appropriate toxicity values required for deriving RBSLs. This process considers the characteristics of the potential exposure (e.g., chronic), the route of exposure (e.g., oral, inhalation, dermal), and the chemical-specific toxic response (e.g., carcinogenic and/or non-carcinogenic). All potential exposures for the site exposure scenarios were treated as long-term chronic exposures regardless of exposure duration. Where appropriate, route-specific toxicity values were used. As applicable, both carcinogenic and non-carcinogenic effects were considered in deriving RBSLs.

In accordance with risk assessment guidelines, chemicals are evaluated for their potential health effects in two categories, carcinogens and noncarcinogens, with different methods used to estimate the potential for carcinogenic and noncarcinogenic health effects to occur. All chemicals produce noncarcinogenic effects at sufficiently high doses, however, only some chemicals are associated with carcinogenic effects. Regulatory agencies generally consider carcinogens to pose a cancer risk at all exposure levels (i.e., a “no-threshold” assumption); that is, any increase in dose is associated with an increase in the probability of developing cancer. In contrast, for reasons described below, noncarcinogens generally are thought to produce adverse health effects only when some minimum exposure level is reached (i.e., a threshold dose). As applicable, both carcinogenic and non-carcinogenic effects were considered in deriving RBSLs.

Carcinogenic Effects

Current risk assessment practice for carcinogens is based on the assumption that there is no threshold dose below which carcinogenic effects do not occur and that carcinogenic processes are the same at high and low doses. This approach has generally been adopted by regulatory agencies as a conservative practice to protect public health. The "no-threshold" assumption was used in this HHRA for evaluating carcinogenic effects. Therefore, the magnitude of the risk declines with decreasing exposure; however, the resulting risk is believed to be zero only at zero exposure. If there is in fact a threshold for carcinogenicity, actual risks could be zero at sufficiently low doses.

Noncarcinogenic Effects

To assess risks associated with noncarcinogenic effects, the USEPA has adopted a science policy position that protective mechanisms such as repair, detoxification, and compensation must be overcome before an adverse noncarcinogenic health effect is manifested. Therefore, a range of exposures exists from zero to some finite value (i.e., a threshold) that can be tolerated by an organism without appreciable risk of adverse effects.

Sources of Toxicity Values

Carcinogenic and non-carcinogenic toxicity criteria were obtained from multiple sources, based on the hierarchy of sources identified in DTSC (2015) and USEPA (2017) guidance. The hierarchy of sources is as follows:

1) DTSC's Toxicity Criteria database (DTSC, 2018b)
2) Integrated Risk Information System (IRIS) database (USEPA, 2018)
3) USEPA's Provisional Peer Reviewed Toxicity Values (PPRTVs)
4) The Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk levels (MRLs)
5) PPRTV appendix values
6) USEPA Health Effects Assessment Summary Table (HEAST)

As per DTSC guidance (DTSC, 2015), the more protective cancer and non-cancer toxicity criteria available from USEPA and DTSC were selected for this evaluation Route-to-route extrapolations were used to approximate reference concentrations (RfCs) (DTSC 2018b) for chemicals that have oral reference doses (RfDs) but do not have inhalation RfCs.

For chemicals without toxicity values, toxicity values for surrogate chemicals were used, where possible. Surrogate chemicals are chemicals that are assumed to exhibit toxicity similar to that of the chemical lacking a toxicity value based on structural similarities. All toxicity criteria used in these evaluations are summarized in Tables 6-10 and 6-11.

Total Petroleum Hydrocarbons

For this evaluation, petroleum hydrocarbons were evaluated using the RfDs and RfCs identified by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB, 2016a,b) for deriving Environmental Screening Levels (ESLs).

Inorganic Lead

Cal/EPA and USEPA have determined that lead exposure can result in various health effects, depending on the level of exposure. Potential health effects differ, depending on whether exposure occurs to an adult, a pregnant woman, or a child. Additionally, lead exposure is typically evaluated in terms of blood-lead levels. For these reasons, two screening levels were used to evaluate potential lead exposures at the Site. One goal is considered protective of adults, including pregnant women, based on the commercial/industrial DTSC-

modified screening level (DTSC-SL) of 320 mg/kg and the other is considered protective of children, based on the residential DTSC-SL of 80 mg/kg (DTSC, 2018).

6.3.3 Target Risk Levels

Target risk levels were determined according to USEPA and DTSC guidance. USEPA (1990) guidance indicates that a carcinogenic risk probability between 1 in 10,000 and 1 in 1,000,000 (1×10^{-4} to 1×10^{-6}) is generally acceptable. The lower end of this risk management range is typically applied to residential situations, whereas the higher range may be considered appropriate for commercial situations. Therefore, for commercial and construction workers, RBSLs were developed for a target risk level of 1×10^{-5}. For this evaluation, RBSLs for residential receptors were developed based on a target risk level of 1×10^{-6}.

Potential non-carcinogenic effects are estimated by calculating the ratio between exposure (e.g., dose) and the chemical-specific RfD or RfC. This ratio is defined as the hazard quotient (HQ) and is evaluated separately for each exposure pathway. The sum of all chemical-specific and pathway-specific HQs is defined as a hazard index (HI). The USEPA (1989 and 1990) considers a HI less than 1 protective of adverse health effects. For this evaluation, RBSLs were developed using a target HQ of 1 for all receptors.

6.3.4 Fate and Transport Analyses

Fate and transport models were used to evaluate inter-media transfer and transport of COPCs in the development of RBSLs. Inter-media transfer is the movement of constituents between environmental media (e.g., from soil to air). Constituent transport occurs through the movement of an environmental medium by natural advective and dispersive processes, such as air dispersion. To develop RBSLs, fate and transport models have been incorporated into each of the equations that were be used to calculate risk-based screening levels. These models include the following:

- Dust emission from soils
- Emission of volatiles from
  - soils to outdoor air
  - soil gas to indoor air
  - groundwater to indoor air

The models used to account for each of these fate and transport processes as part of the derivation of RBSLs are described in detail in Appendix B.

6.3.5 Risk-Based Screening Levels

Receptor-specific RBSLs were calculated for each environmental medium using the equations and parameters summarized in Tables 6-6 through 6-9. The RBSLs are provided in Tables 6-13 through 6-111 and in Appendix C.

6.4 RISK CHARACTERIZATION

Risks were characterized for all receptors using the ratio of concentrations measured at the Site to the receptor-specific RBSLs calculated for each environmental medium. This evaluation consisted of three steps: 1) specifying the target risk and hazard quotient to use in calculating RBSLs for each receptor group; 2) estimating exposure point concentrations (EPCs) for each chemical; and 3) comparing the EPCs to the RBSLs to estimate risks and hazards for each receptor. Each of these steps is described below.

6.4.1 Estimating Risks and Hazard Quotients

The RBSLs were calculated for a specified target risk (i.e., a carcinogenic risk of 1 x 10^{-6} for residents and 1 x 10^{-5} for workers) and concentrations greater than the RBSLs represent carcinogenic risks proportionally greater than the target risk. Similarly, concentrations less than the RBSLs represent carcinogenic risks proportionally less than the target risk. Risks were calculated as follows, using the ratio of each COPC's reasonable maximum exposure (RME) concentration and its corresponding soil RBSL:

Residential Scenarios:

$$Risk = \frac{\text{RME concentration}}{\text{RBSL}} \times 10^{-6}$$

Commercial and Construction workers:

$$Risk = \frac{\text{RME concentration}}{\text{RBSL}} \times 10^{-5}$$

The noncarcinogenic HQ calculation process is similar. Since the target hazard quotient (THQ) is 1.0, the resulting HQs are the actual ratios of the RME concentration and THQ for each chemical. In accordance with USEPA and DTSC guidance, the risk ratios for each chemical and potentially complete exposure pathway were summed to determine the multi-pathway carcinogenic risk estimates and noncarcinogenic HI for each receptor group.

For lead exposures in soil, the RBSLs used in this evaluation are DTSC-SLs. The worker RBSL for lead corresponds to the DTSC-SL of 320 mg/kg, which was developed to be protective of adults, including

pregnant women (DTSC, 2018a). The residential RBSL for lead corresponds to the DTSC-SL of 80 mg/kg, which was developed to be protective of children (DTSC, 2018a).

6.4.2 Exposure Point Concentrations

Exposure point concentrations (EPCs) for each receptor group were estimated using the chemical concentrations measured in environmental media. In accordance with USEPA (1989 and 2002) guidance, the EPCs are represented by the reasonable maximum exposure (RME) point concentrations, which is represented by the maximum concentration or the 95% upper confidence limit (UCL_{95}) on the mean concentration. The UCL_{95} concentrations were calculated using the latest version of ProUCL (version 5.1) from USEPA (2015a and 2015b). In addition to calculating UCL_{95}s for data that are normally and lognormally distributed, ProUCL 5.1 calculates UCL_{95}s for data that follow other parametric distributions (i.e., the gamma distribution) and incorporates nonparametric estimation methods (e.g., Skewness adjusted central limit theorem [CLT], Kaplan-Meier, and bootstrapping methods). Some of the methods used by ProUCL 5.1, such as the Kaplan-Meier (KM) method and the robust regression on order statistics (ROS) methods, incorporate methods for calculating UCL_{95} for data with non-detected concentrations (i.e., below laboratory reporting limits).

To assess potential health risks for workers, RBSLs were compared to two sets of RME concentrations: 1) RME concentrations for soil samples from a depth of 0 to 2 feet bgs for commercial workers, and 2) RME concentrations for samples collected from a depth of 0 to 10 feet bgs, for construction workers and the on-site hypothetical resident. For soil gas, potential risks were either estimated for each individual sampling location so RME concentrations are represented by the detected soil gas concentrations at each soil gas sampling location or by using overall maximum detected concentrations. For groundwater, sampling results collected from April 2013 to May 2017 were used to estimate potential risks via vapor migration from groundwater into indoor air.

6.5 RISK CHARACTERIZATION CONSIDERATIONS

This section identifies important risk characterization issues associated with the HHRA that need to be considered when reviewing the estimated risks that correspond to baseline risk assessment conditions/assumptions that do not accurately reflect site-specific conditions and when evaluating potential risk management needs. As described in more detail below, the estimated baseline risks presented in this report likely overstate the actual risks associated with the AOCs being evaluated.

6.5.1 Actual Site Land Use

It is noteworthy that the baseline assumptions used to calculate potential risks in this report are based on potential land use considerations that generally differ from the actual setting of the AOCs being evaluated. For example, the estimated risks presented in this report are based on the assumption that potential receptors will be exposed to bare soils. However, significant portions of many of the AOCs being evaluated are mostly, if not completely, covered by pavement and/or buildings, with such covering minimizing or eliminating any contact with soils. For AOCs covered by pavement/buildings where little if any exposure to soils is expected, the identification of soils with elevated risk levels does not mean that actual receptors experience elevated exposures, but it does help identify areas where existing paving should be maintained.

The use of conservative baseline assumptions about land use and site conditions that do not reflect current or expected conditions is intended to support the identification of risk management measures (e.g., land use restrictions against residential development). However, as explained above, the health risks estimated on the basis of conservative baseline risk assessment assumptions that do not reflect current or expected conditions will overstate the potential health risks to receptors. Thus, while the use of such baseline assumptions can have value in supporting risk management decisions, they can diminish the value of the baseline risk assessment as the basis for risk communication. For this reason, any risk communication based on the results in this report should include information regarding the assumptions used and how the use of assumptions that more accurately reflect the site would affect the estimated baseline risk levels.

6.5.2 Risks Attributable to Background Levels of COPCs

Even when present at naturally occurring background levels, metals such as arsenic can contribute significantly to cancer risk estimates. Because remediation is not usually required for chemicals present below background levels, an important function of the baseline risk assessment is to distinguish risks attributable to background from the total estimated risk. This distinction can also be an important aspect of risk communication at a site.

The estimated risks associated with background levels need to be considered when reviewing the risk estimates in this report as they illustrate that the risks associated with naturally occurring background levels of arsenic (i.e., not related to Site operations) can contribute significantly to risk estimates (refer to AOCs N and O). In regard to risk management, Cal/EPA does not typically require clean-up below naturally occurring background levels.

6.6 OVERVIEW OF HEALTH RISK RESULTS

Table 6-12 presents a summary of the lifetime incremental cancer risks and hazard indices calculated for the potentially exposed populations evaluated for each of the AOCs and off-site areas evaluated in this HHRA.

For reasons discussed in Section 6.5, the health risk estimates in this HHRA are characterized as "baseline" health risks. Since they do not take actual land use or the presence of existing features that may prevent or mitigate exposure (e,g,. presence of asphalt) into account, the risk estimates summarized in Table 6-12 are likely overestimates and likely do not reflect the actual health risks to potential receptors present in the AOCs.

6.6.1 Soil

Commercial Worker

As shown in Table 6-12, none of the estimated soil risks or hazards for the commercial scenario exceed the target risk level of 1 x 10^{-5} or target hazard level of 1.

Construction Worker

Similar to the commercial worker, none of the estimated soil risks for the construction worker exceed the target risk level of 1 x 10^{-5}. The highest estimated soil hazards slightly exceed the target hazard level of 1 in AOCs KK, LL, and MM.

Hypothetical Resident

As shown in Table 6-12, only the estimated soil risk in AOC G (3 x10^{-6}) exceeds the target risk level for residents (1 x 10^{-6}). Similar to the construction worker, the highest estimated residential soil hazards slightly exceed the target hazard level of 1 in AOCs KK, LL.

6.6.2 Groundwater – Vapor Migration into Indoor Air

Commercial Worker

None of the estimated groundwater vapor intrusion risks or hazards for the commercial scenario exceed the target risk level of 1 x 10^{-5} or target hazard level of 1.

Hypothetical Resident

The estimated groundwater vapor intrusion risks for the residential scenario exceed the target risk level of 1 x 10^{-6} in 13 of the 18 AOCs evaluated, with the estimated risks ranging from 3 x10^{-6} to 9 x 10^{-5}. The primary contributors to the estimated risks are TCE and 1,2,3-TCP. None of the estimated hazard levels associated with groundwater vapor intrusion exceed the target hazard level of 1.

6.6.3 Soil Gas – Vapor Migration into Indoor Air

Soil gas sampling was completed in three of the AOCs evaluated (EE, J-K, and Z).

Commercial Worker

None of the estimated soil gas vapor intrusion risks or hazards for the commercial scenario exceed the target risk level of 1×10^{-5} or target hazard level of 1.

Hypothetical Resident

Only the estimated soil gas vapor intrusion risk for AOC J-K (2×10^{-6}) slightly exceeded the residential target risk level of 1×10^{-6}. None of the estimated hazard levels associated with vapor intrusion from soil gas exceeded the target hazard level of 1.

It is noteworthy that the estimated vapor intrusion risks associated with shallow soil gas were far lower than the estimated vapor intrusion risks based on vapor intrusion modeling from groundwater in AOCs G and J-K. Estimated vapor intrusion risks associated with deeper groundwater (assumed depth of 44 feet bgs for AOCs) are associated with a higher level of uncertainty than vapor intrusion risk estimates based on shallow soil gas (e,g., sampling depth of 5 feet bgs). This is due to the fact that shallow soil gas results are considered more representative of soil gas conditions in close proximity to buildings as opposed to soil gas levels estimated based on volatilization from deeper groundwater followed by subsequent migration up through the vadose zone. For this reason, when available, vapor intrusion risk estimates based on shallow soil gas are used in lieu of vapor intrusion risk estimates based on deeper groundwater to estimate cumulative risks and hazards.

6.6.4 Cumulative risk from Soil and Vapor Migration

Cumulative risks were estimated by summing the estimated risks for chemicals in soil to the health risks associated with vapor migration when applicable.

Commercial Worker

As shown in Table 6-12, none of the cumulative risks or hazards for the commercial scenario exceed the target risk level of 1×10^{-5} or target hazard level of 1.

Hypothetical Resident

Since the estimated risks or hazards associated with an individual media exceeded residential target risk and hazard level for many of the AOCs, the estimated cumulative risk and hazard for the majority of the AOCs also exceed target risk or hazard levels. Thirteen of the 18 AOCs evaluated are associated with a cumulative risk or HI that exceeds the corresponding target levels.

The following section provides a more in-depth summary of potential risks and hazards for the various AOCs evaluated in the HHRA. The primary chemicals contributing to the estimated risks are identified for each AOC. For some exposure areas, the estimated risk for some chemicals is primarily attributable to background levels. These areas and chemicals are noted. For some AOCs, the distribution of chemicals is heterogeneous and the estimated health risks are due to assumed exposure to small subareas with relatively higher concentrations of chemicals (i.e., hot spots). These hot spots are identified in the more detailed summaries of the AOCs provided below.

6.7 RISK ESTIMATES

The following sections summarize the estimated risks for potential receptors for each AOC associated with the Site. Carcinogenic risk probabilities and HIs were calculated for future receptors potentially exposed to COPCs in soils, particulates emitted from soil as airborne dusts, and volatiles emitted to the atmosphere from soil. It should be noted that USEPA (1989) guidance recommends that cancer risk estimates and hazards should be reported using one significant figure only. Thus, if a risk is calculated as 5.4×10^{-4}, the risk estimate is reported as 5×10^{-4}. Similarly, if a hazard index is calculated as 1.2, it is reported as 1.

6.7.1 AOC DD – Former Airport Maintenance Shop and Yard

AOC DD, located north of AOC EE, has been utilized as a maintenance and storage yard since the 1970's (Figure 5-1). The AOC is approximately 120 feet by 120 feet in size with the vast majority covered by asphalt. Photographic documentation obtained from County inspections in 1988 show a large number of drums stored in the area. No prior characterization activities had been conducted in AOC DD.

6.7.1.1 Soil

Commercial Worker

As shown in Table 6-13, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 9×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.4, which is below the target HI of 1.

Construction Worker

As shown in Table 6-14, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 2×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}).

The estimated non-carcinogenic HI is 0.9, which is below the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.0001, which is well below the target HI of 1.

Hypothetical Resident

As shown in Table 6-15, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 4 x 10^{-9}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}).

The estimated non-carcinogenic HI is 0.9, which is below the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.0001, which is well below the target HI of 1.

Hot-Spot Analysis

Of the 22 samples collected from 0 to 10 feet bgs, three were associated with TPH-diesel results that exceeded the corresponding construction worker and residential RBSLs, which are 254 mg/kg and 255 mg/kg, respectively. These results are associated with borings B102 (274 mg/kg), B103 (645 mg/kg), and B104 (370 mg/kg) and all were collected at a depth of 1 ft bgs directly beneath the asphalt. The maximum detected TPH-diesel result associated with a sampling depth greater than 1 ft bgs is 43 mg/kg, which is well below the corresponding construction worker and residential RBSLs. The maximum detected TPH-diesel result of 645 mg/kg from 0-2 feet bgs is well below the commercial worker RBSL of 1,105 mg/kg.

As described Section 5, the methodology used by the mobile lab to analyze TPH data was based on ultraviolet fluorescence (UVF) technology. The UVF technique does not measure TPH directly, instead the method measures the PAHs contained in the sample extract and extrapolates TPH concentrations from known amounts of PAH in TPH. Because the fluorescence method is quite sensitive to the PAH concentrations, small variations in the PAH concentrations can give large variation in the extrapolated TPH concentrations.

This AOC, and the majority of other AOCs included in this evaluation, are covered by asphalt, which is known to contain relatively large concentrations of PAH compounds. Over time, slightly acidic and repeated rain water can mobilize small amounts of PAH compounds such that the PAH compounds will infiltrate into the uppermost portions of the underlying soils. Due to the small amounts of PAH compounds which leached into the soil, when the sample is analyzed by fluorescence, the additional PAH contamination (from the asphalt) will be additive to any native PAHs, and will give an exaggerated TPH concentration (referred to a “matrix interference”). For this reason, the TPH-g and TPH-d concentrations reported for

some samples collected from one and four feet bgs, such as the TPH-diesel samples identified above, likely have overstated TPH results due to the overlying asphalt.

6.7.1.2 Groundwater

The maximum detected results for VOCs in well CAMW40 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-16, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-17, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 3×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is TCE (91%). The estimated risk for all other chemicals is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that well CAMW40 is situated within AOC EE, which is located directly south of AOC DD. Shallow soil gas sampling (5 feet bgs) was conducted in AOC EE in 2016 and TCE was reported as not detected. The results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air. The results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed to the groundwater modeling, which is estimating potential vapor migration from a groundwater depth of 44 feet bgs, and thus, is associated with a higher level of uncertainty.

Assuming that TCE is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 0.7, which is below the target HI of 1.

6.7.1.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3 x 10^{-7} and 0.5, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 3 x 10^{-6}, which is near the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated hazard is 2, which exceeds the target HI of 1. The contributions to the HI resulting from soil exposure and exposure via vapor intrusion from groundwater are similar.

6.7.2 AOC EE – Former Cal Aero Restoration Yard

AOC EE, located just south of AOC DD, consists of Building 515 and the open area (approximately 350 feet by 200 feet in size) to the north and west of the building (Figure 5-2). In the past, this area was used by Cal Aero for the restoration and dismantling of aircraft.

6.7.2.1 Soil

Commercial Worker

As shown in Table 6-18, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 3 x 10^{-10}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.1, which is below the target HI of 1.

Construction Worker

As shown in Table 6-19, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 6 x 10^{-11}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.2, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-20, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 1 x 10^{-8}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}). The estimated non-carcinogenic HI is 0.2, which is below the target HI of 1.

Hot-Spot Analysis

Of the 59 samples collected from 0 to 10 feet bgs, only one is associated with a TPH-diesel result that exceeded the corresponding construction worker and residential RBSLs, which are 198 mg/kg and 193 mg/kg, respectively. This result is associated with boring B100 (280 mg/kg) and was collected at a depth of 1 ft bgs directly beneath the asphalt. The maximum detected TPH-diesel result associated with sampling depth greater than 1 ft bgs is 96 mg/kg, which is well below the corresponding construction worker and residential RBSLs. The maximum detected TPH-diesel result of 280 mg/kg from 0-2 feet bgs is well below the commercial worker RBSL of 875 mg/kg.

As the maximum TPH-diesel result was collected from a depth of 1 foot directly below an asphalt surface, it is likely that this result is attributable to matrix interference as discussed in Section 5.1.2.

6.7.2.2 Groundwater

The maximum detected results for VOCs in well CAMW40 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-21, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-22, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 3×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is TCE (91%). The estimated risk for all other chemicals is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that shallow soil gas sampling (5 feet bgs) was conducted in AOC EE in 2016, and TCE was reported as not detected. As indicated above, the results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air and the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air. Potential risks estimated using the shallow soil gas sampling data is described in more detail below in Section 6.7.2.3.

Assuming that TCE is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

6.7.2.3 Soil Gas

Commercial Worker

As shown in Table 6-23, the maximum estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from soil gas to indoor air is 6×10^{-10}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and well below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.01, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-24, the maximum estimated cumulative cancer risk for potential residential exposure to VOCs migrating from soil gas to indoor air is 5×10^{-8}, which below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.1, which is below the target HI of 1.

6.7.2.4 Cumulative Risk from Exposure to Soil and Vapor Migration from Soil Gas and Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 1×10^{-9} and 0.01, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

Similarly, the estimated cumulative risk and HI for the hypothetical resident are 7×10^{-8} and 0.3, respectively, which are below the target risk (1×10^{-6}) and hazard level (1). As noted above, vapor intrusion estimates based on shallow soil gas are considered to more accurately reflect potential vapor intrusion exposure, as compared to estimates based on deeper groundwater, and thus, were used to estimate the potential cumulative risk.

6.7.3 AOC FF – Building A440

AOC FF, located nearly adjacent to AOC EE to the southwest, consists of Building A440 and the immediate surrounding area (Figure 5-3). Stripping and painting of aircraft have been performed at this facility and the rinse water from these activities was reportedly collected in four bermed areas on the concrete adjacent to the building.

6.7.3.1 Soil

Commercial Worker

As shown in Table 6-25, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 8 x 10^{-11}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.00002, which is below the target HI of 1.

Construction Worker

As shown in Table 6-26, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 1 x 10^{-11}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.00009, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-27, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 5 x 10^{-9}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}). The estimated non-carcinogenic HI is 0.0001, which is below the target HI of 1.

Hot-Spot Analysis

No chemical was detected at a concentration that exceeded the corresponding RBSLs for any of the exposure scenarios evaluated.

6.7.3.2 Groundwater

The maximum detected results for VOCs in well CAMW40 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-28, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3 x 10^{-7}, which is below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-29, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 3 x 10^{-6}, which is near the low end of the USEPA target risk

range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10^{-6}). The primary contributor to the estimated risk is TCE (91%). The estimated risk for all other chemicals is 3 x 10^{-7}, which is below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and is below the target risk level for residents (1 x 10^{-6}).

It is noteworthy that well CAMW40 is situated within AOC EE, which is located directly east of AOC FF. Shallow soil gas sampling (5 feet bgs) was conducted in AOC EE in 2016 and TCE was reported as not detected. The results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed estimates based on migration from a groundwater depth of 44 feet bgs.

Assuming that TCE is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 3 x 10^{-7}, which is below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and is below the target risk level for residents (1 x 10^{-6}).

6.7.3.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3 x 10^{-7} and 0.09, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 3 x 10^{-6}, which exceeds the target risk (1 x 10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 0.7, which is below the target HI of 1.

6.7.4 AOC G – Former PAC Wash Rack Area

AOC G, located to the west of AOC FF immediately south and southeast of AOC J-K, consists of the area identified as the former PAC aircraft wash rack area and the area immediately south of it (Figure 5-4). In total, the AOC encompasses an area approximately 300 feet by 200 feet in size.

6.7.4.1 Soil

Commercial Worker

As shown in Table 6-30, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 3 x 10^{-8}, which is well below the low end of the USEPA target risk range of

1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.2, which is below the target HI of 1.

Construction Worker

As shown in Table 6-31, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 5×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.4, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-32, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 3×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is 1,2,3-Trichloropane (1,2,3-TCP) (93%). The estimated risk for all other chemicals is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

In regard to 1,2,3-TCP, it is noteworthy that it was detected in a low percentage of samples (1.7% with DSITMS method and 12% with Method 8260B) at depths ranging from 33 to 61 feet bgs. As there would be no direct contact due to the depths of the detections, the listed carcinogenic RBSL is based on the inhalation pathway only. The results of this analysis reflect the conservatism of the model used to estimate air concentrations associated with volatilization from soil. As described in more detail below, shallow soil gas sampling was conducted in AOC J-K located adjacent to AOC G to the west and 1,2,3-TCP was not detected. Based on the result of the shallow soil gas sampling in which 1,2,3-TCP was not detected, the estimated risk from soil should likely be based on the other chemicals detected (2×10^{-7}), which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 0.5, which is below the target HI of 1.

Hot-Spot Analysis

Based on the mobile lab results (DSITMS), 1,2,3-TCP was detected in six out of 346 samples at concentrations ranging from 0.041 mg/kg to 0.15 mg/kg that exceeded the residential soil RBSL (0.0018 mg/kg) in boring B18 at depths ranging from 37 to 58 feet bgs. Similarly, based on the Method 8260B results, 1,2,3-TCP was detected in six out 51 samples at concentrations ranging from 0.0048 mg/kg to 0.044 mg/kg that exceeded the soil RBSL in borings B18, B27, B29, and B3 at depths ranging from 33 to 69 feet

bgs. However, as indicated above, the results of soil gas sampling in the adjacent AOC (J-K) indicated that 1,2,3-TCP was not detected in shallow soil gas (i.e., 5 feet bgs).

Out of 58 samples collected from 0 to 10 feet bgs, three were associated with TPH-diesel results that exceeded the corresponding construction worker and residential RBSLs, which are 198 mg/kg and 193 mg/kg, respectively. These results are associated with borings B25 (499 mg/kg), B30 (470 mg/kg), and B60 (221 mg/kg) and all were collected at a depth of 1 ft bgs directly beneath the asphalt. The maximum detected TPH-diesel result associated with sampling depth greater than 1 ft bgs is 45 mg/kg, which is well below the corresponding construction worker and residential RBSLs. The maximum detected TPH-diesel result of 498 mg/kg from 0-2 feet bgs is well below the commercial worker RBSL of 875 mg/kg. As the maximum TPH-diesel results were collected from a depth of 1 foot directly below an asphalt surface, it is likely that this result is attributable to matrix interference as discussed Section 5.1.2.

Based on the mobile lab results (UVF-3100), TPH-gas was detected in 1 out of 58 samples at a concentration of 6,790 mg/kg at boring B28 at a depth of 1 foot bgs that exceeded the corresponding commercial, construction worker, and residential soil RBSLs. The next highest detected TPH-gas concentration from 0 to 10 feet bgs was 9.74 mg/kg at boring B16 at a depth of four feet bgs. The corresponding duplicate sample analyzed using Method 8015 had a detected concentration of 0.064 mg/kg. As the mobile lab result was not confirmed by the Method 8015 duplicate and was roughly 700-fold higher than the next highest detected result using UVF-3100, the Method 8015 result was used to calculate the listed RME concentrations.

6.7.4.2 Groundwater

The maximum detected results for VOCs in wells CAMW25 and CAMW27 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-33, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 4×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.005, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-34, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 9×10^{-5}, which is at the upper end of the USEPA target risk

range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is 1,2,3-TCP (over 99%). The estimated risk for all other chemicals is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that shallow soil gas sampling (5 feet bgs) was conducted in AOC J-K (located adjacent to AOC to the west) in 2016 and 1,2,3-TCP was reported as not detected. As indicated above, the results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air and the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air. Potential risks estimated using the shallow soil gas sampling data collected within AOC J-K is described in more detail below.

Assuming that 1,2,3-TCP is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 0.04, which is below the target HI of 1.

6.7.4.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 4×10^{-6} and 0.2, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 9×10^{-5}, which exceeds the target risk (1×10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 0.5, which is below the target HI of 1.

As noted above, shallow soil gas sampling was performed in close proximity to AOC G in AOC J-K and 1,2,3-TCP was reported as not detected. Thus, the vapor intrusion risk estimated for AOC G is may be significantly overestimated. The estimated vapor intrusion risk based on the soil gas data collected in AOC J-K is 2×10^{-6}, which only slightly exceeds the target risk level for residents.

6.7.5 AOC GG – Former Aircraft Dismantling Area

AOC GG, located approximately 300 feet east of AOC EE, was formerly utilized as an aircraft dismantling area (Figure 5-5). Based on the 1946 aerial image, dismantling and cleaning operations took place in an

area roughly 600 feet by 500 feet where Buildings B130, B140, and B150 now exist. Aircraft parts and engines appear to have been staged in the southwestern portion of the AOC, cleaned in the southeastern portion of the AOC, and then subsequently staged on racks in the northern portion of the AOC.

6.7.5.1 Soil

Commercial Worker

As shown in Table 6-35, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 1×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.2, which is below the target HI of 1.

Construction Worker

As shown in Table 6-36, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 3×10^{-10}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.005, which is well below the target HI of 1.

Hypothetical Resident

As shown in Table 6-37, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 6×10^{-8}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.005, which is well below the target HI of 1.

Hot-Spot Analysis

Of the 40 samples collected from 0 to 10 feet bgs, four were associated with TPH-diesel results that exceeded the corresponding construction worker and residential RBSLs, which are 161 mg/kg and 162 mg/kg, respectively. These results are associated with borings B74 (255 mg/kg, 1 foot bgs), B115 (228 mg/kg, 4 feet bgs), B125 (280 mg/kg, 1 foot bgs), and B132 (833 mg/kg, 4 feet bgs), which were collected at depths of 1 foot and 4 feet bgs beneath what was previously an asphalt surface. The maximum detected TPH-diesel result besides these samples from 0 to 10 feet is 123 mg/kg, which is below the corresponding

construction worker and residential RBSLs. The maximum detected TPH-diesel result of 280 mg/kg from 0-2 feet bgs is well below the commercial worker RBSL of 720 mg/kg.

Since the TPH-diesel results from borings B74, B115, B125 were collected from depths of 1 to 4 feet directly below what was previously an asphalt surface, it is likely that these results are attributable to matrix interference as discussed *Section 5.1.2*, rather than site operations. The TPH-diesel result from boring B132 is also likely attributable to matrix interference due to how much higher it is compared to the rest of the results associated with this AOC, however, in this case the shallower result from a depth of 1 foot had a TPH-diesel concentration of 84 mg/kg. The sample collected below this result at 7 feet bgs is 42 mg/kg, indicating that any potentially impacted area would be quite limited.

6.7.5.2 Groundwater

The maximum detected results for VOCs in well CAMW40 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-38, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-39, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 3×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is TCE (91%). The estimated risk for all other chemicals is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that well CAMW40 is situated within AOC EE, which is located directly west of AOC GG. Shallow soil gas sampling (5 feet bgs) was conducted in AOC EE in 2016 and TCE was reported as not detected. The results of the shallow soil gas sampling suggest that the groundwater modeling is likely overestimating potential vapor migration from groundwater to indoor air. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed to an estimate based on migration from a groundwater depth of 44 feet bgs.

Assuming that TCE is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 3 x 10-7, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 0.7, which is below the target HI of 1.

6.7.5.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3×10^{-7} and 0.3, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 4×10^{-6}, which exceeds the target risk (1×10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 2, which exceeds the target HI of 1. Soil exposure and exposure via vapor intrusion from groundwater are relatively equal contributors to the HI.

6.7.6 AOC H – Former Waste Disposal Ponds

AOC H, located immediately south of AOC KK, consists of three former waste disposal ponds (Figure 5-6). The ponds received waste water discharge from the former PAC wash rack area (AOC G) via piping (AOC OO). Based on the 1955 aerial image where the ponds are readily identifiable, the AOC encompasses an area approximately 200 feet by 650 feet. No VOCs were detected in samples from prior characterization activities in AOC H, however, these activities were relatively limited in scope and were restricted to the northernmost ponds.

6.7.6.1 Soil

Commercial Worker

As shown in Table 6-40, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 2×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.1, which is below the target HI of 1.

Construction Worker

As shown in Table 6-41, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 3×10^{-10}, which is well below the low end of the USEPA target risk range of

1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.4, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-42, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 7×10^{-8}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.4, which is below the target HI of 1.

Hot-Spot Analysis

Of the 22 samples collected from 0 to 10 feet bgs, one was associated with a TPH-diesel result that exceeded the corresponding construction worker and residential RBSLs, which are 185 mg/kg and 182 mg/kg, respectively. This result is associated with boring B155 (222 mg/kg) and was collected at a depth of nine feet bgs. The sample collected below this result at a depth of 12 feet had a reported TPH-diesel result of 2.1 mg/kg, indicating that the extent of the elevated TPH-diesel levels is likely limited. There were no samples collected at shallower depths in the boring. As indicated in the remedial investigation report (Tetra Tech, 2014), this area was over excavated due to petroleum impacts during construction of the current Southern California Edison facility.

The next highest TPH-diesel result from 0 to 10 feet is 125 mg/kg, which is below the corresponding construction worker and residential RBSLs. This is also the maximum detected TPH-diesel result from 0-2 feet bgs, which is well below the commercial worker RBSL of 820 mg/kg.

6.7.6.2 Groundwater

The maximum detected results for VOCs in well CAMW6 from April 2013 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-43, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 9×10^{-10}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.0004, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-44, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 1×10^{-8}, which is below the low end of the USEPA target risk

range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}). The estimated non-carcinogenic HI is 0.003, which is below the target HI of 1.

6.7.6.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3 x 10^{-9} and 0.4, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk and HI for the residential scenario are 9 x 10^{-8} and 0.4, respectively, which are below the target risk (1 x 10^{-6}) and hazard level (1).

6.7.7 AOC HH – Buildings A230, A235, A340, A435

AOC HH, located north of AOC G, is comprised of Buildings A230, A235, A340, and A435 (Figure 5-7). These buildings were utilized by PAC from approximately 1950 to 1959 for the purposes of aircraft modification. Additional prior operations in these buildings included aircraft maintenance, modification, and restoration.

6.7.7.1 Soil

Commercial Worker

As shown in Table 6-45, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 9 x 10^{-10}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.001, which is below the target HI of 1.

Construction Worker

As shown in Table 6-46, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 2 x 10^{-11}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.0002, which is equal to the target HI of 1.

Hypothetical Resident

As shown in Table 6-47, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 4 x 10^{-8}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}). The estimated non-carcinogenic HI is 0.006, which is below the target HI of 1.

Hot-Spot Analysis

No chemicals were detected at levels that exceeded the corresponding soil RBSLs for the exposure scenarios evaluated.

6.7.7.2 Groundwater

The maximum detected results for VOCs in wells CAMW25 and CAMW27 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-48, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 4×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.005, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-49, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 9×10^{-5}, which is at the upper end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is 1,2,3,-TCP (over 99%). The estimated risk for all other chemicals is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that Shallow soil gas sampling (5 feet bgs) was conducted in AOC J-K (located adjacent to AOC HH to the west) in 2016 and 1,2,3-TCP was reported as not detected. The results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet begs/potential building foundation as opposed to an estimate based on migration from a groundwater depth of 44 feet bgs.

Assuming that 1,2,3-TCP is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 0.04, which is below the target HI of 1.

6.7.7.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 4 x 10^{-6} and 0.006, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 9 x 10^{-5}, which exceeds the target risk (1 x 10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 0.05, which is below the target HI of 1.

6.7.8 AOC JJ – Former UST C-15 and Sump I

AOC JJ, located approximately 17 feet south of AOC HH Building A435, is comprised of the former UST C-15 excavation area and the sump identified immediately south of it (Figure 5-8). In total, the AOC is approximately 50 by 15 feet in size. Additional assessment was recommended following the removal of the UST in 1992 to delineate suspected petroleum hydrocarbons in soils beneath the UST (Kennedy/Jenks, 1991); However no further characterization had been performed prior to the current investigation.

6.7.8.1 Soil

Commercial Worker

As shown in Table 6-50, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 2 x 10^{-11}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.2, which is below the target HI of 1.

Construction Worker

As shown in Table 6-51, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 3 x 10^{-12}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.6, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-52, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 7 x 10^{-10}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}). The estimated non-carcinogenic HI is 0.7, which is below the target HI of 1.

Hot-Spot Analysis

Of the 19 samples collected from 0 to 10 feet bgs, two were associated with TPH-diesel results that exceeded the corresponding construction worker or residential RBSLs, which are 483 mg/kg and 397 mg/kg, respectively. These results are associated with borings B42 (790 mg/kg) and B49 (429 mg/kg) and were collected at depths of ten feet and one foot bgs, respectively. The sample collected above the concentration of 790 mg/kg at a depth of four feet bgs is much lower (67 mg/kg). The sample collected below the maximum result in boring B42 at a depth of 12 feet had a reported TPH-diesel result of 1.1 mg/kg. These results indicate that the extent of the elevated TPH-diesel levels is likely limited. Since the TPH-diesel result from borings B49 was collected at a depth of 1 feet directly below an asphalt surface, it is likely that this results is attributable to matrix interference as discussed in Section 5.1.2, rather than site operations.

Besides the TPH-diesel results discussed above, the next highest result from 0 to 10 feet is 265 mg/kg, which is below the corresponding construction worker and residential RBSLs. The maximum detected TPH-diesel result of 429 mg/kg from 0-2 feet bgs is well below the commercial worker RBSL of 2,005 mg/kg.

6.7.8.2 Groundwater

The maximum detected results for VOCs in wells CAMW25 and CAMW27 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-53, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 4×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.005, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-54, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 9×10^{-5}, which is at the upper end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is 1,2,3-TCP (over 99%). The estimated risk for all other chemicals is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that shallow soil gas sampling (5 feet bgs) was conducted in AOC J-K (located to the west of AOC JJ) in 2016 and 1,2,3-TCP was reported as not detected. The results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed an estimate based on vapor migration from a groundwater depth of 44 feet bgs.

Assuming that 1,2,3-TCP is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 0.04, which is below the target HI of 1.

6.7.8.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 4×10^{-6} and 0.2, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 9×10^{-5}, which exceeds the target risk (1×10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 0.7, which is below the target HI of 1.

6.7.9 AOC J-K – PAC Paint Shop and Paint Shed Areas

AOC J-K, located immediately west of AOC G, consists of the PAC paint shop (Area J) and paint shed (Area K), Building A240, and the open area between these buildings and Building A230 (Figure 5-9). In total the AOC encompasses an area approximately 350 feet by 300 feet. Prior investigations in this area have detected various VOCs, including chloroform, PCE, TCE, and carbon tetrachloride, in soil and/or soil gas at depths up to approximately 50 feet (SEACOR, 1992a; Tetra Tech, 2005a).

6.7.9.1 Soil

Commercial Worker

As shown in Table 6-55, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 7×10^{-9}, which is well below the low end of the USEPA target risk range of

1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.001, which is below the target HI of 1.

Construction Worker

As shown in Table 6-56, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 1×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.005, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-57, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 3×10^{-7}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.005, which is below the target HI of 1.

Hot-Spot Analysis

No chemicals were detected at levels that exceeded the corresponding soil RBSLs for the exposure scenarios evaluated.

6.7.9.2 Groundwater

Commercial Worker

As shown in Table 6-58, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 4×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.005, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-59, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 9×10^{-5}, which is at the upper end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is 1,2,3-TCP (over 99%). The estimated risk for all other chemicals is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that shallow soil gas sampling (5 feet bgs) was conducted in AOC J-K (located to the west of AOC JJ) in 2016 and 1,2,3-TCP was reported as not detected. The results of the shallow soil gas

sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed to and estimated based on vapor migration from a groundwater depth of 44 feet bgs.

Assuming that 1,2,3-TCP is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 0.04, which is below the target HI of 1.

6.7.9.3 Soil Gas

Commercial Worker

As shown in Table 6-60, the maximum estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from soil gas to indoor air is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and well below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.004, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-61, the maximum estimated cumulative cancer risk for potential residential exposure to VOCs migrating from soil gas to indoor air is 2×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.03, which is below the target HI of 1.

6.7.9.4 Cumulative Risk from Exposure to Soil and Vapor Migration from Soil Gas and Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 2×10^{-7} and 0.004, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 2×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and slightly exceeds the target risk level for residents (1×10^{-6}). The estimated risk is primarily attributable to vapor intrusion. The estimated cumulative hazard is 0.04, which is below the target HI of 1.

6.7.10 AOC KK – Building A270, Yanks Museum

AOC KK, located approximately 150 feet south of AOC G, is comprised of Building A270 and the paved area around the building (Figure 5-10). In total, AOC KK is approximately 350 feet by 350 feet in size. From 1968 to the mid 1970's, American Electric produced and stored napalm at the facility. The AOC has been occupied by Yanks Air Museum since 1984 and has been used since then for the restoration and display of aircraft.

6.7.10.1 Soil

Commercial Worker

As shown in Table 6-62, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 2×10^{-10}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.5, which is below the target HI of 1.

Construction Worker

As shown in Table 6-63, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 3×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.0003, which is well below the target HI of 1.

Hypothetical Resident

As shown in Table 6-64, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 7×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.0003, which is well below the target HI of 1.

Hot-Spot Analysis

Of the 26 samples collected from 0 to 10 feet bgs, two were associated with TPH-diesel results that exceeded the corresponding commercial, construction worker, and residential RBSLs, which are 820 mg/kg, 185 mg/kg, and 182 mg/kg, respectively. These results are associated with borings B58 (882 mg/kg)

and B61 (293 mg/kg) and all were collected at a depth of 1 ft bgs directly beneath the asphalt. The next highest TPH-diesel result is 151 mg/kg, which is less than the RBSLs for the potential receptor scenarios. Additionally, the maximum detected TPH-diesel result associated with sampling depth greater than 1 ft bgs is 26 mg/kg, which is well below the corresponding RBSLs for the potential receptor scenarios.

6.7.10.2 Groundwater

The maximum detected results for VOCs in well CAMW8 from April 2013 to May 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-65, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-66, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 4×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is TCE (90%). The estimated risk for all other chemicals is 4×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and is below the target risk level for residents (1×10^{-6}).

It is noteworthy that the maximum TCE concentration associated with CAMW8 is 670 µg/L. This is similar to the maximum TCE concentration detected in well CAMW40 (610 µg/L) located to the northeast in AOC EE. As described above, shallow soil gas sampling was conducted in AOC EE and TCE was reported as not detected. Soil gas sampling was also conducted in AOC J-K located to the north of AOC KK and the estimated risk for TCE based on the soil gas results is 8 x 10-8, which is below the target risk level for residents. The results of the available shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air for TCE. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed to an estimate based on vapor migration from a groundwater depth of 44 feet bgs.

Assuming that TCE levels in shallow soil gas are associated with low risk levels, the estimated risk for all other chemicals detected in groundwater is 4 x 10-7, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

The estimated non-carcinogenic HI is 0.8, which is below the target HI of 1.

6.7.10.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3×10^{-7} and 0.6, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 4×10^{-6}, which exceeds the residential target risk (1×10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 2, which exceeds the target HI of 1. The hazard attributable to soil exposure is somewhat higher than that for exposure via vapor intrusion from groundwater.

6.7.11 AOC LL – Former UST C-18

AOC LL, located approximately 120 feet southwest of AOC KK, consists of the area on the west side of Building A285 where former USTs C-18 and C-19 were located (Figure 5-11). The AOC is approximately 125 feet by 175 feet in size.

6.7.11.1 Soil

Commercial Worker

As shown in Table 6-67, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 5×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.6, which is below the target HI of 1.

Construction Worker

As shown in Table 6-68, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 9×10^{-12}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.00007, which is well below the target HI of 1.

Hypothetical Resident

As shown in Table 6-69, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 2 x 10^{-9}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.00007, which is well below the target HI of 1.

Hot-Spot Analysis

Of the seven samples collected from 0 to 10 feet bgs, two were associated with TPH-diesel results that exceeded the corresponding construction worker and residential RBSLs, which are 254 mg/kg and 239 mg/kg, respectively. These results are associated with borings B133 (353 mg/kg) and B134 (642 mg/kg) and all were collected at a depth of 1 ft bgs directly beneath the asphalt. These are the only borings associated with this small UST AOC. The highest TPH-diesel result associated with a depth greater than 1 foot bgs is 20 mg/kg, which is well below the RBSLs for the potential receptor scenarios.

Since the TPH-diesel results from borings B133 and B134 were collected at a depth of 1 foot directly below an asphalt surface, it is likely that these results are attributable to matrix interference as discussed in Section 5.1.2, rather than site operations.

6.7.11.2 Groundwater

The maximum detected results for VOCs in well CAMW8 from April 2013 to May 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-70, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3 x 10^{-7}, which is below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-71, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 4 x 10^{-6}, which is near the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10-6). The primary contributor to the estimated risk is TCE (90%). The estimated risk for all other chemicals is 4 x 10-7, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

It is noteworthy that the maximum TCE concentration associated with CAMW8 is 670 µg/L. This is similar to the maximum TCE concentration detected in well CAMW40 (610 µg/L) located to the northeast in AOC EE. As described above, shallow soil gas sampling was conducted in AOC EE and TCE was reported as not detected. Soil gas sampling was also conducted in AOC J-K located to the north of AOC LL and the estimated risk for TCE based on the soil gas results is 8 x 10-8, which is below the target risk level for residents. The results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air for TCE. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed to and estimate based on vapor migration from a groundwater depth of 44 feet bgs.

Assuming that TCE levels in shallow soil gas are associated with low risk levels, the estimated risk for all other chemicals detected in groundwater is 4 x 10-7, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

The estimated non-carcinogenic HI is 0.8, which is below the target HI of 1.

6.7.11.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3 x 10^{-7} and 0.7, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 4 x 10^{-6}, which exceeds the residential target risk (1 x 10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 2, which exceeds the target HI of 1. The estimated HI is roughly equally attributable to soil exposure and vapor intrusion from groundwater.

6.7.12 AOC M – Fuel Dump Area

AOC M, which overlaps the northwestern corner of AOC GG, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as an area near Building E2 (currently identified as Building B130) used by PAC as a JP-4 fuel dump area (Figure 5-12).

6.7.12.1 Soil

Commercial Worker

As shown in Table 6-72, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 5×10^{-10}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.2, which is below the target HI of 1.

Construction Worker

As shown in Table 6-73, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 8×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.4, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-74, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 2×10^{-8}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.5, which is below the target HI of 1.

Hot-Spot Analysis

No chemicals were detected at levels that exceeded the corresponding soil RBSLs for the exposure scenarios evaluated.

6.7.12.2 Groundwater

The maximum detected results for VOCs in well CAMW40 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-75, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3×10^{-7}, which is below the low end of the USEPA

target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-76, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 3 x 10^{-6}, which is near the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10^{-6}). The primary contributor to the estimated risk is TCE (91%). The estimated risk for all other chemicals is 3 x 10^{-7}, which is below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and is below the target risk level for residents (1 x 10^{-6}).

It is noteworthy that well CAMW40 is situated within AOC EE, which is located directly west of AOC M. Shallow soil gas sampling (5 feet bgs) was conducted in AOC EE in 2016 and TCE was reported as not detected. The results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed to an estimate based on vapor migration from a groundwater depth of 44 feet.

Assuming that TCE is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 3 x 10-7, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

The estimated non-carcinogenic HI is 0.7, which is below the target HI of 1.

6.7.12.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3 x 10^{-7} and 0.3, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 4 x 10^{-6}, which exceeds the residential target risk (1 x 10^{-6}). The estimated risk is primarily attributable to vapor intrusion from groundwater. The estimated cumulative hazard is 1.2, which slightly exceeds the target HI of 1 and results from similar contributions from soil exposure and exposure via vapor migration from groundwater.

6.7.13 AOC MM – Building A385

AOC MM, located to the east of AOC H, is comprised of Building A385, the paved area immediately west of the building, and a portion of the open area to the south of the building (Figure 5-13). In total the AOC encompasses an area approximately 275 feet by 275 feet. Inspection reports indicated that oil and organic solvents were used in the past at the AOC and that spillage/disposal may have occurred.

6.7.13.1 Soil

Commercial Worker

As shown in Table 6-77, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 2×10^{-10}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.5, which is below the target HI of 1.

Construction Worker

As shown in Table 6-78, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 3×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.0003, which is well below the target HI of 1.

Hypothetical Resident

As shown in Table 6-79, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 8×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 1, which is equal to the target HI of 1. Virtually all of the estimated hazard (over 99%) is attributable to TPH-diesel. The estimated HI for all other compounds is 0.0003, which is well below the target HI of 1.

Hot-Spot Analysis

Of the 25 samples collected from 0 to 10 feet bgs, two were associated with TPH-diesel results that exceeded the corresponding construction worker and residential RBSLs, which are 198 mg/kg and 193 mg/kg, respectively. These results are associated with borings B34 (686 mg/kg) and B35 (872 mg/kg) and

both were collected at a depth of 1 ft bgs directly beneath the asphalt. The next highest TPH-diesel result from 0 to 10 feet bgs is 16 mg/kg, which is well below the RBSLs for the potential receptor scenarios.

Since the TPH-diesel results from borings B34 and B35 were collected at a depth of 1 foot directly below an asphalt surface, it is likely that these results are attributable to matrix interference as discussed in Section 5.1.2, rather than site operations.

6.7.13.2 Groundwater

The maximum detected results for VOCs in well CAMW32 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-80, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 8×10^{-9}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.003, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-81, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 1×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.02, which is below the target HI of 1.

6.7.13.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 8×10^{-9} and 0.5, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 1×10^{-7}, which is below the residential target risk (1×10^{-6}). The estimated cumulative hazard is 1.4, which slightly exceeds the target HI of 1 and is due primarily to exposure to soil.

6.7.14 AOC N – Suspected Landfill

AOC N, located near the northwestern corner of the Airport, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as an alleged solid waste landfill

(Figure 5-14). Based on the 1955 aerial image which shows an apparent bermed area, AOC N is approximately 300 feet by 300 feet in size.

6.7.14.1 Soil

Commercial Worker

As shown in Table 6-82, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 4×10^{-6}, which is near the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.4, which is below the target HI of 1.

Construction Worker

As shown in Table 6-83, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 9×10^{-8}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}).

The estimated non-carcinogenic HI is 2, which exceeds the target HI of 1. The primary contributors to the estimated HI are arsenic (47%) with an HI of 1.1 and cobalt (25%) with an HI of 0.58. Only arsenic is associated with an estimated hazard that is slightly greater than the target HI of 1.

It is noteworthy that the primary contributors to the estimated HI are likely primarily attributable to ambient conditions at AOC N. As described in Appendix F, a comparison to available background data suggests that arsenic and cobalt detected at AOC N are representative background levels and are not associated with Site activities.

Assuming that the arsenic and cobalt levels detected at AOC N are representative of ambient conditions, the resulting HI is 0.7, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-84, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 1×10^{-5}, which is at the midpoint of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and exceeds the target risk level for residents (1×10^{-6}). The primary contributor to the estimated risk is arsenic (98%). As indicated above, arsenic levels detected in AOC N are representative of background levels.

Assuming that the detected levels of arsenic are attributable to ambient conditions, the estimated cumulative cancer risk is 2×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and well below the target risk level for residents (1×10^{-6}).

The estimated non-carcinogenic HI is 4, which exceeds the target HI of 1. The primary contributors to the estimated HI are arsenic (79%) with an HI of 3.2 and cobalt (13%) with an HI of 0.5. Only arsenic is associated with an estimated hazard that exceeds the target HI of 1. As indicated above, arsenic and cobalt levels detected in AOC N are attributable to ambient conditions.

Assuming that the arsenic and cobalt levels detected at AOC N are representative of ambient conditions, the resulting HI is 0.4, which is below the target HI of 1.

Hot-Spot Analysis

Besides arsenic and cobalt, which were determined to be attributable to ambient conditions, naphthalene was the only compound detected in soil at a level that exceeded the corresponding residential soil RBSL. Naphthalene was not detected from 0 to 10 feet, but was detected at boring B88 (11 mg/kg) at a depth of 28 feet bgs, which exceeded the residential soil RBSL of 2.5 mg/kg that is protective of inhalation exposures. Overall naphthalene was detected in three out 60 samples using Method SW8270C at depths ranging from 25 to 28 feet bgs. Also, it is noteworthy that the duplicate result for the maximum detect at boring B88 was reported as 0.27 mg/kg. The third detected result was 0.15 mg/kg at boring B96 at a depth of 25 feet bgs. These results indicate that any naphthalene impacted soil at AOC N is likely quite limited.

Evaluation of Lead

Tables 6-82 and 6-83 show the comparisons of goals protective of commercial and construction workers compared to lead concentrations measured in surface and subsurface soil. As can be observed, the UCL_{95} lead concentrations in surface and subsurface soil within AOC N (16 mg/kg) are well below the health protective criteria for workers (320 mg/kg). Table 6-84, shows show the comparisons of the goal protective of residents compared to lead concentrations measured in surface and subsurface soil. As shown in the table, the UCL_{95} lead concentration of 16 mg/kg is well below the health criteria protective of residents (80 mg/kg). None of the detected lead concentrations exceeded the health protective worker criteria. Only the maximum result of 125 mg/kg detected at boring B91 at a depth of 4 feet exceeded the health criteria protective of residents.

6.7.14.2 Groundwater

The maximum detected results for VOCs in wells CAMW36 and CAMW37 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-85, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3 x 10^{-7}, which is near the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.007, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-86, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 7 x 10^{-6}, which is at the upper end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10-6). The primary contributor to the estimated risk is 1,2,3-TCP (over 99%). The estimated risk for all other chemicals is 2 x 10-8, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

It is noteworthy that Shallow soil gas sampling (5 feet bgs) was conducted in AOC J-K (located to the northeast of AOC N) in 2016 and 1,2,3-TCP was reported as not detected. The results of the shallow soil gas sampling suggest that the groundwater modeling is overestimating potential vapor migration from groundwater to indoor air. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed to an estimate based vapor migration from a groundwater depth of 44 feet bgs.

Assuming that 1,2,3-TCP is not present in shallow soil gas, the estimated risk for all other chemicals detected in groundwater is 2 x 10-8, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

The estimated non-carcinogenic HI is 0.005, which is below the target HI of 1.

6.7.14.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 4 x 10^{-6} and 0.4, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 7 x 10^{-6}, which is within the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10^{-6}). The

estimated risk is primarily attributable to vapor intrusion. The estimated cumulative hazard is 0.4, which is below the target HI of 1.

6.7.15 AOC NN – Former Building 30

AOC NN, located south of runway 21 in the northeastern quadrant of the Airport, consists of former Building 30 and the open area immediately surrounding it and to the south (Figure 5-15). The AOC was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as being used for aircraft stripping, painting, and crop dusting activities. In 1988, a 2,000 gallon spill of an unknown chemical and discharges of unknown substances from barrels to the north of the building were reported in this area.

6.7.15.1 Soil

Commercial Worker

As shown in Table 6-87, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 7×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.00002, which is below the target HI of 1.

Construction Worker

As shown in Table 6-88, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 1×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.0001, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-89, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 3×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.0001, which is below the target HI of 1.

Hot-Spot Analysis

No chemicals were detected at levels that exceeded the corresponding soil RBSLs for the exposure scenarios evaluated.

6.7.15.2 Groundwater

The maximum detected results for VOCs in wells CAMW38 and CAMW39 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air. AOC NN is located in the eastern portion of the airport away from the GW impacts identified in the central and western portions of the airport and is not close to any wells. CAMW38 and CAMW39 were selected since they located the farthest to the east.

Commercial Worker

As shown in Table 6-90, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 6×10^{-9}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.002, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-91, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 8×10^{-8}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.01, which is below the target HI of 1.

6.7.15.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 6×10^{-9} and 0.002, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 8×10^{-8} and 0.01, respectively, which are below the target risk (1×10^{-6}) and hazard level (1).

6.7.16 AOC O – United States Forest Service Area/Reported Solid Waste Landfill

AOC O is located approximately 300 feet southeast of AOC Z near the central portion of the Airport property (Figure 5-16). The AOC was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as being used by the U.S. Forest Service for the mixing and loading of chemical fire retardants and later reportedly used as a solid waste landfill.

6.7.16.1 Soil

Commercial Worker

As shown in Table 6-92, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 5 x 10^{-6}, which is near the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.6, which is below the target HI of 1.

Construction Worker

As shown in Table 6-93, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 1 x 10^{-7}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}).

The estimated non-carcinogenic HI is 3, which exceeds the target HI of 1. The primary contributors to the estimated HI are arsenic (51%) with an HI of 1.4 and cobalt (21%) with an HI of 0.58. Only arsenic is associated with an estimated hazard that is greater than the target HI of 1.

It is noteworthy that the primary contributors to the estimated HI are likely primarily attributable to ambient conditions at AOC O. As described in Appendix F, a comparison to available background data suggests that arsenic and cobalt detected at AOC O are representative background levels and are not associated with Site activities.

Assuming that the arsenic and cobalt levels detected at AOC O are representative of ambient conditions, the resulting HI is 0.7, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-94, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 2 x 10^{-5}, which is near the midpoint of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10^{-6}). The primary contributor to the estimated risk is arsenic (99%). As indicated above, arsenic levels detected in AOC O are representative of background levels.

Assuming that the detected levels of arsenic are attributable to ambient conditions, the estimated cumulative cancer risk is 3 x 10^{-8}, which is below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and well below the target risk level for residents (1 x 10^{-6}).

The estimated non-carcinogenic HI is 5, which exceeds the target HI of 1. The primary contributors to the estimated HI are arsenic (81%) with an HI of 4.1 and cobalt (10%) with an HI of 0.5. Only arsenic is

associated with an estimated hazard that exceeds the target HI of 1. As indicated above, arsenic and cobalt levels detected in AOC O are attributable to ambient conditions.

Assuming that the arsenic and cobalt levels detected at AOC O are representative of ambient conditions, the resulting HI is 0.4, which is below the target HI of 1.

Hot-Spot Analysis

Arsenic, which was determined to be attributable to ambient conditions, was the only compound detected in soil at a level that exceeded the corresponding soil RBSLs for the exposure scenarios evaluated.

Evaluation of Lead

Tables 6-92 and 6-93 show the comparisons of goals protective of commercial and construction workers compared to lead concentrations measured in surface and subsurface soil. As can be observed, the UCL_{95} lead concentrations in surface and subsurface soil within AOC O (2.9 mg/kg) are well below the health protective criteria for workers (320 mg/kg). Table 6-94 shows show the comparisons of the goal protective of residents compared to lead concentrations measured in surface and subsurface soil. As shown in the table, the UCL_{95} lead concentration of 2.9 mg/kg is well below the health criteria protective of residents (80 mg/kg). The maximum detected lead concentration of 4.4 mg/kg does not exceed either the worker or residential health criteria for lead.

6.7.16.2 Groundwater

The maximum detected results for VOCs in wells CAMW49, CAMW50, and CAMW51 from April 2013 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-95, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 2×10^{-8}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.003, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-96, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 4×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.02, which is below the target HI of 1.

6.7.16.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 5 x 10^{-6} and 0.6, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 4 x 10^{-7} and 0.5, respectively, which are below the target risk (1 x 10^{-6}) and hazard level (1).

6.7.17 AOC OO – Former PAC Wash Rack Area Drain

AOC OO, located on the western side of AOC G, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as discharge piping for waste water from the former PAC wash rack area (Figure 5-17). The piping, visible in the 1955 aerial image, runs in a southeast orientation from AOC G to a series of former drainage ponds (AOC H) south of Building A280.

6.7.17.1 Soil

Commercial Worker

As shown in Table 6-97, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 6 x 10^{-10}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.4, which is below the target HI of 1.

Construction Worker

As shown in Table 6-98, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 1 x 10^{-10}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.5, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-99, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 3 x 10^{-8}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for residents (1 x 10^{-6}). The estimated non-carcinogenic HI is 0.5, which is below the target HI of 1.

Hot-Spot Analysis

Of the 28 samples collected from 0 to 10 feet bgs, three were associated with TPH-diesel results that exceeded the corresponding construction worker and residential RBSLs, which are 254 mg/kg and 239 mg/kg, respectively. These results are associated with borings B43 (773 mg/kg), B52 (395 mg/kg) and B44 (339 mg/kg) and all were collected at a depth of 1 ft bgs directly beneath the asphalt surface. The next highest TPH-diesel result from 0 to 10 feet bgs is 116 mg/kg, which is well below the RBSLs for the potential receptor scenarios.

Since the TPH-diesel results from borings B43, B44, and B52 were collected at a depth of 1 foot directly below an asphalt surface, it is likely that these results are attributable to matrix interference as discussed in Section 5.1.2, rather than site operations.

6.7.17.2 Groundwater

The maximum detected results for VOCs in well CAMW8 from April 2013 to May 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-100, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 3×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.09, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-101, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 4 x 10-6, which is near the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and exceeds the target risk level for residents (1 x 10-6). The primary contributor to the estimated risk is TCE (90%). The estimated risk for all other chemicals is 4 x 10-7, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

It is noteworthy that the maximum TCE concentration associated with CAMW8 is 670 µg/L. This is similar to the maximum TCE concentration detected in well CAMW40 (610 µg/L) located to the northeast in AOC EE. As described above, shallow soil gas sampling was conducted in AOC EE and TCE was reported as not detected. Soil gas sampling was also conducted in AOC J-K located to the north of AOC OO and the estimated risk for TCE based on the soil gas results is 8 x 10-8, which is below the target risk level for residents. The results of the shallow soil gas sampling suggest that the groundwater modeling is

overestimating potential vapor migration from groundwater to indoor air for TCE. As indicated above, the results of the shallow soil gas sampling are considered to provide a more accurate estimate of potential vapor migration into indoor air since it is representative of soil gas 5 feet bgs/potential building foundation as opposed an estimate based vapor migration from a groundwater depth of 44 feet bgs.

Assuming that TCE levels in shallow soil gas are insignificant, the estimated risk for all other chemicals detected in groundwater is 4 x 10-7, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and is below the target risk level for residents (1 x 10-6).

The estimated non-carcinogenic HI is 0.8, which is below the target HI of 1.

6.7.17.3 Cumulative Risk from Exposure to Soil and Vapor Migration from Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 3 x 10^{-7} and 0.5, respectively, which are below the target risk (1 x 10^{-5}) and hazard level (1).

Hypothetical Resident

The estimated cumulative risk for the hypothetical resident is 4 x 10^{-6}, which is within the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and exceeds the target risk level for residents (1 x 10^{-6}). The estimated risk is primarily attributable to vapor intrusion. The estimated cumulative hazard is 1.3, which slightly exceeds the target HI of 1 due to exposures from both soil and vapor intrusion from groundwater.

6.7.18 AOC Z – Waste Water Discharge from Building A495

AOC Z, located approximately 650 feet east of AOC MM, was identified in the *Preliminary Report on Generators of PCE and TCE at the Chino Airport* (SBDEHS, 1989) as a runoff area for discharge of waste water from Building A495, where aircraft maintenance, repair, stripping and painting have occurred (Figure 5-18). The AOC is oriented generally to the southwest from Building A495 and encompasses an area approximately 1,000 feet by 50 feet in size.

6.7.18.1 Soil

Commercial Worker

As shown in Table 6-102, the estimated cumulative cancer risk for potential commercial worker exposure to soil from 0 to 2 feet bgs is 2 x 10^{-10}, which is well below the low end of the USEPA target risk range of 1 x 10^{-4} to 1 x 10^{-6} and below the target risk level for workers (1 x 10^{-5}). The estimated non-carcinogenic HI is 0.00006, which is below the target HI of 1.

Construction Worker

As shown in Table 6-103, the estimated cumulative cancer risk for potential construction worker exposure to soil from 0 to 10 feet bgs is 3×10^{-11}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.0003, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-104, the estimated cumulative cancer risk for potential residential exposure to soil from 0 to 10 feet bgs is 8×10^{-9}, which is well below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.0003, which is below the target HI of 1.

Hot-Spot Analysis

No chemicals were detected at levels that exceeded the corresponding soil RBSLs for the exposure scenarios evaluated.

6.7.18.2 Groundwater

The maximum detected results for VOCs in wells CAMW33, CAMW34, and CAMW35 from June 2015 to April 2017 were used to estimate potential risks associated with exposures to VOCs migrating from groundwater to indoor air.

Commercial Worker

As shown in Table 6-105, the estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from groundwater to indoor air is 6×10^{-8}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.02, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-106, the estimated cumulative cancer risk for potential residential exposure to VOCs migrating from groundwater to indoor air is 9×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.2, which is below the target HI of 1.

6.7.18.3 Soil Gas

Commercial Worker

As shown in Table 6-107, the maximum estimated cumulative cancer risk for potential commercial worker exposure to VOCs migrating from soil gas to indoor air is 9×10^{-8}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and well below the target risk level for workers (1×10^{-5}). The estimated non-carcinogenic HI is 0.003, which is below the target HI of 1.

Hypothetical Resident

As shown in Table 6-108, the maximum estimated cumulative cancer risk for potential residential exposure to VOCs migrating from soil gas to indoor air is 8×10^{-7}, which is below the low end of the USEPA target risk range of 1×10^{-4} to 1×10^{-6} and below the target risk level for residents (1×10^{-6}). The estimated non-carcinogenic HI is 0.02, which is below the target HI of 1.

6.7.18.4 Cumulative Risk from Exposure to Soil and Vapor Migration from Soil Gas and Groundwater

Commercial Worker

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 9×10^{-8} and 0.003, respectively, which are below the target risk (1×10^{-5}) and hazard level (1).

Hypothetical Resident

As shown in Table 6-12, the estimated cumulative risk and HI for the commercial scenario are 8×10^{-7} and 0.02, respectively, which are below the target risk (1×10^{-6}) and hazard level (1).

6.7.19 Off-Site Groundwater Plume – Potential Vapor Intrusion

As described above, COPCs in groundwater have migrated off-site to the southwest. The off-site groundwater plume is located in areas zoned for general industrial, agricultural, or open space use. Although the area is zoned for industrial use, it was discovered that one older residential property is still located within the industrial-zoned area and within the off-site plume southwest of the Site on Euclid Avenue, approximately 1,000 feet north of monitoring well CAMW-11B and roughly 500 feet east of sampling location F3B (refer to Figure 6-2). The following sections summarize the results of a vapor intrusion evaluation for off-site commercial workers and the residence located on Euclid Avenue. The modeling approach and assumptions associated with this evaluation are presented in Appendix B.

Off-Site Commercial Worker

For the off-site commercial worker, a conservative evaluation was conducted to evaluate potential vapor intrusion associated with the off-site plume in which the maximum potential risk and hazard is estimated

using the overall maximum detected COPC concentrations associated with the off-site plume, based on sampling conducted from April 2013 to May 2017.

As shown in Table 6-107, the maximum estimated cumulative cancer risk for potential off-site commercial worker exposure to vapors migrating from groundwater to indoor air based on the maximum detected groundwater concentration is 9 x 10-6, which is within the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and below the target risk level for workers (1 x 10-5). The primary contributor to the estimated risk is 1,2,3-TCP (99%) with an estimated risk of 8.5 x 10-6. The maximum estimated risk for all other detected chemicals is 9 x 10-8, which is below the low end of the USEPA target risk range of 1 x 10-4 to 1 x 10-6 and well below the target risk level for workers (1 x 10-5). The maximum 1,2,3-TCP concentration of 44 µg/L was detected at monitoring well CAMW-56 located near the Site boundary to the southwest. It is noteworthy that the maximum result was detected in April 2016. The most recent sampling result for 1,2,3-TCP at CAMW-56 is 27 µg/L from May 2017. Based on the most recent result for 1,2,3-TCP, the maximum estimated risk would decrease to 5 x 10-6.

The estimated non-carcinogenic HI is 0.03, which is well below the target HI of 1.

Off-Site Resident

Shallow soil gas sampling was conducted at locations CAMW-11B and F3B in 2016 to better evaluate the potential vapor intrusion risk for the off-site residence located on Euclid Avenue within the industrial-zoned area southwest of the site. The soil gas sampling was conducted at sampling depths of 5, 10, 15, and 19-20 feet bgs at these two sampling locations.

As shown in Table 6-110, the estimated risks at sampling location CAMW-11B based on the site- and depth-specific residential soil gas RBSLs (Appendix B) range from 1 x 10-7 to 1 x 10-6, which are below or equal to the lowest end of the USEPA target risk range of 1 x 10-6 to 1 x 10-4 and below or equal to the target risk level for residents (1 x 10-6). Similarly, the estimated non-carcinogenic HIs based on the site- and depth-specific RBSLs range from 0.001 to 0.003, which are well below the target HI of 1.

As shown in Table 6-111, the estimated risks at sampling location F3B based on the site- and depth-specific residential soil gas RBSLs range from 3 x 10-7 (5 feet bgs) to 2 x 10-6 (15 feet bgs), which range from below to slightly above 1) the lowest end of the USEPA target risk range of 1 x 10-6 to 1 x 10-4 and 2) the target risk level for residents of 1 x 10-6. However, only the sampling result from 15 feet bgs is associated with an estimated risk that slightly exceeds the residential target risk level (1 x 10-6). The estimated risk associated with the 10-foot sample is 1 x 10-6 and the maximum estimated risk associated with the 5-foot samples is 4 x 10-7, which are equal to or well below the target risk level for residents (1 x 10-6). The

estimated non-carcinogenic HIs based on the site- and depth-specific RBSLs range from 0.005 (5 feet bgs) to 0.009 (10 and 15 feet bgs), which are well below the target HI of 1.

The results of this soil gas sampling and comparison to site- and depth-specific soil gas RBSLs protective of a residential scenario indicate that attenuation is significant enough that it is unlikely that chemicals detected in soil gas at sampling locations CAMW-11B and F3B are present at levels that would be expected to result in adverse health effects under a residential exposure scenario.

6.8 HHRA SUMMARY

Risks were estimated for three groups of human receptors by comparing risk-based screening levels to measured concentrations of COPCs in each environmental medium. Separate carcinogenic risk estimates and non-carcinogenic hazard indices were calculated for each receptor group, as summarized in Table 6-12.

Commercial Workers

Commercial workers were assumed to contact and incidentally ingest soil, inhale dusts emitted from soil, and inhale vapors emitted to outdoor air from soil. Additionally, commercial workers were assumed to be exposed to vapors migrating into indoor air from groundwater and soil gas. As shown in Table 6-12, all of the cumulative risks estimated for commercial workers are below the target risk of 1×10^{-5}. The cumulative risks estimated for soil exposure and exposure to VOCs migrating from groundwater or soil gas into indoor air range from 1×10^{-9} (AOC EE) to approximately 5×10^{-6} (AOC O). Non-carcinogenic HIs calculated for future commercial worker exposures to soil to VOCs migrating from groundwater or soil gas into indoor air are all below the target HI of 1. The estimated HIs range from 0.002 (AOC NN) to 0.7 (AOC LL).

Construction Workers

Construction workers were assumed to contact and incidentally ingest surface and subsurface soil, inhale dusts emitted from soil, and inhale vapors emitted from soil. As shown in Table 6-12, the estimated risks for construction worker exposure to soil are all below the target risk of 1×10^{-5}. The estimated risks range from 3×10^{-12} (AOC JJ) to 4×10^{-8} (AOC N). Non-carcinogenic HIs estimated for construction worker exposure to soil range from 0.00009 to 1.3. Only three AOCs are associated with estimated HIs that slightly exceed the target HI of 1, which include AOC KK (HI = 1.2), AOC LL (HI = 1.1), and AOC MM (HI = 1.3). The primary contributor to the elevated HI is TPH-diesel in shallow soil.

Hypothetical Resident

Risks were only evaluated for a hypothetical on-site residential scenario for Airport management purposes to assess potential health concerns associated with unrestricted Site use. At this time, it is not anticipated

that the Site will be used for residential purposes. For this evaluation, hypothetical residents were assumed to be comprised of both children and adults who may contact and incidentally ingest soil, inhale dusts emitted from soil, and inhale vapors emitted to outdoor air from soil. Additionally, hypothetical residents were assumed to be exposed to vapors migrating into indoor air from groundwater and soil gas. The cumulative risks estimated for hypothetical on-site residents range from 7×10^{-8} to 9×10^{-5}. As shown in Table 6-12, 12 of the 18 AOCs evaluated are associated with an estimated cumulative risk that exceeds the target risk of 1×10^{-6}. The elevated risks are primarily due to estimated risks associated with vapor migration from groundwater into indoor air for which TCE and 1,2,3-TCP are the primary contributors to the estimated risk.

The non-carcinogenic HIs calculated for hypothetical on-site resident exposures to soil and exposure to vapors migrating into indoor air from groundwater and soil gas range from 0.01 to 2. The estimated HIs for seven of the 18 AOCs evaluated exceed the target HI of 1 (AOCs DD, GG, KK, LL, M, MM, and OO). The elevated HIs are primarily due to a combination of assumed exposure to soil and vapor migration from groundwater. Only three of the AOCs with elevated HIs are associated with a single media that exceeds the target HI (AOCs KK, LL, and MM for soil). For the other four AOCs (DD, GG, M, and OO), no single media has an estimated HI that exceed the target HI of 1. The elevated soil HIs are due primarily to TPH-diesel in shallow soil and assumed TCE migration from groundwater to indoor air.

Primary Contributors to Estimated Risks and Hazards for On-Site Receptors

As described above, 1,2,3-TCP and TCE in groundwater and TPH-diesel in soil are the primary contributors to the estimated risks and hazards from potential exposures to soil or groundwater for the three groups of on-site human receptors evaluated in this report. In regard to estimated risks for 1,2,3-TCP and TCE migrating from groundwater to indoor air, it is notable that the vapor migration risk estimated for 1,2,3-TCP and TCE based on shallow soil gas data are roughly 52 to 64-fold lower than the corresponding estimates based on modeling from groundwater in AOCs EE and J-K. Vapor intrusion modeling based on shallow soil gas data is considered to be a more accurate estimate of potential vapor intrusion exposures since shallow soil gas data is more representative of soil gas conditions near the foundations of potential buildings as opposed to vapor intrusion estimates based on modeling from deeper groundwater (e.g., assumed groundwater depth of 44 feet for the site). This comparison suggests that the vapor intrusion modeling based on groundwater data is significantly overestimating potential vapor intrusion risks.

TPH-diesel in soil is a primary contributor to estimated hazards that exceed the target HI of 1. As indicated above, most of the elevated TPH-diesel results in shallow soil (1 to 4 feet bgs) appear to be attributable to

matrix interference associated with the UVF analytical method used to analyze TPH-diesel in shallow soil directly below asphalt surfaces rather than site activities.

Off-Site Commercial Workers

Off-site commercial workers were assumed to be exposed to COPCs detected in the off-site groundwater plume via vapor migration into indoor air. As shown in Table 6-12, the maximum estimated cumulative risk for potential off-site commercial workers (9×10^{-6}) is below the target risk of 1×10^{-5}. The maximum estimated non-carcinogenic HI calculated for potential off-site commercial worker exposures to VOCs migrating from groundwater into indoor air is 0.03, which is below the target HI of 1.

Off-Site Resident

The off-site residential receptor was assumed to be exposed to COPCs detected in the off-site groundwater plume via vapor migration into indoor air. However, soil gas data sampling was conducted in the vicinity of the off-site residence and was used to evaluate potential vapor intrusion risks. As shown in Table 6-12, the estimated cumulative risk for the off-site resident ranged from 4×10^{-7} to 1×10^{-6} at the shallowest soil gas sampling depth of 5 feet bgs that likely provide the most accurate estimates of potential vapor intrusion. These risk estimates range from well below, to equal to, the residential target risk of 1×10^{-6}. The estimated non-carcinogenic HIs calculated for potential off-site resident exposures to VOCs migrating from groundwater into indoor air range from 0.001 to 0.009, which are well below the target HI of 1.

7.0 SCREENING ECOLOGICAL RISK EVALUATION

The screening ecological risk assessment (SERA) provides an evaluation of the potential ecological hazards for current and future conditions at the Site. The SERA consists of the following components:

- Site characterization, including potentially affected habitats
- Biological characterization
- Chemicals of potential ecological concern (COPECs)
- Exposure pathway assessment
- Risk characterization

Because the Site has been an operating airport for decades, it is unlikely that it provides suitable habitat for any special status species in the area. Biological characterization provides a description of the biological resources occurring in and around potentially affected areas, and identifies the ecologically and commercially relevant receptors (i.e., species) of concern. COPECs are selected to focus the SERA on chemicals in various media that may impact biological resources. The exposure pathway assessment identifies potential exposure pathways to focus the assessment on those exposure scenarios that are most likely to put the ecological receptors at risk (DTSC, 1996a and 1996b). Based on the identification of any complete pathways, a screening risk characterization would be conducted to determine the potential for hazards to receptors of concern (DTSC, 1996b; USEPA, 1992, 1997, and 1998).

Since a biological characterization has not been performed for the Site, this screening evaluation focuses on COPECs and an evaluation of potentially complete exposure pathways for ecological receptors.

7.1 SITE CHARACTERIZATION

Portions of the Airport property have functioned as an airfield since the early 1940s. Past and present uses consist of: a flight academy; aircraft sales and storage; modification of military aircraft; various manufacturing; crop dusting; aircraft restoration and maintenance repair shops; aircraft painting, stripping and washing; mixing and loading of fire retardant chemicals for forest fires, and maintenance and operations for the United States Forest Service aircraft and aircraft museums. A detailed site history is documented in the *Historical Assessment Report, Chino Airport Groundwater Assessment* (Tetra Tech, 2013b). Prior to 1940, the Airport property was primarily used for agriculture.

7.2 POTENTIALLY AFFECTED AREAS

Based on historical operations and characterization data, an evaluation was made to determine where potentially affected areas may exist. Based on this evaluation, the areas adjacent to the Site were defined as the focus of this SERA. The potential for future chemical migration from the on-site area were also

determined to be potential surface water runoff to aquatic habitat and off-site groundwater migration to aquatic habitat.

7.3 CHEMICALS OF POTENTIAL ECOLOGICAL CONCERN

COPECs are chemicals that have been detected in the environment that may adversely affect ecological receptors of concern. The chemical groups detected in the environmental media sampled include: VOCs, SVOCs, PAHs, TPH, and metals. One or more of these chemicals have been detected in groundwater and/or soil.

7.3.1 Chemicals of Potential Ecological Concern in Soil

As described above, portions of the Airport property have functioned as an airfield since the early 1940s. Since the Site is actively maintained to support airport activities and very little terrestrial habitat exists, ecological receptors are unlikely to contact constituents in soil, except on a sporadic basis. However, the potential for future chemical migration (i.e., surface water runoff) from soil and discharge to surface waters was evaluated. Consequently, COPECs were identified for soil that may impact ecological receptors; they are summarized in Table 6-5.

7.3.2 Chemicals of Potential Ecological Concern in Groundwater

Although potential ecological receptors in surface waters are unlikely to directly contact constituents detected in groundwater, impacted groundwater at the site has migrated into off-site areas. As a result of this migration, it is therefore possible that chemicals in groundwater could eventually be transported into any surface water bodies near the Site. Therefore, all detected constituent concentrations were identified as groundwater COPECs for potential migration to surface water bodies in the vicinity of the Site. Groundwater COPECs are summarized in Table 6-5.

7.4 EXPOSURE PATHWAY ASSESSMENT

Identification of complete exposure pathways focuses the SERA on those exposure scenarios that are most likely to put potential ecological receptors at risk. Potentially complete exposure pathways consist of the following:

- A source and mechanism of a constituent release
- A transport medium (e.g., soil, sediment, water, tissue)
- A point or area where receptors of concern may contact constituents
- An exposure route through which constituent exposure occurs (e.g., ingestion)

7.4.1 On-Site Area

Because suitable habitats and receptors of concern are not likely present, exposures to COPECs in soils at the Site are considered to be incomplete, and are not assessed.

7.4.2 Surface Water Runoff

Based on aerial photographs and relevant site information, it appears that the Prado Regional Park, located roughly a mile to the southwest of the Site, is the closest area that may be associated with any suitable habitat that may be able to support ecological receptors. The Prado Reservoir is located within the Prado Regional Park. At this time it is not known if this area provides enough habitat that would be suitable to support any special status species in the area. However, the regional park is surrounded by developed areas and also encompasses a golf course. Thus, it is likely that the area is associated with common urban species, which may live in the area or be transient visitors.

In general, the Site area is described as having a gentle southwest slope that drains to the southwest toward the Prado Reservoir. Additionally, several surface drainage creeks are located south of the Site and flow into the Prado Flood Control Basin, part of the larger PBMZ, which encompasses Prado Regional Park, the Prado Reservoir, and he Orange County Water District's wetland ponds. Although, it is not known if there is drainage pathway(s) from the Site that connect to any of the surface drainage creeks. However, many of the AOCs identified as having soil impacts are either partially or mostly covered by asphalt, which would minimize or eliminate site contaminants associated with surface runoff. Based on this information and the distance to the Prado Reservoir, it is considered unlikely that contaminants from the Site would migrate to the reservoir via surface water runoff. For this reason, potential ecological exposures to COPECs in surface water runoff are considered to be incomplete and are not assessed.

7.4.3 Groundwater Migration to Off-Site Areas

Based on site investigations conducted to date, contaminants in groundwater have migrated off-site to the southwest in the direction of Prado Regional Park (refer to Figure 3-11). Although the off-site plume appears to extend to an area in the vicinity of the northeastern boundary of the regional park, areas in which groundwater could be seeping/daylighting to the ground surface have not been identified. Additionally, the depth to groundwater in the vicinity of the regional park is below the Prado Reservoir. Thus, it is considered unlikely that impacted groundwater migrating from the Site would be intercepted by Prado Reservoir.

7.5 SERA SUMMARY

A screening level ecological risk assessment was conducted to evaluate potential ecological hazards associated with the Site. COPECs related to past and current site operations were identified in soil and groundwater that could potentially be accessible to ecological receptors.

Two potentially affected areas were considered. The first area consisted of the on-site area, which is considered to contain negligible habitat to support ecological receptors and was therefore determined to have no potentially complete exposure pathways, thus posing no hazards to potential receptors of concern.

The second potentially affected area was identified as Prado Regional Park, which is located approximately one mile to the southwest of the site. In addition to open space, Prado Reservoir is located within the regional park. Although it is not known if this area provides enough habitat to be suitable to support any special status species in the area, a screening evaluation was conducted for two potential chemical migration routes from the site, which include surface water runoff and off-site groundwater migration.

Due to the distance from the Site and the fact that many of the AOCs identified as having soil impacts are either partially or mostly covered by asphalt, which would minimize or eliminate site contaminants associated with surface runoff, potential ecological exposures to COPECs in surface water runoff are considered incomplete.

In regard to off-site groundwater migration, it does not appear that groundwater is daylighting into surface water within the Prado Regional Park. Additionally, the depth of groundwater is identified as being below the reservoir. Thus, it is considered unlikely that groundwater is being intercepted by Prado Reservoir. Based on this information, potential ecological exposures to COPECs in groundwater are considered to be incomplete.

8.0 REFERENCES

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TABLES

TABLE ES-1

Summary of Estimated Risks and Hazards

AOC	Summary of Cumulative Cancer Risk and Noncancer Hazard Quotient																	
	Commercial Worker								Construction Worker		Hypothetical Resident							
	Soil (0-2 ft bgs)		Groundwater (Vapor Intrusion to Indoor Air)		Soil Gas (Vapor Intrusion to Indoor Air)		Cumulative Risk Soil and Vapor Intrusion (0-2 ft bgs)		Soil (0-10 ft bgs)		Soil (0-10 bgs)		Groundwater (Vapor Intrusion to Indoor Air)		Soil Gas (Vapor Intrusion to Indoor Air)		Cumulative Risk Soil and Vapor Intrusion (0-10 ft bgs)	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
On-Site																		
AOC DD – Former Airport Maintenance Shop and Yard	9E-11	0.4	3E-07	0.09	NA	NA	3E-07	0.5	2E-11	0.9	4E-09	0.9	**3.E-06**	0.7	NA	NA	**3E-06**	**2**
AOC EE – Former Cal Aero Restoration Yard	3E-10	0.1	3E-07	0.09	6E-10	0.01	1E-09	0.01	6E-11	0.2	1E-08	0.2	**3.E-06**	0.7	5E-08	0.1	7E-08	0.3
AOC FF – Building A440	8E-11	0.00002	3E-07	0.09	NA	NA	3.E-07	0.09	1E-11	0.00009	5E-09	0.0001	**3.E-06**	0.7	NA	NA	**3E-06**	0.7
AOC G - Former PAC Wash Rack Area	3E-08	0.2	4E-06	0.005	NA	NA	4.E-06	0.2	5E-09	0.4	**3E-06**	0.5	**9.E-05**	0.04	NA	NA	**9E-05**	0.5
AOC GG – Former Aircraft Dismantling Area	1E-09	0.2	3E-07	0.09	NA	NA	3.E-07	0.3	3E-10	0.98	6E-08	0.97	**3.E-06**	0.7	NA	NA	**4E-06**	**2**
AOC H – Former Waste Disposal Ponds	2E-09	0.4	9E-10	0.0004	NA	NA	3.E-09	0.4	3E-10	0.4	7E-08	0.4	1.E-08	0.003	NA	NA	8E-08	0.4
AOC HH – Buildings A230, A235, A340, A435	9E-10	0.001	4E-06	0.005	NA	NA	4.E-06	0.006	2E-11	0.0002	4E-08	0.006	**9.E-05**	0.04	NA	NA	**9E-05**	0.05
AOC JJ – Former UST C-15 and Sump I	2E-11	0.2	4E-06	0.005	NA	NA	4.E-06	0.2	3E-12	0.6	7E-10	0.7	**9.E-05**	0.04	NA	NA	**9E-05**	0.7
AOC J-K – PAC Paint Shop and Paint Shed Areas	7E-09	0.001	4E-06	0.005	2.E-07	0.004	2E-07	0.004	1E-09	0.005	3E-07	0.005	**9.E-05**	0.04	**2.E-06**	0.03	**2E-06**	0.04
AOC KK – Building A270, Yanks Museum	2E-10	0.5	3E-07	0.09	NA	NA	3.E-07	0.6	3E-11	**1.2**	7E-09	**1.2**	**4.E-06**	0.8	NA	NA	**4E-06**	**2**
AOC LL – Former UST C-18	5E-11	0.6	3E-07	0.09	NA	NA	3.E-07	0.7	9E-12	**1.1**	2E-09	**1.2**	**4.E-06**	0.8	NA	NA	**4E-06**	**2**
AOC M – Fuel Dump Area	5E-10	0.2	3E-07	0.09	NA	NA	3.E-07	0.3	8E-11	0.4	2E-08	0.5	**3.E-06**	0.7	NA	NA	**3E-06**	**1.2**
AOC MM – Building A385	2E-10	0.5	8E-09	0.003	NA	NA	8.E-09	0.5	3E-11	**1.3**	8E-09	**1.4**	1.E-07	0.02	NA	NA	1E-07	**1.4**
AOC N – Suspected Landfill	4E-06	0.4	3E-07	0.0007	NA	NA	4.E-06	0.4	4E-08	0.7	2E-07	0.4	**7.E-06**	0.005	NA	NA	**7E-06**	0.4
AOC NN - Former Building 30	7E-11	0.00002	6E-09	0.002	NA	NA	6.E-09	0.002	1E-11	0.0001	3E-09	0.0001	8.E-08	0.01	NA	NA	8E-08	0.01
AOC O – U.S. Forest Service Area/Reported Solid Waste Landfill	5E-06	0.6	2E-08	0.003	NA	NA	5.E-06	0.60	4E-08	0.7	3E-08	0.4	4.E-07	0.02	NA	NA	4E-07	0.5
AOC OO – Former PAC Wash Rack Area Drain	6E-10	0.4	3E-07	0.09	NA	NA	3.E-07	0.5	1E-10	0.5	3E-08	0.5	**4.E-06**	0.8	NA	NA	**4E-06**	**1.3**
AOC Z – Waste Water Discharge from Building A495	2E-10	0.00006	6E-08	0.02	9.E-08	0.003	9E-08	0.003	3E-11	0.0003	8E-09	0.0003	9.E-07	0.2	8.E-07	0.02	8E-07	0.02
Off-Site[1]																		
Off-Site Vapor Migration into Indoor Air	NA	NA	9E-06	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.E-06	0.009	NA	NA

Notes:

ft bgs = feet below ground surface

NA = not applicable

[1] - For the off-site scenario, the resident is not hypothetical.

- exceeds target hazard level of 1.
- exceeds target risk level of 1×10^{-5} for workers or 1×10^{-6} for residents.
- below the target risk level of 1×10^{-5} for workers, 1×10^{-6} for residents, or below taget hazard level of 1.

Table 4-1
Summary of Investigation Borings, Sampling and Analysis by AOC
Remedial Investigation
Chino Airport, Chino, California

AOC - Area	Number of Borings	Number of Samples Analyzed for VOCs		Number of Samples Analyzed for TPH		Number of Samples Analyzed for SVOCs	Number of Samples Analyzed for Metals
		DSITMS	Method SW8260B	UVF-3100	Method SW8015B	Method SW8270C	Method SW6010B/7471A
	Number	Number	Number	Number	Number	Number	Number
AOC DD – Former Airport Maintenance Shop and Yard	6	46	4	46	4	-	-
AOC EE – Former Cal Aero Restoration Yard	15	222	19	222	19	-	-
AOC FF – Building A440	4	33	4	-	-	-	-
AOC G - Former PAC Wash Rack Area[a]	20	346	51	317	35	-	-
AOC GG – Former Aircraft Dismantling Area	11	108	12	108	12	-	-
AOC H – Former Waste Disposal Ponds	10	150	13	150	13	-	-
AOC HH – Buildings A230, A235, A340, A435	8	65	9	-	-	-	-
AOC JJ – Former UST C-15 and Sump I	5	49	6	49	6	-	-
AOC J-K – PAC Paint Shop and Paint Shed Areas	14	245	25	-	-	-	-
AOC KK – Building A270, Yanks Museum	7	72	8	72	8	-	-
AOC LL – Former UST C-18	2	23	2	23	2	-	-
AOC M – Fuel Dump Area	4	28	4	28	4	-	-
AOC MM – Building A385	7	100	11	100	11	-	-
AOC N – Suspected Landfill	9	85	8	85	8	52	52
AOC NN - Former Building 30	10	74	5	-	-	-	-
AOC O – U.S. Forest Service Area/Reported Solid Waste Landfill	5	48	4	48	4	28	28
AOC OO – Former PAC Wash Rack Area Drain[a]	10	136	18	109	9	-	-
AOC Z – Waste Water Discharge from Building A495	9	38	8	-	-	-	-
Background Metals Sampling	2	-	-	-	-	-	10
Total	158	1,868	211	1,357	135	80	90

Acronyms and Abbreviations:

AOC - Area of Concern
bgs - below ground surface
TPH - total petroleum hydrocarbons
SVOCs - semi-volatile organic compounds
VOCs - volatile organic compounds

Notes:

a. TPH samples were not collected from all borings.
(-) indicates samples were not analyzed for parameter.

Table 4-2
Soil Sampling Summary by Boring
Remedial Investigation
Chino Airport, Chino, California

AOC	Boring ID	Total Depth (feet bgs)	No. Soil Samples Analyzed for Parameter				No. of Verification Soil Samples Analyzed			Soil Sampling Interval (feet bgs)[1]
			VOCs (DSITMS)	TPH (UVF-3100)	SVOCs / Metals	VOCs (TO-15)	VOCs (SW8260B)	TPH (SW8015B)	SVOCs / Metals	
DD	B101	20.0	8	8	-	-	1	1	-	1 - 20
DD	B102	20.0	7	7	-	-	1	1	-	1 - 20
DD	B103	20.0	8	8	-	-	-	-	-	1 - 20
DD	B104	20.0	8	8	-	-	1	1	-	1 - 20
DD	B105	20.0	8	8	-	-	-	-	-	1 - 20
DD	B106	20.0	7	7	-	-	1	1	-	1 - 20
EE	B93	36.0	14	14	-	-	1	1	-	1 - 36
EE	B94	38.0	13	13	-	-	1	1	-	1 - 38
EE	B95	37.0	14	14	-	-	1	1	-	1 - 37
EE	B98	40.0	15	15	-	-	1	1	-	1 - 40
EE	B99	66.5	22	22	-	-	1	1	-	1 - 66.5
EE	B100	37.0	13	13	-	-	1	1	-	1 - 37
EE	B107	57.0	19	19	-	-	1	1	-	1 - 57
EE	B108	38.0	15	15	-	-	1	1	-	1 - 38
EE	B109	40.0	13	13	-	-	2	2	-	1 - 40
EE	B110	38.0	13	13	-	-	2	2	-	1 - 38
EE	B111	59.5	19	19	-	-	1	1	-	1 - 59.5
EE	B112	34.5	9	9	-	-	1	1	-	1 - 34.5
EE	B121	36.0	15	15	-	-	2	2	-	1 - 36
EE	B122	40.0	14	14	-	-	2	2	-	1 - 40
EE	B123	39.0	14	14	-	-	1	1	-	1 - 39
FF	B136	20.0	8	-	-	-	1	-	-	1.5 - 20
FF	B137	20.0	9	-	-	-	1	-	-	1 - 20
FF	B138	20.0	8	-	-	-	1	-	-	1 - 20
FF	B139	20.0	8	-	-	-	1	-	-	1 - 20
G	B01	40.0	14	14	-	-	2	2	-	1 - 40
G	B02	40.0	15	15	-	-	1	1	-	1 - 40
G	B03	40.0	14	14	-	-	2	2	-	1 - 40
G	B04	40.0	13	13	-	-	1	1	-	1 - 40
G	B05	40.0	14	14	-	-	2	2	-	1 - 40
G	B15	60.8	22	22	-	-	2	2	-	1 - 61
G	B16	40.0	15	15	-	-	1	1	-	1 - 40
G	B17	40.0	15	15	-	-	1	1	-	1 - 40
G	B18	61.0	25	25	-	-	3	3	-	1 - 61
G	B24	49.0	20	20	-	-	2	2	-	1 - 49
G	B25	59.0	18	18	-	-	3	3	-	1 - 59
G	B26	59.5	14	14	-	-	2	2	-	1 - 59.5
G	B27	61.9	21	21	-	-	1	1	-	1 - 62

Table 4-2
Soil Sampling Summary by Boring
Remedial Investigation
Chino Airport, Chino, California

AOC	Boring ID	Total Depth (feet bgs)	No. Soil Samples Analyzed for Parameter				No. of Verification Soil Samples Analyzed			Soil Sampling Interval (feet bgs)[1]
			VOCs (DSITMS)	TPH (UVF-3100)	SVOCs / Metals	VOCs (TO-15)	VOCs (SW8260B)	TPH (SW8015B)	SVOCs / Metals	
G	B28	42.0	13	13	-	-	3	3	-	1 - 42
G	B29	69.0	23	23	-	-	3	3	-	1 - 69
G	B30	59.7	17	17	-	-	3	3	-	1 - 59.5
G	B31	61.0	25	25	-	-	2	2	-	1 - 61
G	B60	59.0	19	19	-	-	1	1	-	1 - 59
G	B66	57.0	18	-	-	-	9	-	-	1 - 57
G	B67	33.5	11	-	-	-	7	-	-	1 - 33.5
GG	B113	22.0	8	8	-	-	1	1	-	1 - 22
GG	B114	22.0	6	6	-	-	1	1	-	1 - 22
GG	B115	22.0	7	7	-	-	1	1	-	1 - 22
GG	B116	22.0	9	9	-	-	1	1	-	1 - 22
GG	B117	45.0	13	13	-	-	1	1	-	1 - 45
GG	B124	20.0	7	7	-	-	1	1	-	1 - 20
GG	B125	68.0	22	22	-	-	2	2	-	1 - 68
GG	B131	20.0	7	7	-	-	1	1	-	1 - 20
GG	B132	41.5	15	15	-	-	1	1	-	1 - 41.5
GG	B74	20.0	7	7	-	-	1	1	-	1 - 20
GG	B75	20.0	7	7	-	-	1	1	-	1 - 20
H	B97	20.0	7	7	-	-	1	1	-	1 - 20
H	B140	20.0	8	8	-	-	1	1	-	1 - 20
H	B141	20.0	8	8	-	-	1	1	-	1 - 20
H	B150	50.5	20	20	-	-	1	1	-	1 - 50.5
H	B155	56.0	21	21	-	-	2	2	-	9 - 56
H	B156	54.0	19	19	-	-	2	2	-	1 - 54
H	B157	50.0	18	18	-	-	1	1	-	1 - 50
H	B158	50.0	19	19	-	-	1	1	-	1 - 50
H	B161	50.0	15	15	-	-	2	2	-	1 - 50
H	B162	50.0	15	15	-	-	1	1	-	1 - 50
HH	B118	20.0	8	-	-	-	1	-	-	1 - 20
HH	B119	20.0	7	-	-	-	1	-	-	1 - 20
HH	B120	20.0	8	-	-	-	1	-	-	1 - 20
HH	B126	20.0	7	-	-	-	1	-	-	1 - 20
HH	B127	20.0	6	-	-	-	1	-	-	1 - 20
HH	B128	34.0	15	-	-	-	2	-	-	1 - 34
HH	B129	20.0	7	-	-	-	1	-	-	1 - 19.5
HH	B130	20.0	7	-	-	-	1	-	-	1 - 20
JJ	B41	30.0	9	9	-	-	2	2	-	1 - 30
JJ	B42	30.0	10	10	-	-	1	1	-	1 - 30

Table 4-2
Soil Sampling Summary by Boring
Remedial Investigation
Chino Airport, Chino, California

AOC	Boring ID	Total Depth (feet bgs)	No. Soil Samples Analyzed for Parameter				No. of Verification Soil Samples Analyzed			Soil Sampling Interval (feet bgs)[1]
			VOCs (DSITMS)	TPH (UVF-3100)	SVOCs / Metals	VOCs (TO-15)	VOCs (SW8260B)	TPH (SW8015B)	SVOCs / Metals	
JJ	B49	30.0	10	10	-	-	1	1	-	1 - 30
JJ	B50	30.0	10	10	-	-	1	1	-	1 - 30
JJ	B51	30.0	10	10	-	-	1	1	-	1 - 30
J-K	B06	40.0	14	-	-	-	1	-	-	1 - 40
J-K	B07	78.0	33	-	-	-	4	-	-	1 - 78
J-K	B08	40.0	15	-	-	-	2	-	-	1 - 40
J-K	B09	36.0	13	-	-	-	2	-	-	1 - 36
J-K	B10	40.0	15	-	-	-	1	-	-	1 - 40
J-K	B11	40.0	15	-	-	-	2	-	-	1 - 40
J-K	B12	40.0	18	-	-	-	1	-	-	1 - 40
J-K	B13	36.0	13	-	-	-	2	-	-	1 - 36
J-K	B14	38.0	13	-	-	-	2	-	-	1 - 38
J-K	B148	5.5	-	-	-	1	-	-	-	4.9
J-K	B149	5.5	-	-	-	1	-	-	-	4.9
J-K	B163	12.0	-	-	-	1	-	-	-	11.9
J-K	B164	12.0	-	-	-	Note 2	-	-	-	11.9
J-K	B165	12.0	-	-	-	1	-	-	-	11.9
J-K	B19	40.0	15	-	-	-	3	-	-	1 - 40
J-K	B20	45.0	17	-	-	-	-	-	-	1 - 45
J-K	B21	74.0	31	-	-	-	2	-	-	1 - 74
J-K	B22	58.0	20	-	-	-	2	-	-	1 - 58
J-K	B23	38.0	13	-	-	-	1	-	-	1 - 38
KK	B57	20.0	7	7	-	-	1	1	-	1 - 20
KK	B58	57.2	22	22	-	-	1	1	-	1 - 57
KK	B59	20.0	6	6	-	-	1	1	-	1 - 20
KK	B61	20.0	7	7	-	-	1	1	-	1 - 20
KK	B62	44.0	16	16	-	-	2	2	-	1 - 44
KK	B63	20.0	7	7	-	-	1	1	-	1 - 20
KK	B64	20.0	7	7	-	-	1	1	-	1 - 20
LL	B133	32.0	11	11	-	-	1	1	-	1 - 32
LL	B134	32.0	12	12	-	-	1	1	-	1 - 32
M	B65	20.0	7	7	-	-	1	1	-	1 - 20
M	B71	20.0	7	7	-	-	1	1	-	1 - 20
M	B72	20.0	7	7	-	-	1	1	-	1 - 20
M	B73	20.0	7	7	-	-	1	1	-	1 - 20
MM	B32	52.0	20	20	-	-	3	3	-	1 - 52
MM	B33	40.0	14	14	-	-	2	2	-	1 - 40
MM	B34	40.0	13	13	-	-	2	2	-	1 - 40

Table 4-2
Soil Sampling Summary by Boring
Remedial Investigation
Chino Airport, Chino, California

AOC	Boring ID	Total Depth (feet bgs)	No. Soil Samples Analyzed for Parameter				No. of Verification Soil Samples Analyzed			Soil Sampling Interval (feet bgs)[1]
			VOCs (DSITMS)	TPH (UVF-3100)	SVOCs / Metals	VOCs (TO-15)	VOCs (SW8260B)	TPH (SW8015B)	SVOCs / Metals	
MM	B35	40.0	14	14	-	-	1	1	-	1 - 40
MM	B36	40.0	12	12	-	-	1	1	-	1 - 40
MM	B37	40.0	13	13	-	-	1	1	-	1 - 40
MM	B38	40.0	14	14	-	-	1	1	-	1 - 40
N	B70	30.0	10	10	6	-	1	1	1	1 - 30
N	B86	30.0	10	10	6	-	1	1	1	1 - 30
N	B87	30.0	9	9	6	-	1	1	1	1 - 30
N	B88	30.0	8	8	6	-	1	1	1	1 - 30
N	B89	30.0	9	9	6	-	1	1	1	1 - 30
N	B90	30.0	10	10	6	-	1	1	1	1 - 30
N	B91	30.0	10	10	5	-	-	-	-	1 - 30
N	B92	92.0	10	10	5	-	1	1	1	1 - 30
N	B96	30.0	9	9	6	-	1	1	1	1 - 30
NN	B76	20.0	7	-	-	-	-	-	-	1 - 20
NN	B77	20.0	8	-	-	-	1	-	-	1 - 20
NN	B78	20.0	7	-	-	-	1	-	-	1 - 20
NN	B79	20.0	7	-	-	-	1	-	-	1 - 20
NN	B80	20.0	7	-	-	-	-	-	-	1 - 20
NN	B81	20.0	8	-	-	-	-	-	-	1 - 20
NN	B82	20.0	7	-	-	-	1	-	-	1 - 20
NN	B83	20.0	7	-	-	-	-	-	-	1 - 20
NN	B84	20.0	8	-	-	-	1	-	-	1 - 20
NN	B85	20.0	8	-	-	-	-	-	-	1 - 20
O	B39	30.0	10	10	6	-	1	1	1	1 - 30
O	B40	30.0	9	9	6	-	1	1	1	1 - 30
O	B46	30.0	10	10	6	-	1	1	1	1 - 30
O	B47	25.0	9	9	5	-	1	1	1	1 - 25
O	B48	30.0	10	10	5	-	-	-	-	1 - 30
OO	B43	36.5	12	12	-	-	1	1	-	1 - 36.5
OO	B44	40.0	15	15	-	-	1	1	-	1 - 40
OO	B45	43.0	11	11	-	-	1	1	-	1 - 43
OO	B52	40.0	14	14	-	-	1	1	-	1 - 40
OO	B53	37.0	14	14	-	-	2	2	-	1 - 37
OO	B54	55.5	18	18	-	-	2	2	-	1 - 55
OO	B55	40.0	14	14	-	-	-	-	-	1 - 40.0
OO	B56	40.5	11	11	-	-	1	1	-	1 - 40.5
OO	B68	46.0	17	-	-	-	5	-	-	1 - 46
OO	B69	34.0	10	-	-	-	4	-	-	1 - 34

Table 4-2
Soil Sampling Summary by Boring
Remedial Investigation
Chino Airport, Chino, California

AOC	Boring ID	Total Depth (feet bgs)	No. Soil Samples Analyzed for Parameter				No. of Verification Soil Samples Analyzed			Soil Sampling Interval (feet bgs)[1]
			VOCs (DSITMS)	TPH (UVF-3100)	SVOCs / Metals	VOCs (TO-15)	VOCs (SW8260B)	TPH (SW8015B)	SVOCs / Metals	
Z	B135	20.0	5	-	-	2	-	-	-	1 - 20
Z	B142	20.0	7	-	-	2	1	-	-	1 - 20
Z	B143	20.0	4	-	-	2	1	-	-	1 - 20
Z	B144	20.0	4	-	-	2	1	-	-	1 - 20
Z	B145	20.0	4	-	-	2	1	-	-	1 - 20
Z	B146	20.0	1	-	-	2	1	-	-	5
Z	B147	20.0	4	-	-	2	1	-	-	1 - 20
Z	B151	20.0	5	-	-	2	1	-	-	1 - 20
Z	B152	20.0	4	-	-	2	1	-	-	1 - 20
Background	B153	20.0	-	-	5	-	-	-	-	0.5 - 19
Background	B154	20.0	-	-	5	-	-	-	-	0.5 - 19

Acronyms and Abbreviations:

bgs: below ground surface

Notes:

1. The sampling range for samples collected for SVOC and metals analysis varied slightly.
2. A sample could not be collected from this location.

Key:

AOC DD – Former Airport Maintenance Shop and Yard
AOC EE – Former Cal Aero Restoration Yard
AOC H – Former Waste Disposal Ponds
AOC FF – Building A440
AOC G - Former PAC Wash Rack Area
AOC GG – Former Aircraft Dismantling Area
AOC H – Former Waste Disposal Ponds
AOC HH – Buildings A230, A235, A340, A435
AOC JJ – Former UST C-15 and Sump I
AOC J-K – PAC Paint Shop and Paint Shed Areas
AOC KK – Building A270, Yanks Museum
AOC LL – Former UST C-18
AOC M – Fuel Dump Area
AOC MM – Building A385
AOC N – Suspected Landfill
AOC NN - Former Building 30
AOC O – U.S. Forest Service Area/Reported Solid Waste Landfill
AOC OO – Former PAC Wash Rack Area Drain
AOC Z – Waste Water Discharge from Building A495

Table 4-3
Summary of Investigation Borings for Soil Gas Sampling
Remedial Investigation
Chino Airport, Chino, California

AOC	Boring ID Number	Easting[1]	Northing[1]	Probe ID	Borehole Diameter (inches)	Tubing Diameter (inches)	Probe Depth (feet bgs)	Boring Depth (feet bgs)
J-K	B148	6668862	1815688	B148-JKD5	2.25	0.25	4.9	5
J-K	B149	6668909	1815629	B149-JKD5	2.25	0.25	4.9	5
J-K	B163	6668613	1815688	O-D12	2.25	0.25	11.9	12
J-K	B164	6668704	1815687	P-D12	2.25	0.25	11.9	12
J-K	B165	6668804	1815687	Q-D12	2.25	0.25	11.9	12
Z	B135	6670431	1814930	B135-ZD11	2.25	0.25	10.9	11
Z				B135-ZD15.5	2.25	0.25	15.4	15.5
Z	B142	6670240	1814495	B142-ZD10	2.25	0.25	9.9	10
Z				B142-ZD17.5	2.25	0.25	17.4	17.5
Z	B143	6670197	1814418	B143-ZD12.5	2.25	0.25	12.4	12.5
Z				B143-ZD19.5	2.25	0.25	19.4	19.5
Z	B144	6670154	1814331	B144-ZD10.5	2.25	0.25	10.4	10.5
Z				B144-ZD16	2.25	0.25	15.9	16
Z	B145	6670112	1814233	B145-ZD11	2.25	0.25	10.9	11
Z				B145-ZD17.5	2.25	0.25	17.4	17.5
Z	B146	6670364	1814863	B146-ZD9.5	2.25	0.25	9.4	9.5
Z				B146-ZD13.5	2.25	0.25	13.4	13.5
Z	B147	6670293	1814800	B147-ZD6.5	2.25	0.25	6.4	6.5
Z				B147-ZD15	2.25	0.25	14.9	15
Z	B151	6670241	1814613	B151-ZD5	2.25	0.25	4.9	5
Z				B151-ZD13.5	2.25	0.25	13.4	13.5
Z	B152	6670243	1814721	B152-ZD10	2.25	0.25	9.9	10
Z				B152-ZD15	2.25	0.25	14.9	15

Acronyms and Abbreviations:
AOC - Area of Concern
bgs: below ground surface
Notes:
1. California State Plane, Zone V, NAD 83, in feet.
Key:
AOC J-K – PAC Paint Shop and Paint Shed Areas
AOC Z – Waste Water Discharge from Building A495

Table 6-1
Chemicals Detected in Soil (0-2 feet)

Chemical	Number of Samples	Number Detected	Percent Detected	Detected Concentrations, mg/kg Minimum	Detected Concentrations, mg/kg Maximum
VOCs[1]					
1,1,1-Trichloroethane	211	3	1.4	0.00034	0.00065
1,1-Dichloroethane	211	2	0.95	0.00072	0.00072
1,1-Dichloroethene	211	6	2.8	0.00031	0.0360
1,2,3-Trichlorobenzene	211	1	0.5	0.00110	0.0011
1,2,3-Trichloropropane	211	6	2.8	0.00480	0.0440
1,2,4-Trichlorobenzene	211	4	1.9	0.00026	0.0035
1,2,4-Trimethylbenzene	211	1	0.5	0.00100	0.0010
1,2-Dichlorobenzene	211	5	2.4	0.00035	0.1200
1,2-Dichloroethane	211	3	1.4	0.00043	0.0190
1,3-Dichlorobenzene	211	4	1.9	0.00092	0.0083
1,4-Dichlorobenzene	211	5	2.4	0.00018	0.0660
2-Butanone (MEK)	211	41	19	0.00300	0.0600
Acetone	211	60	28	0.00480	0.2700
Benzene	211	187	89	0.00012	0.0260
Bromoform	211	2	0.95	0.00130	0.0014
Tert-butyl alcohol	211	14	6.6	0.00430	0.0065
Carbon disulfide	211	19	9.0	0.00028	0.00081
Carbon Tetrachloride	211	7	3.3	0.00025	0.0480
Chlorobenzene	211	4	1.9	0.00043	0.0084
Chloroform	211	18	8.5	0.00020	0.0110
Chloromethane	211	2	0.95	0.00030	0.00045
Ethylbenzene	211	34	16	0.00012	0.00240
Methylene chloride	211	1	0.47	0.00500	0.0050
Tetrachloroethene	211	5	2.4	0.00016	0.00043
Toluene	211	101	48	0.00041	0.0150
Trichloroethene	211	16	7.6	0.00034	0.0150
Trichlorofluoromethane	211	4	1.9	0.00034	0.0037
o-xylene	211	3	1.4	0.00062	0.0014
m,p-xylene	211	39	18	0.00021	0.0034
TPHs					
TPH-gas	99	4	4.0	0.97	6,790
TPH-diesel	99	92	93	0.41	882
SVOCs					
Dimethyl Phthalate	1	1	100	0.31	0.31
PAHs[1]					
Acenaphthene	80	1	1.3	0.16	0.16
Benzo(a)pyrene	80	1	1.3	0.12	0.12
Benzo(g,h,i)perylene	80	1	1.3	0.15	0.15
Fluoranthene	80	2	2.5	0.13	0.20
Indeno(1,2,3-c,d)pyrene	80	1	1.3	0.11	0.11
1-Methylnaphthalene	80	1	1.3	0.18	0.18
2-Methylnaphthalene	80	1	1.3	0.40	0.40
Naphthalene	80	2	2.5	0.15	11
Phenanthrene	80	2	2.5	0.13	0.20
Pyrene	80	2	2.5	0.13	0.20

Table 6-1
Chemicals Detected in Soil (0-2 feet)

Chemical	Number of Samples	Number Detected	Percent Detected	Detected Concentrations, mg/kg	
				Minimum	Maximum
Metals					
Arsenic	1	1	100	1.3	1.3
Barium	1	1	100	134	134
Beryllium	1	1	100	0.47	0.47
Chromium III	1	1	100	24	24
Cobalt	1	1	100	11	11
Copper	1	1	100	13	13
Lead	1	1	100	2.1	2.1
Nickel	1	1	100	14	14
Vanadium	1	1	100	43	43
Zinc	1	1	100	48	48

Definitions:

mg/kg - milligrams per kilogram
TPH - total petroleum hydrocarbon
PAH - polycyclic aromatic hydrocarbon
VOC - volatile organic compound
SVOC - semi-volatile organic compound

Notes:

[1] Chemicals conservatively evaluated using maximum detect from entire dataset unless noted otherwise.

Table 6-2
Chemicals Detected in Soil (0-10 feet)

Chemical	Number of Samples	Number Detected	Percent Detected	Detected Concentrations, mg/kg Minimum	Detected Concentrations, mg/kg Maximum
VOCs[1]					
1,1,1-Trichloroethane	211	3	1.4	0.00034	0.00065
1,1-Dichloroethane	211	2	0.9	0.00072	0.00072
1,1-Dichloroethene	211	6	2.8	0.00031	0.03600
1,2,3-Trichlorobenzene	211	1	0.5	0.00110	0.00110
1,2,3-Trichloropropane	211	6	2.8	0.00480	0.04400
1,2,4-Trichlorobenzene	211	4	1.9	0.00026	0.00350
1,2,4-Trimethylbenzene	211	1	0.5	0.00100	0.00100
1,2-Dichlorobenzene	211	5	2.4	0.00035	0.12000
1,2-Dichloroethane	211	3	1.4	0.00043	0.01900
1,3-Dichlorobenzene	211	4	1.9	0.00092	0.00830
1,4-Dichlorobenzene	211	5	2.4	0.00018	0.06600
2-Butanone (MEK)	211	41	19	0.00300	0.06000
Acetone	211	60	28	0.00480	0.27000
Benzene	211	187	89	0.00012	0.02600
Bromoform	211	2	0.9	0.00130	0.00140
Tert-butyl alcohol	211	14	6.6	0.00430	0.00650
Carbon disulfide	211	19	9.0	0.00028	0.00081
Carbon Tetrachloride	211	7	3.3	0.00025	0.04800
Chlorobenzene	211	4	1.9	0.00043	0.00840
Chloroform	211	18	8.5	0.00020	0.01100
Chloromethane	211	2	0.9	0.00030	0.00045
Ethylbenzene	211	34	16	0.00012	0.00240
Methylene chloride	211	1	0.5	0.00500	0.00500
Tetrachloroethene	211	5	2.4	0.00016	0.00043
Toluene	211	101	48	0.00041	0.01500
Trichloroethene	211	16	7.6	0.00034	0.01500
Trichlorofluoromethane	211	4	1.9	0.00034	0.00370
o-xylene	211	3	1.4	0.00062	0.00140
m,p-xylene	211	39	18	0.00021	0.00340
TPHs					
TPH-gas	362	24	6.6	0.50	6,790
TPH-diesel	362	211	58	0.015	882
SVOCs					
Diethyl Phthalate	25	1	4.0	0.31	0.31
Dimethyl Phthalate	25	13	52	0.19	0.35
PAHs[1]					
Acenaphthene	80	1	1.3	0.16	0.16
Benzo(a)pyrene	80	1	1.3	0.12	0.12
Benzo(g,h,i)perylene	80	1	1.3	0.15	0.15
Fluoranthene	80	2	2.5	0.13	0.20
Indeno(1,2,3-c,d)pyrene	80	1	1.3	0.11	0.11
1-Methylnaphthalene	80	1	1.3	0.18	0.18
2-Methylnaphthalene	80	1	1.3	0.40	0.40
Naphthalene	80	2	2.5	0.15	11
Phenanthrene	80	2	2.5	0.13	0.20
Pyrene	80	2	2.5	0.13	0.20

Table 6-2
Chemicals Detected in Soil (0-10 feet)

Chemical	Number of Samples	Number Detected	Percent Detected	Detected Concentrations, mg/kg	
				Minimum	Maximum
Metals					
Arsenic	16	14	88	0.38	4.5
Barium	16	16	100	90	232
Beryllium	16	16	100	0.16	0.70
Cadmium	16	8	50	0.40	14
Chromium III	16	16	100	21	195
Cobalt	16	16	100	3.9	14
Copper	16	16	100	6.2	65
Lead	16	16	100	0.81	125
Mercury	16	10	63	0.0062	0.058
Molybdenum	16	7	44	0.23	1.5
Nickel	16	16	100	5.2	18
Silver	16	7	44	0.18	0.55
Vanadium	16	16	100	1.9	69
Zinc	16	16	100	23	195

Definitions:

mg/kg - milligrams per kilogram
TPH - total petroleum hydrocarbon
PAH - polycyclic aromatic hydrocarbon
VOC - volatile organic compound
SVOC - semi-volatile organic compound

Notes:

[1] Chemicals conservatively evaluated using maximum detect from entire dataset unless noted otherwise.

Table 6-3
Volatile Chemicals Detected in Groundwater[1]

Chemical	Number of Samples	Number Detected	Percent Detected	Detected Concentrations, µg/L	
				Minimum	Maximum
VOCs					
On-Site					
1,4-Dioxane	95	15	16	0.13	6.9
Acetone	286	3	1.0	11	12
Bromodichloromethane	286	1	0.3	0.23	0.23
Bromomethane	286	1	0.3	4.1	4.1
2-Butanone (MEK)	286	1	0.3	1.2	1.2
Benzene	286	18	6.3	0.14	0.84
Carbon Disulfide	286	3	1.0	0.43	5.6
Chlorobenzene	286	4	1.4	0.21	0.26
Carbon Tetrachloride	286	28	10	0.15	1.9
Chloroform	286	89	31	0.49	29
1,1-Dichloroethane	286	18	6.3	0.17	0.41
1,2-Dichloroethane	286	32	11	0.24	0.76
1,3-Dichlorobenzene	286	1	0.3	0.23	0.23
1,1-Dichloroethene	286	47	16	0.15	6.9
cis-1,2-Dichloroethene	286	48	17	0.20	47
trans-1,2-Dichloroethene	286	29	10	0.14	2.5
1,2-Dichloropropane	286	9	3	0.20	0.89
Methylene Chloride	286	1	0.3	0.16	0.16
tert-Butyl alcohol	245	3	1.2	4.8	6.8
Toluene	286	3	1.0	0.36	0.39
1,1,2-Trichloroethane	286	25	9	0.39	2.6
Trichloroethene	286	188	66	0.34	830
1,2,3-Trichloropropane	286	51	18	0.6	28
Trichlorofluoromethane	286	29	10	1.6	38
1,1,2,2-Tetrachloroethane	286	1	0.3	0.71	0.71
Tetrachloroethene	286	42	15	0.24	3.7
Off-Site					
1,4-Dioxane	66	1	1.5	0.25	0.25
Acetone	251	1	0.4	53.00	53.00
Bromomethane	251	1	0.4	4.40	4.40
2-Butanone (MEK)	251	1	0.4	2.60	2.60
Benzene	251	2	0.8	0.14	0.16
Carbon Disulfide	251	22	8.8	0.36	7.10
Chloroform	251	89	35.5	0.48	31.00
1,1-Dichloroethane	251	15	6.0	0.13	0.41
1,2-Dichloroethane	251	42	16.7	0.21	1.50
1,1-Dichloroethene	251	48	19.1	0.21	5.80
cis-1,2-Dichloroethene	251	58	23.1	0.31	12.00
trans-1,2-Dichloroethene	251	47	18.7	0.21	2.90
Methylene Chloride	251	2	0.8	0.22	0.25

Table 6-3
Volatile Chemicals Detected in Groundwater[1]

Chemical	Number of Samples	Number Detected	Percent Detected	Detected Concentrations, µg/L	
				Minimum	Maximum
tert-Butyl alcohol	178	2	1.1	5.00	7.60
1,1,2-Trichloroethane	251	15	6.0	0.41	0.82
Trichloroethene	251	65	25.9	0.38	250.00
1,2,3-Trichloropropane	251	69	27.5	0.65	44.00
Trichlorofluoromethane	251	14	5.6	0.85	10.00
1,1,2,2-Tetrachloroethane	251	2	0.8	0.35	0.95
Tetrachloroethene	251	6	2.4	0.31	0.53

Definitions:

µg/L - micrograms per liter

VOC - volatile organic compound

Notes:

[1] Only volatile chemicals are identified as the only complete exposure pathway identified for GW is potential vapor migration. Includes data collected from April 2013 to May 2017.

Table 6-4
Chemicals Detected in Soil Gas

Chemical	Number of Samples	Number Detected	Percent Detected	Detected Concentrations, µg/m^3 Minimum	Maximum
VOCs					
AOC EE					
1,1-Dichloroethane	1	1	100%	9.8	9.8
1,1-Dichloroethene	1	1	100%	7,820	7,820
Propylene	1	1	100%	3.9	3.9
1,1,1-Trichloroethane	1	1	100%	47	47
AOC J-K					
Acetone	4	3	75%	14	25
Benzene	4	4	100%	5.1	6.8
Carbon disulfide	4	4	100%	7.6	39
Carbon tetrachloride	4	2	50%	11	23
Chloroform	4	2	50%	5.5	7.1
Cyclohexane	4	3	75%	4.0	7.8
Dichlorodifluoromethane	4	1	25%	6.0	6.0
Ethylbenzene	4	3	75%	3.9	12
n-Hexane	4	2	50%	6.6	7.1
Propylene	4	1	25%	4.0	4.0
Tetrachloroethene	4	4	100%	8.6	42
Tetrahydrofuran	4	4	100%	3.1	6.2
Toluene	4	4	100%	3.8	41
Trichloroethene	4	1	25%	39	39
Trichlorofluoromethane	4	2	50%	6.6	14
1,2,4-Trimethylbenzene	4	4	100%	4.8	9.5
1,3,5-Trimethylbenzene	4	2	50%	5.2	6.8
o-Xylene	4	4	100%	4.2	14
m,p-Xylene	4	4	100%	4.8	38
n-Heptane	4	2	50%	5.0	8.4
Naphthalene	4	1	25%	25	25
AOC Z					
Acetone	18	12	67%	10	33
Benzene	18	11	61%	6.3	40
Carbon disulfide	18	15	83%	3.7	105
Cyclohexane	18	14	78%	3.2	18
Ethylbenzene	18	11	61%	3.1	12
n-Hexane	18	5	28%	3.4	7.6
Propylene	18	2	11%	5.6	14
Tetrachloroethene	18	6	33%	6.0	10
Tetrahydrofuran	18	11	61%	3.5	9.0
Toluene	18	15	83%	3.4	66
Trichlorofluoromethane	18	2	11%	9.3	9.4
1,2,4-Trimethylbenzene	18	16	89%	4.9	11
1,3,5-Trimethylbenzene	18	12	67%	3.8	6.8
o-Xylene	18	14	78%	3.5	14
m,p-Xylene	18	17	94%	4.8	45
n-Heptane	18	3	17%	3.5	5.2
Naphthalene	18	12	67%	10	29

Definitions:
µg/m3 - micrograms per cubic meter
AOC - area of concern
VOC - volatile organic compound

Table 6-5
Chemicals of Potential Concern (COPCs) in Soil, Soil Gas, and Groundwater

Chemical	Soil (feet bgs) 0-2	Soil (feet bgs) 0-10	Soil Gas	Groundwater
VOCs[1]				
1,1,1-Trichloroethane	X	X	X	
1,1,2,2-Tetrachloroethane				X
1,1,2-Trichloroethane				X
1,1-Dichloroethane	X	X	X	X
1,1-Dichloroethene	X	X	X	X
1,2,3-Trichlorobenzene	X	X		
1,2,3-Trichloropropane	X	X		X
1,2,4-Trichlorobenzene	X	X		
1,2,4-Trimethylbenzene	X	X	X	
1,2-Dichlorobenzene	X	X		
1,2-Dichloroethane	X	X		X
1,2-Dichloropropane				X
1,3,5-Trimethylbenzene			X	
1,3-Dichlorobenzene	X	X		X
1,4-Dichlorobenzene	X	X		
1,4-Dioxane				X
2-Butanone (MEK)	X	X		X
4-Ethyltoluene			X	
Acetone	X	X	X	X
Benzene	X	X	X	X
Bromoform	X	X		
Tert-butyl alcohol	X	X		X
Carbon disulfide	X	X	X	X
Carbon Tetrachloride	X	X	X	X
Chlorobenzene	X	X		
Chloroform	X	X	X	X
Chloromethane	X	X		
cis-1,2-Dichloroethene				X
Cyclohexane			X	
Dichlorodifluoromethane			X	
Ethylbenzene	X	X	X	
n-Heptane			X	
n-Hexane			X	
Methylene chloride	X	X		X
Propylene			X	
Tetrachloroethene	X	X	X	X
Tetrahydrofuran			X	
Toluene	X	X	X	X
trans-1,2-Dichloroethene				X
Trichloroethene	X	X	X	X
Trichlorofluoromethane	X	X	X	X
o-xylene	X	X	X	
m-xylene				
m,p-xylene	X	X	X	

Table 6-5
Chemicals of Potential Concern (COPCs) in Soil, Soil Gas, and Groundwater

Chemical	Soil (feet bgs) 0-2	Soil (feet bgs) 0-10	Soil Gas	Groundwater
TPHs				
TPH-gas	X	X		
TPH-diesel	X	X		
SVOCs				
Diethyl Phthalate		X		
Dimethyl Phthalate	X	X		
PAHs[1]				
Acenaphthene	X	X		
Benzo(a)pyrene	X	X		
Benzo(g,h,i)perylene	X	X		
Fluoranthene	X	X		
Indeno(1,2,3-c,d)pyrene	X	X		
1-Methylnaphthalene	X	X		
2-Methylnaphthalene	X	X		
Naphthalene	X	X	X	
Phenanthrene	X	X		
Pyrene	X	X		
Metals				
Arsenic	X	X		
Barium	X	X		
Beryllium	X	X		
Cadmium		X		
Chromium III	X	X		
Cobalt	X	X		
Copper	X	X		
Lead	X	X		
Mercury		X		
Molybdenum		X		
Nickel	X	X		
Selenium		X		
Silver		X		
Vanadium	X	X		
Zinc	X	X		

Definitions:

bgs - below ground surface

PAH - polycyclic aromatic hydrocarbon

SVOC - semi-volatile organic compound

TPH - total petroleum hydrocarbon

VOC - volatile organic compound

Notes:

[1] Chemicals in soil conservatively evaluated using maximum detect from entire dataset unless noted otherwise.

Table 6-6
Estimation of Risk-Based Screening Levels (RBSLs) - Soil:
Ingestion, Dermal Contact, and Inhalation
(Commercial and Construction Workers)

Nonvolatile Carcinogens

$$C_s = \frac{TR \times AT}{EF \times ED \times \left[\left(\frac{IR \times SF_o}{BW \times 10^6\ mg/kg}\right) + \left(\frac{SA \times AF \times ABS \times SF_o}{BW \times 10^6\ mg/kg}\right) + \left(\frac{ET \times (1day/24hours) \times URF \times 10^3\ ug/mg}{PEF}\right)\right]}$$

Nonvolatile Noncarcinogens

$$C_s = \frac{THQ \times AT}{EF \times ED \times \left[\left(\frac{IR}{BW \times RfD_o \times 10^6\ mg/kg}\right) + \left(\frac{SA \times AF \times ABS}{BW \times RfD_o \times 10^6\ mg/kg}\right) + \left(\frac{ET \times (1day/24hours)}{PEF \times RfC}\right)\right]}$$

Volatile Carcinogens (outdoor air)

$$C_s = \frac{TR \times AT}{EF \times ED \times \left[\left(\frac{IR \times SF_o}{BW \times 10^6\ mg/kg}\right) + \left(\frac{SA \times AF \times ABS \times SF_o}{BW \times 10^6\ mg/kg}\right) + \left(\frac{ET \times URF \times 10^3\ ug/mg}{VF}\right)\right]}$$

Volatile Noncarcinogens (outdoor air)

$$C_s = \frac{THQ \times AT}{EF \times ED \times \left[\left(\frac{IR}{BW \times RfD_o \times 10^6\ mg/kg}\right) + \left(\frac{SA \times AF \times ABS}{BW \times RfD_o \times 10^6\ mg/kg}\right) + \left(\frac{ET}{VF \times RfC}\right)\right]}$$

Variable	Parameter	Value	Source/Rationale
C_s	Risk-based screening level for soil	mg/kg	
ABS	Absorption Fraction	chemical-specific	
AF	Soil Adherence Factor		
	Commercial workers	0.2 mg/cm^2	Cal/EPA 2014b
	Construction workers	0.8 mg/cm^2	Cal/EPA 2014b
AT	Averaging Time		
	Carcinogen	70 years x 365 days/year	Lifetime (USEPA 1989)
	Non-carcinogen	ED x 365 days/year	Cal/EPA 2014b
BW	Body Weight		
	Construction & Commercial workers	80 kg	Cal/EPA 2014b
EF	Exposure Frequency		
	Construction & Commercial workers	250 days/year	Cal/EPA 2014b
ED	Exposure Duration		
	Commercial workers	25 year	Cal/EPA 2014b
	Construction workers	1 year	Cal/EPA 2014b
ET	Exposure time	8 hours/day	Cal/EPA 2014b
IR	Soil Ingestion Rate		
	Commercial workers	100 mg/day	Cal/EPA 2014b
	Construction workers	330 mg/day	Cal/EPA 2014b
PEF	Particulate Emissions Factor		
	Commercial workers	1.36E+09 m^3/kg	Cal/EPA 2014b
	Construction workers	1.00E+06 m^3/kg	Cal/EPA 2014b

Table 6-6
Estimation of Risk-Based Screening Levels (RBSLs) - Soil:
Ingestion, Dermal Contact, and Inhalation
(Commercial and Construction Workers)

RfC	Reference concentration	- mg/m^3	chemical-specific
Variable	**Parameter**	**Value**	**Source/Rationale**
RfD_o	Oral/dermal reference dose	- mg/kg/day	chemical-specific
SA	Skin surface area		
	Construction & Commercial workers	6,032 cm^2/day	Cal/EPA 2014b
SF_o	Oral/dermal carcinogenic slope factor	- $(mg/kg/day)^{-1}$	chemical-specific
THQ	Target HQ	1 unitless	USEPA 1989
TR	Target Risk	10^{-5} unitless	USEPA 1989
URF	Unit risk factor	- $(\mu g/m^3)^{-1}$	chemical-specific

Table 6-7
Estimation of Risk-Based Screening Levels (RBSLs) - Soil:
Ingestion, Dermal Contact, and Inhalation
(Residents)

Nonvolatile Carcinogens

$$C_s = \frac{TR \times AT}{EF \times \left[\left(\left(\frac{ED_c \times IR_c}{BW_c} + \frac{ED_a \times IR_a}{BW_a}\right) \times \frac{SF_o}{10^6\ mg/kg}\right) + \left(\left(\frac{ED_c \times AF_c \times SA_c}{BW_c} + \frac{ED_a \times AF_a \times SA_a}{BW_a}\right) \times \frac{ABS \times SF_o}{10^6\ mg/kg}\right) + \left(\frac{ED_R \times URF \times 10^3\ \mu g/mg}{PEF}\right)\right]}$$

Nonvolatile Noncarcinogens

$$C_s = \frac{THQ \times AT}{EF \times \left[\left(\left(\frac{ED_c \times IR_c}{BW_c}\right) \times \frac{1}{10^6\ mg/kg \times RfD_o}\right) + \left(\left(\frac{ED_c \times AF_c \times SA_c}{BW_c}\right) \times \frac{ABS}{10^6\ mg/kg \times RfD_o}\right) + \left(\frac{ED_R}{RfC \times PEF}\right)\right]}$$

Volatile Carcinogens

$$C_s = \frac{TR \times AT}{EF \times \left[\left(\left(\frac{ED_c \times IR_c}{BW_c} + \frac{ED_a \times IR_a}{BW_a}\right) \times \frac{SF_o}{10^6\ mg/kg}\right) + \left(\left(\frac{ED_c \times AF_c \times SA_c}{BW_c} + \frac{ED_a \times AF_a \times SA_a}{BW_a}\right) \times \frac{ABS \times SF_o}{10^6\ mg/kg}\right)\right]}$$

Volatile Noncarcinogens

$$C_s = \frac{THQ \times AT}{EF \times \left[\left(\left(\frac{ED_c \times IR_c}{BW_c}\right) \times \frac{1}{10^6\ mg/kg \times RfD_o}\right) + \left(\left(\frac{ED_c \times AF_c \times SA_c}{BW_c}\right) \times \frac{ABS}{10^6\ mg/kg \times RfD_o}\right)\right]}$$

Variable	Parameter	Value	Source/Rationale
C_s	Risk based remedial goal for soil	mg/kg	Units for soil
ABS	Absorption Fraction	- unitless	chemical-specific
AF	Soil Adherence Factor		
	AF_c Child	0.2 mg/cm^2	Cal/EPA 2014b
	AF_a Adult	0.07 mg/cm^2	Cal/EPA 2014b
AT	Averaging Time		
	Carcinogen	70 years x 365 days/year	Lifetime (U.S. EPA 1989)
	Non-carcinogen	ED x 365 days/year	USEPA 1989, Cal/EPA 2014b
BW	Body Weight		
	BW_c Child	80 kg	Cal/EPA 2014b
	BW_a Adult	15 kg	Cal/EPA 2014b
ED	Exposure Duration		
	ED_c Child	6 years	Cal/EPA 2014b
	ED_a Adult	20 years	Cal/EPA 2014b
	ED_r Resident (adult plus child)	26 years	Cal/EPA 2014b
EF	Exposure Frequency	350 days/year	Cal/EPA 2014b

Table 6-7
Estimation of Risk-Based Screening Levels (RBSLs) - Soil:
Ingestion, Dermal Contact, and Inhalation
(Residents)

Variable	Parameter	Value		Source/Rationale
IR	Soil Ingestion Rate			
	IR_c Child	200	mg/day	Cal/EPA 2014b
	IR_a Adult	100	mg/day	Cal/EPA 2014b
PEF	Particulate Emissions Factor	1.36E+08	m^3/kg	Cal/EPA 2014b
RfC	Reference concentration	-	mg/m^3	chemical-specific
RfD_o	Oral/dermal reference dose	-	mg/kg/day	chemical-specific
SA	Skin Surface Area			
	SA_c Child	2,900	cm^2	Cal/EPA 2014b
	SA_a Adult	6,032	cm^2	Cal/EPA 2014b
SF_o	Oral/dermal carcinogenic slope factor	chemical-specific		
THQ	Target HQ	1	unitless	USEPA 1989
TR	Target Risk	10^{-6}	unitless	USEPA 1989
URF	Unit risk factor	-	$(\mu g/m^3)^{-1}$	chemical-specific

Table 6-8
Estimation of Risk-Based Screening Levels (RBSLs) - Soil Gas: Inhalation
(Commercial Worker and Resident)

Volatile Carcinogens (indoor air)

$$C_{sg} = \frac{TR \times AT}{ET \times EF \times ED \times \alpha \times URF}$$

Volatile Noncarcinogens (indoor air)

$$C_{sg} = \frac{THQ \times AT \times 1{,}000\ ug\ /\ mg}{ET \times EF \times ED \times \alpha \times \frac{1}{RfC}}$$

Variable	Parameter	RME Value	Source/Rationale
C_{sg}	Risk-based screening level for soil gas	ug/m^3	
TR	Target Risk		
	Indoor Worker	10^{-5} unitless	USEPA 1989
	Future Resident	10^{-6} unitless	USEPA 1989
THQ	Target HQ	1 unitless	USEPA 1989
ET	Exposure Time		
	Indoor Worker	8 hours/24 hour day	Cal/EPA 2014b
	Future Resident	24 hours/24 hour day	Cal/EPA 2014b
EF	Exposure Frequency		
	Indoor Worker	250 days/year	Cal/EPA 2014b
	Future Resident	350 days/year	Cal/EPA 2014b
ED	Exposure Duration		
	Indoor Worker	25 years	Cal/EPA 2014b
	Future Resident	26 years	Cal/EPA 2014b
α	Soil gas attenuation factor	- unitless	chemical-specific
URF	Unit risk factor	- (μg/m^3)$^{-1}$	chemical-specific
RfC	Reference concentration	- mg/m^3	chemical-specific
AT	Averaging Time		
	Carcinogen	70 years x 365 days/year	Lifetime (U.S. EPA 1989)
	Non-carcinogen	ED x 365 days/year	USEPA 1989

Table 6-9
Estimation of risk-Based Screening Levels (RBSLs) - Groundwater: Inhalation
(Commercial Worker and Resident)

Volatile Carcinogens (indoor air)

$$C_{gw} = \frac{TR \times AT}{ET \times EF \times ED \times \alpha \times URF}$$

Volatile Noncarcinogens (indoor air)

$$C_{gw} = \frac{THQ \times AT \times 1{,}000\ ug\ /\ mg}{ET \times EF \times ED \times \alpha \times \frac{1}{RfC}}$$

Variable	Parameter	RME Value	Source/Rationale
C_{gw}	Risk-based screening level for groundwater	ug/L	
TR	Target Risk		
	Commercial Worker	10^{-5} unitless	USEPA 1989
	Future Resident	10^{-6} unitless	USEPA 1989
THQ	Target HQ	1 unitless	USEPA 1989
ET	Exposure Time		
	Indoor Worker	8 hours/24 hour day	Cal/EPA 2014b
	Future Resident	24 hours/24 hour day	Cal/EPA 2014b
EF	Exposure Frequency		
	Indoor Worker	250 days/year	Cal/EPA 2014b
	Future Resident	350 days/year	Cal/EPA 2014b
ED	Exposure Duration		
	Indoor Worker	25 years	Cal/EPA 2014b
	Future Resident	26 years	Cal/EPA 2014b
α	Groundwater attenuation factor	- L/m^3	chemical-specific
URF	Unit risk factor	- $(\mu g/m^3)^{-1}$	chemical-specific
RfC	Reference concentration	- mg/m^3	chemical-specific
AT	Averaging Time		
	Carcinogen	70 years x 365 days/year	Lifetime (U.S. EPA 1989)
	Non-carcinogen	ED x 365 days/year	USEPA 1989

TABLE 6-10
Carcinogenic Toxicity Criteria

Chemical	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Source	Oral Carcinogenic Slope Factor $(mg/kg\text{-}day)^{-1}$	Source	USEPA Weight of Evidence
Volatile Organic Compounds (VOCs)					
Acetone	-	1	-	1	Inadequate data
Benzene	2.90E-05	Cal EPA	1.00E-01	Cal EPA	A
Bromoform	1.10E-06	IRIS	1.10E-02	CalEPA	B2
2-Butanone	-	1	-	1	-
Carbon Disulfide	-	1	-	1	-
Carbon Tetrachloride	4.20E-05	Cal EPA	1.50E-01	CalEPA	Likely carcinogenic
Chlorobenzene	-	1	-	1	D
Chloroform	2.30E-05	IRIS	3.10E-02	CalEPA	B2
Chloromethane	-	1	-	1	D
Cyclohexane	-	1	-	1	Inadequate data
1,2-Dichlorobenzene	-	1	-	1	D
1,3-Dichlorobenzene	-	1	-	1	D
1,4-Dichlorobenzene	1.10E-05	Cal EPA	5.40E-03	Cal EPA	-
Dichlorodifluoromethane	-	1	-	1	-
1,1-Dichloroethane	1.60E-06	Cal EPA	5.70E-03	Cal EPA	C
1,2-Dichloroethane	2.60E-05	IRIS	9.10E-02	IRIS	B2
1,1-Dichloroethene	-	-	-	-	C
cis-1,2-Dichloroethene	-	1	-	1	D
trans-1,2-Dichloroethene	-	1	-	1	Inadequate data
1,2-Dichloropropane	1.00E-05	Cal EPA	3.70E-02	PPRTV	B2
1,4-Dioxane	7.70E-06	CalEPA	2.70E-02	CalEPA	B2
Ethylbenzene	2.50E-06	CalEPA	1.10E-02	CalEPA	D
n-Hexane	-	1	-	1	Inadequate data
Methylene Chloride	1.00E-06	Cal EPA	1.40E-02	Cal EPA	B2
Naphthalene	3.40E-05	Cal EPA	1.20E-01	Cal EPA	C
1,1,2,2-Tetrachloroethane	5.80E-05	Cal EPA	2.00E-01	IRIS	C
Tetrachloroethene	6.10E-06	Cal EPA	5.40E-01	Cal EPA	Likely carcinogenic
Tetrahydrofuran	-	1	-	1	Suggestive evidence
Toluene	-	1	-	1	D
1,2,3-Trichlorobenzene	-	1	-	1	-
1,2,4-Trichlorobenzene	-	-	2.90E-02	PPRTV	D
1,1,1-Trichloroethane	-	1	-	1	D
1,1,2-Trichloroethane	1.60E-05	Cal EPA	5.70E-02	Cal EPA	C
Trichloroethene	4.10E-06	IRIS	4.60E-02	IRIS	Carcinogenic to humans
Trichlorofluoromethane	-	1	-	1	-
1,2,3-Trichloropropane	7.50E-03	-	3.00E+01	IRIS	Likely carcinogenic
1,2,4-Trimethylbenzene	-	1	-	1	Inadequate data
1,3,5-Trimethylbenzene	-	1	-	1	Inadequate data
o-Xylene	-	1	-	1	Inadequate data
Xylenes (total)	-	1	-	1	Inadequate data
Total Petroleum Hydrocarbons (TPH)					
TPH-Diesel	----	1	----	1	-
TPH-Gasoline	----	1	----	1	-
Semi-Volatile Organic Compounds (SVOCs)					
Diethylphthalate	-	1	-	1	D
Dimethylphthalate	-	1	-	1	D

TABLE 6-10
Carcinogenic Toxicity Criteria

Chemical	Inhalation Unit Risk $(\mu g/m^3)^{-1}$	Source	Oral Carcinogenic Slope Factor $(mg/kg\text{-}day)^{-1}$	Source	USEPA Weight of Evidence
PAHs					
Acenaphthene	-	1	-	1	-
Benzo(a)pyrene	1.10E-03	Cal EPA	2.90E+00	Cal EPA	B2
Benzo(g,h,i)perylene	-	1	-	1	D
Fluoranthene	-	1	-	1	D
Indeno(1,2,3-cd)pyrene	1.10E-04	Cal EPA	1.20E+00	Cal EPA	B2
1-Methylnaphthalene	-	1	2.90E-02	PPRTV	-
2-Methylnaphthalene	-	-	-	1	Inadequate data
Phenanthrene	-	1	-	1	D
Pyrene	-	1	-	1	D
Metals					
Arsenic	4.30E-03	IRIS	9.50E+00	Cal EPA	A
Barium	-	1	-	1	D
Beryllium	2.40E-03	CalEPA	-	2	-
Cadmium	4.20E-03	Cal EPA	-	2	B1
Chromium III	-	1	-	1	D
Cobalt	9.00E-03	PPRTV	-	2	B1
Copper	-	1	-	1	D
Lead	-	3	-	3	B2
Molybdenum	-	1	-	1	-
Nickel	2.60E-04	Cal EPA	-	2	-
Selenium	-	1	-	1	D
Silver	-	2	-	1	D
Vanadium	-	1	-	1	-
Zinc	-	1	-	1	D

Notes:
---- = No cancer slope factor or noncancer reference dose available
Cal/EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System (USEPA, 2018)
PPRTV = Provisional Peer Reviewed Toxicity Values (cited in USEPA, 2017)

[1] Not classified as a carcinogen by the USEPA or Cal/EPA.
[2] Not considered an oral carcinogen by the USEPA or Cal/EPA.
[3] Lead evaluated using DTSC-modified screening levels.

Sources:
California Environmental Protection Agency (Cal/EPA). 2018. *Human Health Risk Assessment (HHRA) Note Number 3. January* .
California Environmental Protection Agency (Cal/EPA). 2018. *Toxicity Criteria Database Cancer Slope Factors and Chronic Reference Exposure Levels.*
United States Environmental Protection Agency (USEPA). 2018. *Integrated Risk Information System (IRIS)* .
United States Environmental Protection Agency (USEPA). 2017. Regional Screening Levels. November.

TABLE 6-11
Noncarcinogenic Toxicity Criteria

Chemical	Inhalation Reference Concentration (mg/m^3)	Source	Oral Reference Dose (mg/kg-day)	Source
Volatile Organic Compounds (VOCs)				
Acetone	3.1E+01	ATSDR	9.00E-01	IRIS
Benzene	3.0E-03	IRIS	4.00E-03	IRIS
Bromoform	8.0E-02	1	2.00E-02	IRIS
2-Butanone	5.0E+00	IRIS	6.00E-01	IRIS
Carbon Disulfide	7.0E-01	IRIS	1.00E-01	IRIS
Carbon Tetrachloride	4.0E-02	CalEPA	4.00E-03	IRIS
Chlorobenzene	5.0E-02	PPRTV	2.00E-02	IRIS
Chloroform	9.8E-02	ATSDR	1.00E-02	IRIS
Chloromethane	9.0E-02	IRIS	2.25E-02	2
Cyclohexane	6.0E+00	IRIS	1.50E+00	2
1,2-Dichlorobenzene	2.0E-01	HEAST	9.00E-02	IRIS
1,3-Dichlorobenzene	2.0E-01	3	9.00E-02	3
1,4-Dichlorobenzene	8.0E-01	IRIS	7.00E-02	ATSDR
Dichlorodifluoromethane	1.0E-01	PPRTV	2.00E-01	IRIS
1,1-Dichloroethane	8.0E-01	1	2.00E-01	PPRTV
1,2-Dichloroethane	7.0E-03	PPRTV	6.00E-03	PPRTV
1,1-Dichloroethene	7.0E-02	Cal EPA	5.00E-02	IRIS
cis-1,2-Dichloroethene	8.0E-03	1	2.00E-03	IRIS
trans-1,2-Dichloroethene	8.0E-02	1	2.00E-02	IRIS
1,2-Dichloropropane	4.0E-03	IRIS	4.00E-02	PPRTV
1,4-Dioxane	3.0E-02	IRIS	3.00E-02	IRIS
Ethylbenzene	1.0E+00	IRIS	1.00E-01	IRIS
n-Hexane	7.0E-01	IRIS	3.00E-04	4
Methylene Chloride	4.0E-01	Cal EPA	6.00E-03	IRIS
Naphthalene	3.0E-03	IRIS	2.00E-02	IRIS
1,1,2,2-Tetrachloroethane	8.0E-02	1	2.00E-02	IRIS
Tetrachloroethene	3.5E-02	IRIS	6.00E-03	IRIS
Tetrahydrofuran	2.0E+00	IRIS	9.00E-01	IRIS
Toluene	3.0E-01	Cal EPA	8.00E-02	IRIS
1,2,3-Trichlorobenzene	3.2E-03	1	8.00E-04	PPRTV
1,2,4-Trichlorobenzene	2.0E-03	PPRTV	1.00E-02	IRIS
1,1,1-Trichloroethane	1.0E+00	IRIS	2.00E+00	IRIS
1,1,2-Trichloroethane	2.0E-04	PPRTV	4.00E-03	IRIS
Trichloroethene	2.0E-03	IRIS	5.00E-04	IRIS
Trichlorofluoromethane	1.2E+00	1	3.00E-01	IRIS
1,2,3-Trichloropropane	3.0E-04	IRIS	4.00E-03	IRIS
1,2,4-Trimethylbenzene	6.0E-02	IRIS	1.00E-02	IRIS
1,3,5-Trimethylbenzene	6.0E-02	IRIS	1.00E-02	IRIS
o-Xylene	1.0E-01	IRIS	2.00E-01	IRIS
Xylenes (total)	1.0E-01	IRIS	2.00E-01	IRIS
Total Petroleum Hydrocarbons (TPH)				
TPH-Diesel	1.3E-01	SFB-RWQCB	2.00E-02	SFB-RWQCB
TPH-Gasoline	5.7E-01	SFB-RWQCB	3.90E-02	SFB-RWQCB
Semi-Volatile Organic Compounds (SVOCs)				
Diethylphthalate	3.2E+00	1	8.00E-01	IRIS
Dimethylphthalate	4.0E-01	1	8.00E-01	6

TABLE 6-11
Noncarcinogenic Toxicity Criteria

Chemical	Inhalation Reference Concentration (mg/m^3)	Source	Oral Reference Dose (mg/kg-day)	Source
PAHs				
Acenaphthene	2.4E-01	1	6.00E-02	IRIS
Benzo(a)pyrene	2.0E-06	IRIS	3.00E-04	IRIS
Benzo(g,h,i)perylene	3.0E-03	5	2.00E-02	5
Fluoranthene	1.6E-01	1	4.00E-02	IRIS
Indeno(1,2,3-cd)pyrene	3.0E-03	5	2.00E-02	5
1-Methylnaphthalene	3.0E-03	5	7.00E-02	ATSDR
2-Methylnaphthalene	3.0E-03	5	4.00E-03	IRIS
Phenanthrene	1.2E-01	1,7	3.00E-02	7
Pyrene	1.2E-01	1	3.00E-02	IRIS
Metals				
Arsenic	1.5E-05	REL	3.50E-06	Cal EPA
Barium	5.0E-04	HEAST	2.00E-01	IRIS
Beryllium	7.0E-06	Cal EPA	2.00E-04	Cal EPA
Cadmium	1.0E-05	ATSDR	1.00E-03	Cal EPA
Chromium III	6.0E+00	1	1.50E+00	IRIS
Cobalt	6.0E-06	PPRTV	3.00E-04	PPRTV
Copper	1.6E-01	1	4.00E-02	HEAST
Lead	-	8	-	8
Molybdenum	2.0E-02	1	5.00E-03	IRIS
Nickel	1.4E-05	Cal EPA	1.10E-02	Cal EPA
Selenium	2.0E-02	Cal EPA	5.00E-03	IRIS
Silver	2.0E-02	1	5.00E-03	IRIS
Vanadium	1.0E-04	ATSDR	5.00E-03	IRIS
Zinc	1.2E+00	1	3.00E-01	IRIS

Notes:

---- = No cancer slope factor or noncancer reference dose available

ATSDR = Agency for Toxic Substances Disease Registry

Cal/EPA = California Environmental Protection Agency

HEAST = Health Effects Assessment Summary Tables (cited in USEPA 2017)

IRIS = Integrated Risk Information System (USEPA, 2008a)

NCEA = National Center for Environmental Assessment (cited in USEPA, 2017)

PPRTV = Provisional Peer Reviewed Toxicity Values (cited in USEPA, 2017)

SFB-RWQCB = San Francisco Bay Regional Water Quality Control Board (2016)

[1] Route-to-route extrapolation.

[2] A route-to-route extrapolation from the inhalation RfD was applied.

[3] 1,2-dichlorobenzene used as a surrogate.

[4] Heptane used as a surrogate.

[5] Naphthalene toxicity data used as surrogate information.

[6] Diethlyl phthalate used as a surrogate.

[7] Pyrene toxicity data used as surrogate information. Phenanthrene.

[8] Lead evaluated using DTSC-modified screening levels.

Sources:

Department of Toxic Substances Control (DTSC). 2018. *Human Health Risk Assessment (HHRA) Note Number 3. January*.

California Environmental Protection Agency (Cal/EPA). 2018. *Toxicity Criteria Database Cancer Slope Factors and Chronic Reference Exposure Levels.*

Health Effects Assessment Summary Tables (HEAST). Cited in USEPA Regional Screening Levels (RSLs) 2017. November.

National Center for Environmental Assessment (NCEA). Cited in USEPA Regional Screening Levels (RSLs) 2017. November.

San Francisco Bay Regional Water Quality Control Board (SFB-RWQCB). 2016. User's Guide: Derivation and Application of Environmental Screening Levels (ESLs) - Interim Final

United States Environmental Protection Agency (USEPA). 2018. *Integrated Risk Information System (IRIS)*.

United States Environmental Protection Agency (USEPA). 2017. Regional Screening Levels. November.

TABLE 6-12

Summary of Estimated Risks and Hazards

AOC	Summary of Cumulative Cancer Risk and Noncancer Hazard Quotient																	
	Commercial Worker								Construction Worker		Hypothetical Resident							
	Soil (0-2 ft bgs)		Groundwater (Vapor Intrusion to Indoor Air)		Soil Gas (Vapor Intrusion to Indoor Air)		Cumulative Risk Soil and Vapor Intrusion (0-2 ft bgs)		Soil (0-10 ft bgs)		Soil (0-10 bgs)		Groundwater (Vapor Intrusion to Indoor Air)		Soil Gas (Vapor Intrusion to Indoor Air)		Cumulative Risk Soil and Vapor Intrusion (0-10 ft bgs)	
	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index	Cancer Risk	Hazard Index
On-Site																		
AOC DD – Former Airport Maintenance Shop and Yard	9E-11	0.4	3E-07	0.09	NA	NA	3E-07	0.5	2E-11	0.9	4E-09	0.9	**3.E-06**	0.7	NA	NA	**3E-06**	**2**
AOC EE – Former Cal Aero Restoration Yard	3E-10	0.1	3E-07	0.09	6E-10	0.01	1E-09	0.01	6E-11	0.2	1E-08	0.2	**3.E-06**	0.7	5E-08	0.1	7E-08	0.3
AOC FF – Building A440	8E-11	0.00002	3E-07	0.09	NA	NA	3.E-07	0.09	1E-11	0.00009	5E-09	0.0001	**3.E-06**	0.7	NA	NA	**3E-06**	0.7
AOC G - Former PAC Wash Rack Area	3E-08	0.2	4E-06	0.005	NA	NA	4.E-06	0.2	5E-09	0.4	**3E-06**	0.5	**9.E-05**	0.04	NA	NA	**9E-05**	0.5
AOC GG – Former Aircraft Dismantling Area	1E-09	0.2	3E-07	0.09	NA	NA	3.E-07	0.3	3E-10	0.98	6E-08	0.97	**3.E-06**	0.7	NA	NA	**4E-06**	**2**
AOC H – Former Waste Disposal Ponds	2E-09	0.4	9E-10	0.0004	NA	NA	3.E-09	0.4	3E-10	0.4	7E-08	0.4	1.E-08	0.003	NA	NA	8E-08	0.4
AOC HH – Buildings A230, A235, A340, A435	9E-10	0.001	4E-06	0.005	NA	NA	4.E-06	0.006	2E-11	0.0002	4E-08	0.006	**9.E-05**	0.04	NA	NA	**9E-05**	0.05
AOC JJ – Former UST C-15 and Sump I	2E-11	0.2	4E-06	0.005	NA	NA	4.E-06	0.2	3E-12	0.6	7E-10	0.7	**9.E-05**	0.04	NA	NA	**9E-05**	0.7
AOC J-K – PAC Paint Shop and Paint Shed Areas	7E-09	0.001	4E-06	0.005	2.E-07	0.004	2E-07	0.004	1E-09	0.005	3E-07	0.005	**9.E-05**	0.04	**2.E-06**	0.03	**2E-06**	0.04
AOC KK – Building A270, Yanks Museum	2E-10	0.5	3E-07	0.09	NA	NA	3.E-07	0.6	3E-11	**1.2**	7E-09	**1.2**	**4.E-06**	0.8	NA	NA	**4E-06**	**2**
AOC LL – Former UST C-18	5E-11	0.6	3E-07	0.09	NA	NA	3.E-07	0.7	9E-12	**1.1**	2E-09	**1.2**	**4.E-06**	0.8	NA	NA	**4E-06**	**2**
AOC M – Fuel Dump Area	5E-10	0.2	3E-07	0.09	NA	NA	3.E-07	0.3	8E-11	0.4	2E-08	0.5	**3.E-06**	0.7	NA	NA	**3E-06**	**1.2**
AOC MM – Building A385	2E-10	0.5	8E-09	0.003	NA	NA	8.E-09	0.5	3E-11	**1.3**	8E-09	**1.4**	1.E-07	0.02	NA	NA	1E-07	**1.4**
AOC N – Suspected Landfill	4E-06	0.4	3E-07	0.0007	NA	NA	4.E-06	0.4	4E-08	0.7	2E-07	0.4	**7.E-06**	0.005	NA	NA	**7E-06**	0.4
AOC NN - Former Building 30	7E-11	0.00002	6E-09	0.002	NA	NA	6.E-09	0.002	1E-11	0.0001	3E-09	0.0001	8.E-08	0.01	NA	NA	8E-08	0.01
AOC O – U.S. Forest Service Area/Reported Solid Waste Landfill	5E-06	0.6	2E-08	0.003	NA	NA	5.E-06	0.60	4E-08	0.7	3E-08	0.4	4.E-07	0.02	NA	NA	4E-07	0.5
AOC OO – Former PAC Wash Rack Area Drain	6E-10	0.4	3E-07	0.09	NA	NA	3.E-07	0.5	1E-10	0.5	3E-08	0.5	**4.E-06**	0.8	NA	NA	**4E-06**	**1.3**
AOC Z – Waste Water Discharge from Building A495	2E-10	0.00006	6E-08	0.02	9.E-08	0.003	9E-08	0.003	3E-11	0.0003	8E-09	0.0003	9.E-07	0.2	8.E-07	0.02	8E-07	0.02
Off-Site[1]																		
Off-Site Vapor Migration into Indoor Air	NA	NA	9E-06	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.E-06	0.009	NA	NA

Notes:

ft bgs = feet below ground surface

NA = not applicable

[1] - For the off-site scenario, the resident is not hypothetical.

- exceeds target hazard level of 1.
- exceeds target risk level of 1×10^{-5} for workers or 1×10^{-6} for residents.
- below the target risk level of 1×10^{-5} for workers, 1×10^{-6} for residents, or below taget hazard level of 1.

Table 6-13
AOC DD: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)[2]		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	7,697	ND	ND
1,1-Dichloroethane	ND	169	7,694	ND	ND
1,1-Dichloroethene	ND	-	378	ND	ND
1,2,3-Trichlorobenzene	ND	-	307	ND	ND
1,2,3-Trichloropropane	ND	0.21	21	ND	ND
1,2,4-Trichlorobenzene	ND	1,128	259	ND	ND
1,2,4-Trimethylbenzene	ND	-	1,790	ND	ND
1,2-Dichlorobenzene	ND	-	9,498	ND	ND
1,2-Dichloroethane	ND	22	149	ND	ND
1,3-Dichlorobenzene	ND	-	8,999	ND	ND
1,4-Dichlorobenzene	ND	117	25,634	ND	ND
2-Butanone (MEK)	ND	-	218,909	ND	ND
Acetone	ND	-	715,432	ND	ND
Benzene	0.0013	14.8	48	8.8E-11	2.7E-05
Bromoform	ND	846	3,208	ND	ND
Tert-butyl alcohol	ND	-	2,331,832	ND	ND
Carbon disulfide	ND	-	3,786	ND	ND
Carbon Tetrachloride	ND	4.6	263	ND	ND
Chlorobenzene	ND	-	1,365	ND	ND
Chloroform	ND	15	1,114	ND	ND
Chloromethane	ND	-	509	ND	ND
Ethylbenzene	ND	259	20,792	ND	ND
Methylene chloride	ND	265	2,652	ND	ND
Tetrachloroethene	ND	27	358	ND	ND
Toluene	0.00075	-	5,448	-	1.4E-07
Trichloroethene	ND	64	20	ND	ND
Trichlorofluoromethane	ND	-	5,641	ND	ND
o-xylene	ND	-	2,850	ND	ND
m,p-xylene	ND	-	2,537	ND	ND
TPHs					
TPH-gas	ND	-	4,046	ND	ND
TPH-diesel	456	-	1,105	-	4.1E-01
Estimated Cumulative Risk and Hazard Index				**9E-11**	**0.4**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 2 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-14
AOC DD: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)[2]		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,748	ND	ND
1,1-Dichloroethane	ND	966	1,761	ND	ND
1,1-Dichloroethene	ND	-	86	ND	ND
1,2,3-Trichlorobenzene	ND	-	76	ND	ND
1,2,3-Trichloropropane	ND	1.28	4.9	ND	ND
1,2,4-Trichlorobenzene	ND	8,543	59	ND	ND
1,2,4-Trimethylbenzene	ND	-	422	ND	ND
1,2-Dichlorobenzene	ND	-	2,206	ND	ND
1,2-Dichloroethane	ND	126	34	ND	ND
1,3-Dichlorobenzene	ND	-	2,087	ND	ND
1,4-Dichlorobenzene	ND	664	6,315	ND	ND
2-Butanone (MEK)	ND	-	53,910	ND	ND
Acetone	ND	-	195,831	ND	ND
Benzene	0.0013	85	11	1.5E-11	1.2E-04
Bromoform	ND	5,171	754	ND	ND
Tert-butyl alcohol	ND	-	706,193	ND	ND
Carbon disulfide	ND	-	866	ND	ND
Carbon Tetrachloride	ND	26	61	ND	ND
Chlorobenzene	ND	-	314	ND	ND
Chloroform	ND	86	259	ND	ND
Chloromethane	ND	-	116	ND	ND
Ethylbenzene	ND	1,500	4,940	ND	ND
Methylene chloride	ND	1,546	665	ND	ND
Tetrachloroethene	ND	174	82	ND	ND
Toluene	0.00075	-	1,255	-	6.0E-07
Trichloroethene	ND	371	4.5	ND	ND
Trichlorofluoromethane	ND	-	1,286	ND	ND
o-xylene	ND	-	649	ND	ND
m,p-xylene	ND	-	577	ND	ND
TPHs					
TPH-gas	ND	-	939	ND	ND
TPH-diesel	235	-	254	-	9.2E-01
Estimated Cumulative Risk and Hazard Index				**2E-11**	**0.9**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-15
AOC DD: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,999	ND	ND
1,1-Dichloroethane	ND	4.2	1,840	ND	ND
1,1-Dichloroethene	ND	-	97	ND	ND
1,2,3-Trichlorobenzene	ND	-	41	ND	ND
1,2,3-Trichloropropane	ND	0.0015	5.5	ND	ND
1,2,4-Trichlorobenzene	ND	24	64	ND	ND
1,2,4-Trimethylbenzene	ND	-	324	ND	ND
1,2-Dichlorobenzene	ND	-	1,971	ND	ND
1,2-Dichloroethane	ND	0.55	37	ND	ND
1,3-Dichlorobenzene	ND	-	1,888	ND	ND
1,4-Dichlorobenzene	ND	2.9	3,511	ND	ND
2-Butanone (MEK)	ND	-	30,038	ND	ND
Acetone	ND	-	62,857	ND	ND
Benzene	0.0013	0.37	12	3.5E-09	1.1E-04
Bromoform	ND	20	601	ND	ND
Tert-butyl alcohol	ND	-	156,357	ND	ND
Carbon disulfide	ND	-	907	ND	ND
Carbon Tetrachloride	ND	0.114	59	ND	ND
Chlorobenzene	ND	-	306	ND	ND
Chloroform	ND	0.38	228	ND	ND
Chloromethane	ND	-	126	ND	ND
Ethylbenzene	ND	6.4	3,589	ND	ND
Methylene chloride	ND	1.9	331	ND	ND
Tetrachloroethene	ND	0.63	82	ND	ND
Toluene	0.00075	-	1,221	-	6.1E-07
Trichloroethene	ND	0.94	4.7	ND	ND
Trichlorofluoromethane	ND	-	1,413	ND	ND
o-xylene	ND	-	722	ND	ND
m,p-xylene	ND	-	645	ND	ND
TPHs					
TPH-gas	ND	-	843	ND	ND
TPH-diesel	235	-	255	-	9.2E-01
Estimated Cumulative Risk and Hazard Index				**4E-09**	**0.9**

Definitions:

- bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-16
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.7	2.00E+03	1.20E+05	8.5E-09	1.4E-05
Chloroform	1.1	4.93E+03	3.97E+05	2.2E-09	2.8E-06
1,1-Dichloroethane	ND	6.47E+04	2.96E+06	ND	ND
1,2-Dichloroethane	ND	6.08E+03	3.95E+04	ND	ND
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	ND	----	1.74E+05	ND	ND
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	ND	1.34E+04	1.91E+04	ND	ND
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	610	2.42E+04	7.09E+03	2.5E-07	8.6E-02
1,2,3-Trichloropropane	0.059	6.00E+01	4.82E+03	9.8E-09	1.2E-05
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	0.90	1.69E+04	1.24E+05	5.3E-10	7.2E-06
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-07	0.09

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-17
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L) Carcinogenic	Non-carcinogenic	Residential Risk Screen: Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.7	2.29E+01	1.43E+04	7.4E-08	1.2E-04
Chloroform	1.1	5.65E+01	4.73E+04	1.9E-08	2.3E-05
1,1-Dichloroethane	ND	7.41E+02	3.52E+05	ND	ND
1,2-Dichloroethane	ND	6.96E+01	4.71E+03	ND	ND
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	ND	----	2.07E+04	ND	ND
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	ND	1.53E+02	2.28E+03	ND	ND
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	610	1.94E+02	8.44E+02	3.1E-06	7.2E-01
1,2,3-Trichloropropane	0.059	2.57E-01	5.74E+02	2.3E-07	1.0E-04
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	0.9	1.93E+02	1.48E+04	4.7E-09	6.1E-05
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-06	0.7

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-18
AOC EE: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	0.00065	-	6,037	-	1.1E-07
1,1-Dichloroethane	0.00072	133	6,073	5.4E-12	1.2E-07
1,1-Dichloroethene	0.03600	-	297	-	1.2E-04
1,2,3-Trichlorobenzene	ND	-	259	ND	ND
1,2,3-Trichloropropane	ND	0.18	17	ND	ND
1,2,4-Trichlorobenzene	ND	1,128	204	ND	ND
1,2,4-Trimethylbenzene	ND	-	1,451	ND	ND
1,2-Dichlorobenzene	ND	-	7,592	ND	ND
1,2-Dichloroethane	ND	17	117	ND	ND
1,3-Dichlorobenzene	ND	-	7,186	ND	ND
1,4-Dichlorobenzene	ND	92	21,552	ND	ND
2-Butanone (MEK)	0.00460	-	183,996	-	2.5E-08
Acetone	0.00670	-	657,481	-	1.0E-08
Benzene	0.00370	12	37	3.2E-10	9.9E-05
Bromoform	ND	707	2,591	ND	ND
Tert-butyl alcohol	0.00560	-	2,330,684	-	2.4E-09
Carbon disulfide	ND	-	2,988	ND	ND
Carbon Tetrachloride	ND	3.6	209	ND	ND
Chlorobenzene	ND	-	1,084	ND	ND
Chloroform	ND	12	891	ND	ND
Chloromethane	ND	-	400	ND	ND
Ethylbenzene	0.00053	207	16,948	2.6E-12	3.1E-08
Methylene chloride	ND	213	2,263	ND	ND
Tetrachloroethene	0.00016	24	283	6.8E-12	5.6E-07
Toluene	0.00320	-	4,324	-	7.4E-07
Trichloroethene	0.00040	51	16	7.8E-12	2.6E-05
Trichlorofluoromethane	ND	-	4,437	ND	ND
o-xylene	ND	-	2,240	ND	ND
m,p-xylene	0.00068	-	1,993	-	3.4E-07
TPHs					
TPH-gas	3.6	-	3,233	-	1.1E-03
TPH-diesel	122	-	875	-	1.4E-01
Estimated Cumulative Risk and Hazard Index				**3E-10**	**0.1**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.

1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 2 feet bgs.

2 Protective of the dermal contact, ingestion, and inhalation pathways.

3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-19
AOC EE: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	0.00065	-	1,352	-	4.8E-07
1,1-Dichloroethane	0.00072	750.0	1,369	9.6E-13	5.3E-07
1,1-Dichloroethene	0.03600	-	67	-	5.4E-04
1,2,3-Trichlorobenzene	ND	-	62	ND	ND
1,2,3-Trichloropropane	ND	1.0	4	ND	ND
1,2,4-Trichlorobenzene	ND	8,543	46	ND	ND
1,2,4-Trimethylbenzene	ND	-	336	ND	ND
1,2-Dichlorobenzene	ND	-	1,732	ND	ND
1,2-Dichloroethane	ND	99	26	ND	ND
1,3-Dichlorobenzene	ND	-	1,637	ND	ND
1,4-Dichlorobenzene	ND	515	5,181	ND	ND
2-Butanone (MEK)	0.00460	-	44,216	-	1.0E-07
Acetone	0.00670	-	175,916	-	3.8E-08
Benzene	0.00370	66	8	5.6E-11	4.4E-04
Bromoform	ND	4,217	597	ND	ND
Tert-butyl alcohol	0.00560	-	705,699	-	7.9E-09
Carbon disulfide	ND	-	673	ND	ND
Carbon Tetrachloride	ND	20	47	ND	ND
Chlorobenzene	ND	-	245	ND	ND
Chloroform	ND	67	204	ND	ND
Chloromethane	ND	-	90	ND	ND
Ethylbenzene	0.00053	1,177	3,943	4.5E-13	1.3E-07
Methylene chloride	ND	1,219	553	ND	ND
Tetrachloroethene	0.00016	147	64	1.1E-12	2.5E-06
Toluene	0.00320	-	980	-	3.3E-06
Trichloroethene	0.00040	291	4	1.4E-12	1.1E-04
Trichlorofluoromethane	ND	-	996	ND	ND
o-xylene	ND	-	503	ND	ND
m,p-xylene	0.00068	-	447	-	1.5E-06
TPHs					
TPH-gas	3.6	-	737	-	4.9E-03
TPH-diesel	39	-	198	-	2.0E-01
Estimated Cumulative Risk and Hazard Index				**6E-11**	**0.2**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-20
AOC EE: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	0.00065	-	1,456	-	4.5E-07
1,1-Dichloroethane	0.00072	3.1	1,380	2.3E-10	5.2E-07
1,1-Dichloroethene	0.036	-	71	-	5.1E-04
1,2,3-Trichlorobenzene	ND	-	36	ND	ND
1,2,3-Trichloropropane	ND	0.0013	4.0	ND	ND
1,2,4-Trichlorobenzene	ND	24	47	ND	ND
1,2,4-Trimethylbenzene	ND	-	266	ND	ND
1,2-Dichlorobenzene	ND	-	1,550	ND	ND
1,2-Dichloroethane	ND	0.41	27	ND	ND
1,3-Dichlorobenzene	ND	-	1,479	ND	ND
1,4-Dichlorobenzene	ND	2.1	3,092	ND	ND
2-Butanone (MEK)	0.0046	-	26,444	-	1.7E-07
Acetone	0.0067	-	60,415	-	1.1E-07
Benzene	0.0037	0.27	8.9	1.4E-08	4.2E-04
Bromoform	ND	16.1	487	ND	ND
Tert-butyl alcohol	0.0056	-	156,330	-	3.6E-08
Carbon disulfide	ND	-	680	ND	ND
Carbon Tetrachloride	ND	0.084	45	ND	ND
Chlorobenzene	ND	-	235	ND	ND
Chloroform	ND	0.28	180	ND	ND
Chloromethane	ND	-	93	ND	ND
Ethylbenzene	0.00053	4.8	2,980	1.1E-10	1.8E-07
Methylene chloride	ND	1.9	297	ND	ND
Tetrachloroethene	0.00016	0.53	62	3.0E-10	2.6E-06
Toluene	0.0032	-	936	-	3.4E-06
Trichloroethene	0.00040	0.94	3.6	4.3E-10	1.1E-04
Trichlorofluoromethane	ND	-	1,043	ND	ND
o-xylene	ND	-	531	ND	ND
m,p-xylene	0.00068	-	473	-	1.4E-06
TPHs					
TPH-gas	3.6	-	662	-	5.4E-03
TPH-diesel	39	-	193	-	2.0E-01
Estimated Cumulative Risk and Hazard Index				**1E-08**	**0.2**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-21
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.7	2.00E+03	1.20E+05	8.5E-09	1.4E-05
Chloroform	1.1	4.93E+03	3.97E+05	2.2E-09	2.8E-06
1,1-Dichloroethane	ND	6.47E+04	2.96E+06	ND	ND
1,2-Dichloroethane	ND	6.08E+03	3.95E+04	ND	ND
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	ND	----	1.74E+05	ND	ND
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	ND	1.34E+04	1.91E+04	ND	ND
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	610	2.42E+04	7.09E+03	2.5E-07	8.6E-02
1,2,3-Trichloropropane	0.059	6.00E+01	4.82E+03	9.8E-09	1.2E-05
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	0.9	1.69E+04	1.24E+05	5.3E-10	7.2E-06
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-07	0.09

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-22
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L)		Residential Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.7	2.29E+01	1.43E+04	7.4E-08	1.2E-04
Chloroform	1.1	5.65E+01	4.73E+04	1.9E-08	2.3E-05
1,1-Dichloroethane	ND	7.41E+02	3.52E+05	ND	ND
1,2-Dichloroethane	ND	6.96E+01	4.71E+03	ND	ND
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	ND	----	2.07E+04	ND	ND
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	ND	1.53E+02	2.28E+03	ND	ND
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	610	1.94E+02	8.44E+02	3.1E-06	7.2E-01
1,2,3-Trichloropropane	0.059	2.57E-01	5.74E+02	2.3E-07	1.0E-04
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	0.9	1.93E+02	1.48E+04	4.7E-09	6.1E-05
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-06	0.7

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-23
Maximum Estimated Risk for Potential Commercial Vapor Intrusion Exposures from Shallow Soil Gas in AOC EE (2016 Data)[1]

Chemical	Maximum Detect ($\mu g/m^3$)	Default Commercial Soil Gas Screening Levels ($\mu g/m^3$)[2]		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[3]	Maximum Estimated Hazard Quotient[4]
Chloroform (Trichloromethane)	ND<3	1.06E+04	8.60E+05	ND	ND
1,1-Dichloroethane	9.8	1.54E+05	7.00E+06	6.4E-10	1.4E-06
1,1-Dichloroethene	7,820	----	6.20E+05	----	1.3E-02
Propene	3.9	----	2.60E+07	----	1.5E-07
Tetrachloroethene	ND<3	4.00E+04	3.60E+05	ND	ND
Trichloroethene	ND<3	6.00E+04	1.76E+04	ND	ND
1,1,1-Trichloroethane	47	----	8.80E+06	----	5.3E-06
Maximum Estimated Cumulative Risk and Hazard Index[5]				6.E-10	0.01

Acronyms and Abbreviations:

$\mu g/m^3$ - micrograms per cubic meter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] 2016 soil gas data was collected from a depth of 5 feet.

[2] Listed soil gas screening criteria are the default soil gas RBSLs summarized in Appendix B.

[3] Estimated cancer risk = (soil gas concentration/cancer soil gas screening level) x 10^{-5}.

[4] Estimated hazard = (soil gas concentration/non-cancer soil gas screening level).

[5] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-24
Maximum Estimated Risk for Potential Residential Vapor Intrusion Exposures from Shallow Soil Gas in AOC EE (2016 Data)[1]
Chino Airport, Chino, California

Chemical	Maximum Detect ($\mu g/m^3$)	Default Residential Soil Gas Screening Levels ($\mu g/m^3$)[2]		Residential Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[3]	Maximum Estimated Hazard Quotient[4]
Chloroform (Trichloromethane)	ND<3	1.20E+02	1.00E+05	ND	ND
1,1-Dichloroethane	9.8	1.80E+03	8.30E+05	5.4E-08	1.2E-05
1,1-Dichloroethene	7,820	----	7.30E+04	----	1.1E-01
Propene	3.9	----	3.10E+06	----	1.3E-06
Tetrachloroethene	ND<3	4.60E+02	4.20E+04	ND	ND
Trichloroethene	ND<3	4.80E+02	2.10E+03	ND	ND
1,1,1-Trichloroethane	47	----	1.00E+06	----	4.7E-05
Maximum Estimated Cumulative Risk and Hazard Index[5]				5.E-08	0.1

Acronyms and Abbreviations:

$\mu g/m^3$ - micrograms per cubic meter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] 2016 soil gas data was collected from a depth of 5 feet.

[2] Listed soil gas screening criteria are the default soil gas RBSLs summarized in Appendix B.

[3] Estimated cancer risk = (soil gas concentration/cancer soil gas screening level) x 10^{-6}.

[4] Estimated hazard = (soil gas concentration/non-cancer soil gas screening level).

[5] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-25
AOC FF: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	8,308	ND	ND
1,1-Dichloroethane	ND	182	8,285	ND	ND
1,1-Dichloroethene	ND	-	408	ND	ND
1,2,3-Trichlorobenzene	ND	-	323	ND	ND
1,2,3-Trichloropropane	ND	0.23	23	ND	ND
1,2,4-Trichlorobenzene	ND	1,128	279	ND	ND
1,2,4-Trimethylbenzene	ND	-	1,909	ND	ND
1,2-Dichlorobenzene	ND	-	10,181	ND	ND
1,2-Dichloroethane	ND	24	160	ND	ND
1,3-Dichlorobenzene	ND	-	9,649	ND	ND
1,4-Dichlorobenzene	ND	126	27,001	ND	ND
2-Butanone (MEK)	ND	-	230,604	ND	ND
Acetone	0.00740	-	732,692	-	1.0E-08
Benzene	0.00100	16	51	6.3E-11	1.9E-05
Bromoform	ND	893	3,426	ND	ND
Tert-butyl alcohol	ND	-	2,332,139	ND	ND
Carbon disulfide	ND	-	4,077	ND	ND
Carbon Tetrachloride	ND	4.9	283	ND	ND
Chlorobenzene	ND	-	1,467	ND	ND
Chloroform	ND	16	1,194	ND	ND
Chloromethane	ND	-	548	ND	ND
Ethylbenzene	ND	277	22,134	ND	ND
Methylene chloride	0.00500	283	2,779	1.8E-11	1.8E-06
Tetrachloroethene	ND	28	384	ND	ND
Toluene	0.00062	-	5,854	-	1.1E-07
Trichloroethene	ND	68	21	ND	ND
Trichlorofluoromethane	ND	-	6,083	ND	ND
o-xylene	ND	-	3,074	ND	ND
m,p-xylene	ND	-	2,736	ND	ND
Estimated Cumulative Risk and Hazard Index				**8E-11**	**0.00002**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-26
AOC FF: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,896	ND	ND
1,1-Dichloroethane	ND	1,045	1,906	ND	ND
1,1-Dichloroethene	ND	-	93	ND	ND
1,2,3-Trichlorobenzene	ND	-	81	ND	ND
1,2,3-Trichloropropane	ND	1.4	5.3	ND	ND
1,2,4-Trichlorobenzene	ND	8,543	64	ND	ND
1,2,4-Trimethylbenzene	ND	-	454	ND	ND
1,2-Dichlorobenzene	ND	-	2,378	ND	ND
1,2-Dichloroethane	ND	137	37	ND	ND
1,3-Dichlorobenzene	ND	-	2,251	ND	ND
1,4-Dichlorobenzene	ND	720	6,704	ND	ND
2-Butanone (MEK)	ND	-	57,241	ND	ND
Acetone	0.00740	-	201,895	-	3.7E-08
Benzene	0.00100	92	12	1.1E-11	8.5E-05
Bromoform	ND	5,502	810	ND	ND
Tert-butyl alcohol	ND	-	706,324	ND	ND
Carbon disulfide	ND	-	938	ND	ND
Carbon Tetrachloride	ND	28	65	ND	ND
Chlorobenzene	ND	-	340	ND	ND
Chloroform	ND	93	279	ND	ND
Chloromethane	ND	-	126	ND	ND
Ethylbenzene	ND	1,618	5,295	ND	ND
Methylene chloride	0.00500	1,665	703	3.0E-12	7.1E-06
Tetrachloroethene	ND	183	89	ND	ND
Toluene	0.00062	-	1,356	-	4.6E-07
Trichloroethene	ND	400	4.9	ND	ND
Trichlorofluoromethane	ND	-	1,393	ND	ND
o-xylene	ND	-	703	ND	ND
m,p-xylene	ND	-	626	ND	ND
Estimated Cumulative Risk and Hazard Index				**1E-11**	**0.00009**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-27
AOC FF: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,999	ND	ND
1,1-Dichloroethane	ND	4.2	1,840	ND	ND
1,1-Dichloroethene	ND	-	97	ND	ND
1,2,3-Trichlorobenzene	ND	-	41	ND	ND
1,2,3-Trichloropropane	ND	0.0015	6	ND	ND
1,2,4-Trichlorobenzene	ND	24	64	ND	ND
1,2,4-Trimethylbenzene	ND	-	324	ND	ND
1,2-Dichlorobenzene	ND	-	1,971	ND	ND
1,2-Dichloroethane	ND	0.55	37	ND	ND
1,3-Dichlorobenzene	ND	-	1,888	ND	ND
1,4-Dichlorobenzene	ND	2.9	3,511	ND	ND
2-Butanone (MEK)	ND	-	30,038	ND	ND
Acetone	0.00740	-	62,857	-	1.2E-07
Benzene	0.00100	0.37	12	2.7E-09	8.2E-05
Bromoform	ND	20	601	ND	ND
Tert-butyl alcohol	ND	-	156,357	ND	ND
Carbon disulfide	ND	-	907	ND	ND
Carbon Tetrachloride	ND	0.114	59	ND	ND
Chlorobenzene	ND	-	306	ND	ND
Chloroform	ND	0.38	228	ND	ND
Chloromethane	ND	-	126	ND	ND
Ethylbenzene	ND	6.4	3,589	ND	ND
Methylene chloride	0.00500	1.9	331	2.7E-09	1.5E-05
Tetrachloroethene	ND	0.63	82	ND	ND
Toluene	0.00062	-	1,221	-	5.1E-07
Trichloroethene	ND	0.94	5	ND	ND
Trichlorofluoromethane	ND	-	1,413	ND	ND
o-xylene	ND	-	722	ND	ND
m,p-xylene	ND	-	645	ND	ND
Estimated Cumulative Risk and Hazard Index				**5E-09**	**0.0001**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-28
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.7	2.00E+03	1.20E+05	8.5E-09	1.4E-05
Chloroform	1.1	4.93E+03	3.97E+05	2.2E-09	2.8E-06
1,1-Dichloroethane	ND	6.47E+04	2.96E+06	ND	ND
1,2-Dichloroethane	ND	6.08E+03	3.95E+04	ND	ND
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	ND	----	1.74E+05	ND	ND
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	ND	1.34E+04	1.91E+04	ND	ND
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	610	2.42E+04	7.09E+03	2.5E-07	8.6E-02
1,2,3-Trichloropropane	0.059	6.00E+01	4.82E+03	9.8E-09	1.2E-05
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	0.9	1.69E+04	1.24E+05	5.3E-10	7.2E-06
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-07	0.09

Definitions:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-29
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L) Carcinogenic	Residential On-Site Groundwater RBSL[1] (µg/L) Non-carcinogenic	Residential Risk Screen: Maximum Estimated Risk[2]	Residential Risk Screen: Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.7	2.29E+01	1.43E+04	7.4E-08	1.2E-04
Chloroform	1.1	5.65E+01	4.73E+04	1.9E-08	2.3E-05
1,1-Dichloroethane	ND	7.41E+02	3.52E+05	ND	ND
1,2-Dichloroethane	ND	6.96E+01	4.71E+03	ND	ND
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	ND	----	2.07E+04	ND	ND
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	ND	1.53E+02	2.28E+03	ND	ND
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	610	1.94E+02	8.44E+02	3.1E-06	7.2E-01
1,2,3-Trichloropropane	0.059	2.57E-01	5.74E+02	2.3E-07	1.0E-04
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	0.90	1.93E+02	1.48E+04	4.7E-09	6.1E-05
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-06	0.7

Definitions:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-30
AOC G: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	6,037	ND	ND
1,1-Dichloroethane	ND	133	6,073	ND	ND
1,1-Dichloroethene	ND	-	297	ND	ND
1,2,3-Trichlorobenzene	ND	-	259	ND	ND
1,2,3-Trichloropropane	0.0042	0.18	17	2.4E-08	2.5E-04
1,2,4-Trichlorobenzene	ND	1,128	204	ND	ND
1,2,4-Trimethylbenzene	ND	-	1,451	ND	ND
1,2-Dichlorobenzene	ND	-	7,592	ND	ND
1,2-Dichloroethane	0.01900	17	117	1.1E-09	1.6E-04
1,3-Dichlorobenzene	ND	-	7,186	ND	ND
1,4-Dichlorobenzene	ND	92	21,552	ND	ND
2-Butanone (MEK)	0.02800	-	183,996	-	1.5E-07
Acetone	0.03500	-	657,481	-	5.3E-08
Benzene	0.02600	12	37	2.2E-09	6.9E-04
Bromoform	0.00140	707	2,591	2.0E-12	5.4E-07
Tert-butyl alcohol	0.00480	-	2,330,684	-	2.1E-09
Carbon disulfide	0.00052	-	2,988	-	1.7E-07
Carbon Tetrachloride	ND	3.6	209	ND	ND
Chlorobenzene	ND	-	1,084	ND	ND
Chloroform	0.00160	12	891	1.3E-10	1.8E-06
Chloromethane	0.00030	-	400	-	7.5E-07
Ethylbenzene	0.00130	207	16,948	6.3E-12	7.7E-08
Methylene chloride	ND	213	2,263	ND	ND
Naphthalene	0.00130	56	456	2.3E-11	2.9E-06
Tetrachloroethene	0.00022	24	283	9.3E-12	7.8E-07
Toluene	0.01500	-	4,324	-	3.5E-06
Trichloroethene	0.00080	51	16	1.6E-11	5.1E-05
Trichlorofluoromethane	ND	-	4,437	ND	ND
o-xylene	0.00070	-	2,240	-	3.1E-07
m,p-xylene	0.00170	-	1,993	-	8.5E-07
TPHs					
TPH-gas	1.0	-	3,233	-	3.1E-04
TPH-diesel	210	-	875	-	2.4E-01
Estimated Cumulative Risk and Hazard Index				**3E-08**	**0.2**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.

1 Conservatively based on maximum from all depths with exception of 1,2,3-trichloropropane and TPH-gas/TPH-diesel.
1,2,3-trichloropropane 95%UCL all depths; TPH = 95%UCL 0 to 2 feet bgs.

2 Protective of the dermal contact, ingestion, and inhalation pathways.

3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-31
AOC G: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,352	ND	ND
1,1-Dichloroethane	ND	750	1,369	ND	ND
1,1-Dichloroethene	ND	-	67	ND	ND
1,2,3-Trichlorobenzene	ND	-	62	ND	ND
1,2,3-Trichloropropane	0.00416	1.0	3.8	4.1E-09	1.1E-03
1,2,4-Trichlorobenzene	ND	8,543	46	ND	ND
1,2,4-Trimethylbenzene	ND	-	336	ND	ND
1,2-Dichlorobenzene	ND	-	1,732	ND	ND
1,2-Dichloroethane	0.01900	99	26	1.9E-10	7.2E-04
1,3-Dichlorobenzene	ND	-	1,637	ND	ND
1,4-Dichlorobenzene	ND	515	5,181	ND	ND
2-Butanone (MEK)	0.02800	-	44,216	-	6.3E-07
Acetone	0.03500	-	175,916	-	2.0E-07
Benzene	0.02600	66	8.4	3.9E-10	3.1E-03
Bromoform	0.00140	4,217	597	3.3E-13	2.3E-06
Tert-butyl alcohol	0.00480	-	705,699	-	6.8E-09
Carbon disulfide	0.00052	-	673	-	7.7E-07
Carbon Tetrachloride	ND	20	47	ND	ND
Chlorobenzene	ND	-	245	ND	ND
Chloroform	0.00160	67	204	2.4E-11	7.9E-06
Chloromethane	0.00030	-	90	-	3.3E-06
Ethylbenzene	0.00130	1,177	3,943	1.1E-12	3.3E-07
Methylene chloride	ND	1,219	553	ND	ND
Naphthalene	0.00130	345	103	3.8E-12	1.3E-05
Tetrachloroethene	0.00022	147	64	1.5E-12	3.4E-06
Toluene	0.01500	-	980	-	1.5E-05
Trichloroethene	0.00080	291	3.5	2.8E-12	2.3E-04
Trichlorofluoromethane	ND	-	996	ND	ND
o-xylene	0.00070	-	503	-	1.4E-06
m,p-xylene	0.00170	-	447	-	3.8E-06
TPHs					
TPH-gas	1.6	-	737	-	2.2E-03
TPH-diesel	87	-	198	-	4.4E-01
Estimated Cumulative Risk and Hazard Index				**5E-09**	**0.4**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.

1 Conservatively based on maximum from all depths with exception of 1,2,3-trichloropropane and TPH-gas/TPH-diesel.
1,2,3-trichloropropane 95%UCL all depths; TPH = 95%UCL 0 to 10 feet bgs.

2 Protective of the dermal contact, ingestion, and inhalation pathways.

3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).

Table 6-32
AOC G: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,456	ND	ND
1,1-Dichloroethane	ND	3.1	1,380	ND	ND
1,1-Dichloroethene	ND	-	71	ND	ND
1,2,3-Trichlorobenzene	ND	-	36	ND	ND
1,2,3-Trichloropropane	0.00416	0.0018	4.0	2.4E-06	1.0E-03
1,2,4-Trichlorobenzene	ND	24	47	ND	ND
1,2,4-Trimethylbenzene	ND	-	266	ND	ND
1,2-Dichlorobenzene	ND	-	1,550	ND	ND
1,2-Dichloroethane	0.01900	0.41	27	4.7E-08	7.0E-04
1,3-Dichlorobenzene	ND	-	1,479	ND	ND
1,4-Dichlorobenzene	ND	2.1	3,092	ND	ND
2-Butanone (MEK)	0.02800	-	26,444	-	1.1E-06
Acetone	0.03500	-	60,415	-	5.8E-07
Benzene	0.02600	0.27	9	9.5E-08	2.9E-03
Bromoform	0.00140	16	487	8.7E-11	2.9E-06
Tert-butyl alcohol	0.00480	-	156,330	-	3.1E-08
Carbon disulfide	0.00052	-	680	-	7.6E-07
Carbon Tetrachloride	ND	0.084	45	ND	ND
Chlorobenzene	ND	-	235	ND	ND
Chloroform	0.00160	0.28	180	5.8E-09	8.9E-06
Chloromethane	0.00030	-	93	-	3.2E-06
Ethylbenzene	0.00130	4.8	2,980	2.7E-10	4.4E-07
Methylene chloride	ND	1.9	297	ND	ND
Naphthalene	0.00130	1.7	106	7.5E-10	1.2E-05
Tetrachloroethene	0.00022	0.53	62	4.1E-10	3.5E-06
Toluene	0.01500	-	936	-	1.6E-05
Trichloroethene	0.00080	0.94	4	8.5E-10	2.3E-04
Trichlorofluoromethane	ND	-	1,043	ND	ND
o-xylene	0.00070	-	531	-	1.3E-06
m,p-xylene	0.00170	-	473	-	3.6E-06
TPHs					
TPH-gas	1.6	-	662	-	2.5E-03
TPH-diesel	87	-	193	-	4.5E-01
Estimated Cumulative Risk and Hazard Index				**3E-06**	**0.5**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.

1 Conservatively based on maximum from all depths with exception of 1,2,3-trichloropropane and TPH-gas/TPH-diesel.
1,2,3-trichloropropane 95%UCL all depths; TPH = 95%UCL 0 to 10 feet bgs.

2 Protective of the dermal contact, ingestion, and inhalation pathways.

3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).

Table 6-33
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.9	2.00E+03	1.20E+05	9.5E-09	1.6E-05
Chloroform	3.9	4.93E+03	3.97E+05	7.9E-09	9.8E-06
1,1-Dichloroethane	0.3	6.47E+04	2.96E+06	4.6E-11	1.0E-07
1,2-Dichloroethane	0.26	6.08E+03	3.95E+04	4.3E-10	6.6E-06
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	3.5	----	1.74E+05	----	2.0E-05
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	0.89	1.34E+04	1.91E+04	6.6E-10	4.7E-05
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	1.2	2.42E+04	7.09E+03	5.0E-10	1.7E-04
1,2,3-Trichloropropane	22	6.00E+01	4.82E+03	3.7E-06	4.6E-03
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	ND	1.69E+04	1.24E+05	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				4.E-06	0.005

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-34
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L)		Residential Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.9	2.29E+01	1.43E+04	8.3E-08	1.3E-04
Chloroform	3.9	5.65E+01	4.73E+04	6.9E-08	8.2E-05
1,1-Dichloroethane	0.3	7.41E+02	3.52E+05	4.0E-10	8.5E-07
1,2-Dichloroethane	0.26	6.96E+01	4.71E+03	3.7E-09	5.5E-05
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	3.5	----	2.07E+04	----	1.7E-04
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	0.89	1.53E+02	2.28E+03	5.8E-09	3.9E-04
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	1.2	1.94E+02	8.44E+02	6.2E-09	1.4E-03
1,2,3-Trichloropropane	22	2.57E-01	5.74E+02	8.6E-05	3.8E-02
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	ND	1.93E+02	1.48E+04	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				9.E-05	0.04

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-35
AOC GG: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	4,934	ND	ND
1,1-Dichloroethane	ND	109	4,985	ND	ND
1,1-Dichloroethene	ND	-	243	ND	ND
1,2,3-Trichlorobenzene	ND	-	223	ND	ND
1,2,3-Trichloropropane	ND	0.15	14	ND	ND
1,2,4-Trichlorobenzene	ND	1,128	167	ND	ND
1,2,4-Trimethylbenzene	0.00100	-	1,213	-	8.2E-07
1,2-Dichlorobenzene	ND	-	6,285	ND	ND
1,2-Dichloroethane	ND	14	96	ND	ND
1,3-Dichlorobenzene	ND	-	5,944	ND	ND
1,4-Dichlorobenzene	ND	75	18,499	ND	ND
2-Butanone (MEK)	0.04500	-	157,902	-	2.8E-07
Acetone	0.19000	-	606,571	-	3.1E-07
Benzene	0.01400	10	31	1.5E-09	4.6E-04
Bromoform	ND	604	2,160	ND	ND
Tert-butyl alcohol	0.00600	-	2,329,496	-	2.6E-09
Carbon disulfide	0.00033	-	2,452	-	1.3E-07
Carbon Tetrachloride	ND	3	172	ND	ND
Chlorobenzene	ND	-	893	ND	ND
Chloroform	ND	10	739	ND	ND
Chloromethane	ND	-	328	ND	ND
Ethylbenzene	0.00240	171	14,223	1.4E-11	1.7E-07
Methylene chloride	ND	177	1,965	ND	ND
Naphthalene	ND	51	376	ND	ND
Tetrachloroethene	ND	21	233	ND	ND
Toluene	0.01400	-	3,563	-	3.9E-06
Trichloroethene	ND	42	13	ND	ND
Trichlorofluoromethane	ND	-	3,633	ND	ND
o-xylene	0.00140	-	1,833	-	7.6E-07
m,p-xylene	0.00340	-	1,630	-	2.1E-06
TPHs					
TPH-gas	1.9	-	2,676	-	7.1E-04
TPH-diesel	164	-	720	-	2.3E-01
Estimated Cumulative Risk and Hazard Index				**1E-09**	**0.2**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 2 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-36
AOC GG: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,093	ND	ND
1,1-Dichloroethane	ND	608	1,110	ND	ND
1,1-Dichloroethene	ND	-	54	ND	ND
1,2,3-Trichlorobenzene	ND	-	53	ND	ND
1,2,3-Trichloropropane	ND	0.85	3.0	ND	ND
1,2,4-Trichlorobenzene	ND	8,543	37	ND	ND
1,2,4-Trimethylbenzene	0.00100	-	276	-	3.6E-06
1,2-Dichlorobenzene	ND	-	1,414	ND	ND
1,2-Dichloroethane	ND	80	21	ND	ND
1,3-Dichlorobenzene	ND	-	1,337	ND	ND
1,4-Dichlorobenzene	ND	417	4,362	ND	ND
2-Butanone (MEK)	0.04500	-	37,221	-	1.2E-06
Acetone	0.19000	-	159,019	-	1.2E-06
Benzene	0.01400	54	7	2.6E-10	2.1E-03
Bromoform	ND	3,535	491	ND	ND
Tert-butyl alcohol	0.00600	-	705,184	-	8.5E-09
Carbon disulfide	0.00033	-	546	-	6.0E-07
Carbon Tetrachloride	ND	16	38	ND	ND
Chlorobenzene	ND	-	200	ND	ND
Chloroform	ND	54	166	ND	ND
Chloromethane	ND	-	73	ND	ND
Ethylbenzene	0.00240	961	3,256	2.5E-12	7.4E-07
Methylene chloride	ND	999	471	ND	ND
Naphthalene	ND	311	84	ND	ND
Tetrachloroethene	ND	127	52	ND	ND
Toluene	0.01400	-	797	-	1.8E-05
Trichloroethene	ND	238	3	ND	ND
Trichlorofluoromethane	ND	-	807	ND	ND
o-xylene	0.00140	-	407	-	3.4E-06
m,p-xylene	0.00340	-	362	-	9.4E-06
TPHs					
TPH-gas	1.9	-	602	-	3.2E-03
TPH-diesel	157	-	161	-	9.7E-01
Estimated Cumulative Risk and Hazard Index				**3E-10**	**1**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.

1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.

2 Protective of the dermal contact, ingestion, and inhalation pathways.

3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-37
AOC GG: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,191	ND	ND
1,1-Dichloroethane	ND	2.5	1,146	ND	ND
1,1-Dichloroethene	ND	-	58	ND	ND
1,2,3-Trichlorobenzene	ND	-	33	ND	ND
1,2,3-Trichloropropane	ND	0.0015	3	ND	ND
1,2,4-Trichlorobenzene	ND	24	39	ND	ND
1,2,4-Trimethylbenzene	0.00100	-	231	-	4.3E-06
1,2-Dichlorobenzene	ND	-	1,319	ND	ND
1,2-Dichloroethane	ND	0.33	22	ND	ND
1,3-Dichlorobenzene	ND	-	1,257	ND	ND
1,4-Dichlorobenzene	ND	1.8	2,818	ND	ND
2-Butanone (MEK)	0.04500	-	24,088	-	1.9E-06
Acetone	0.19000	-	58,555	-	3.2E-06
Benzene	0.01400	0.22	7	6.2E-08	1.9E-03
Bromoform	ND	14	422	ND	ND
Tert-butyl alcohol	0.00600	-	156,308	-	3.8E-08
Carbon disulfide	0.00033	-	564	-	5.8E-07
Carbon Tetrachloride	ND	0.068	38	ND	ND
Chlorobenzene	ND	-	197	ND	ND
Chloroform	ND	0.23	154	ND	ND
Chloromethane	ND	-	77	ND	ND
Ethylbenzene	0.00240	4.0	2,617	6.0E-10	9.2E-07
Methylene chloride	ND	1.9	275	ND	ND
Naphthalene	ND	1.5	88	ND	ND
Tetrachloroethene	ND	0.47	52	ND	ND
Toluene	0.01400	-	786	-	1.8E-05
Trichloroethene	ND	0.94	3	ND	ND
Trichlorofluoromethane	ND	-	859	ND	ND
o-xylene	0.00140	-	436	-	3.2E-06
m,p-xylene	0.00340	-	389	-	8.7E-06
TPHs					
TPH-gas	1.9	-	563	-	3.4E-03
TPH-diesel	157	-	162	-	9.7E-01
Estimated Cumulative Risk and Hazard Index				**6E-08**	**1**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-38
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.7	2.00E+03	1.20E+05	8.5E-09	1.4E-05
Chloroform	1.1	4.93E+03	3.97E+05	2.2E-09	2.8E-06
1,1-Dichloroethane	ND	6.47E+04	2.96E+06	ND	ND
1,2-Dichloroethane	ND	6.08E+03	3.95E+04	ND	ND
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	ND	----	1.74E+05	ND	ND
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	ND	1.34E+04	1.91E+04	ND	ND
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	610	2.42E+04	7.09E+03	2.5E-07	8.6E-02
1,2,3-Trichloropropane	0.059	6.00E+01	4.82E+03	9.8E-09	1.2E-05
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	0.90	1.69E+04	1.24E+05	5.3E-10	7.2E-06
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-07	0.09

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-39
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs DD, EE, FF, GG, M)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L)		Residential Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.7	2.29E+01	1.43E+04	7.4E-08	1.2E-04
Chloroform	1.1	5.65E+01	4.73E+04	1.9E-08	2.3E-05
1,1-Dichloroethane	ND	7.41E+02	3.52E+05	ND	ND
1,2-Dichloroethane	ND	6.96E+01	4.71E+03	ND	ND
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	ND	----	2.07E+04	ND	ND
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	ND	1.53E+02	2.28E+03	ND	ND
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	610	1.94E+02	8.44E+02	3.1E-06	7.2E-01
1,2,3-Trichloropropane	0.059	2.57E-01	5.74E+02	2.3E-07	1.0E-04
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	0.9	1.93E+02	1.48E+04	4.7E-09	6.1E-05
Maximum Estimated Cumulative Risk and Hazard Index[4]				3.E-06	0.7

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW40 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-40
AOC H: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	5,642	ND	ND
1,1-Dichloroethane	ND	125	5,685	ND	ND
1,1-Dichloroethene	ND	-	277	ND	ND
1,2,3-Trichlorobenzene	ND	-	246	ND	ND
1,2,3-Trichloropropane	ND	0.17	16	ND	ND
1,2,4-Trichlorobenzene	0.00320	1,128	191	2.8E-12	1.7E-05
1,2,4-Trimethylbenzene	ND	-	1,367	ND	ND
1,2-Dichlorobenzene	0.12000	-	7,128	-	1.7E-05
1,2-Dichloroethane	ND	16	110	ND	ND
1,3-Dichlorobenzene	0.00830	-	6,745	-	1.2E-06
1,4-Dichlorobenzene	0.06600	86	20,493	7.7E-10	3.2E-06
2-Butanone (MEK)	0.01100	-	174,944	-	6.3E-08
Acetone	0.01700	-	640,645	-	2.7E-08
Benzene	0.00990	11	35	9.0E-10	2.8E-04
Bromoform	ND	671	2,439	ND	ND
Tert-butyl alcohol	ND	-	2,330,312	ND	ND
Carbon disulfide	0.00029	-	2,797	-	1.0E-07
Carbon Tetrachloride	ND	3.4	196	ND	ND
Chlorobenzene	0.00840	-	1,016	-	8.3E-06
Chloroform	ND	11	837	ND	ND
Chloromethane	ND	-	374	ND	ND
Ethylbenzene	0.00052	194	15,989	2.7E-12	3.3E-08
Methylene chloride	ND	200	2,161	ND	ND
Naphthalene	ND	54	428	ND	ND
Tetrachloroethene	0.00023	23	265	1.0E-11	8.7E-07
Toluene	0.00550	-	4,053	-	1.4E-06
Trichloroethene	0.00098	48	15	2.0E-11	6.7E-05
Trichlorofluoromethane	ND	-	4,149	ND	ND
o-xylene	ND	-	2,094	ND	ND
m,p-xylene	0.00066	-	1,863	-	3.5E-07
TPHs					
TPH-gas	1.9	-	3,035	-	6.3E-04
TPH-diesel	117	-	820	-	1.4E-01
Estimated Cumulative Risk and Hazard Index				**2E-09**	**0.1**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 2 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-41
AOC H: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,259	ND	ND
1,1-Dichloroethane	ND	699	1,276	ND	ND
1,1-Dichloroethene	ND	-	62	ND	ND
1,2,3-Trichlorobenzene	ND	-	59	ND	ND
1,2,3-Trichloropropane	ND	1.0	3.5	ND	ND
1,2,4-Trichlorobenzene	0.00320	8,543	43	3.7E-13	7.5E-05
1,2,4-Trimethylbenzene	ND	-	315	ND	ND
1,2-Dichlorobenzene	0.12000	-	1,618	-	7.4E-05
1,2-Dichloroethane	ND	92	25	ND	ND
1,3-Dichlorobenzene	0.00830	-	1,530	-	5.4E-06
1,4-Dichlorobenzene	0.06600	480	4,894	1.4E-10	1.3E-05
2-Butanone (MEK)	0.01100	-	41,764	-	2.6E-07
Acetone	0.01700	-	170,265	-	1.0E-07
Benzene	0.00990	62	8	1.6E-10	1.3E-03
Bromoform	ND	3,977	559	ND	ND
Tert-butyl alcohol	ND	-	705,538	ND	ND
Carbon disulfide	0.00029	-	628	-	4.6E-07
Carbon Tetrachloride	ND	19	44	ND	ND
Chlorobenzene	0.00840	-	229	-	3.7E-05
Chloroform	ND	62	190	ND	ND
Chloromethane	ND	-	84	ND	ND
Ethylbenzene	0.00052	1,100	3,699	4.7E-13	1.4E-07
Methylene chloride	ND	1,141	525	ND	ND
Naphthalene	ND	334	96	ND	ND
Tetrachloroethene	0.00023	140	60	1.6E-12	3.8E-06
Toluene	0.00550	-	914	-	6.0E-06
Trichloroethene	0.00098	272	3.3	3.6E-12	3.0E-04
Trichlorofluoromethane	ND	-	928	ND	ND
o-xylene	ND	-	468	ND	ND
m,p-xylene	0.00066	-	416	-	1.6E-06
TPHs					
TPH-gas	1.9	-	689	-	2.8E-03
TPH-diesel	72	-	185	-	3.9E-01
Estimated Cumulative Risk and Hazard Index				**3E-10**	**0.4**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.

1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.

2 Protective of the dermal contact, ingestion, and inhalation pathways.

3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-42
AOC H: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,361	ND	ND
1,1-Dichloroethane	ND	2.9	1,297	ND	ND
1,1-Dichloroethene	ND	-	67	ND	ND
1,2,3-Trichlorobenzene	ND	-	35	ND	ND
1,2,3-Trichloropropane	ND	0.0015	3.8	ND	ND
1,2,4-Trichlorobenzene	0.00320	24	44	1.3E-10	7.2E-05
1,2,4-Trimethylbenzene	ND	-	254	ND	ND
1,2-Dichlorobenzene	0.12000	-	1,469	-	8.2E-05
1,2-Dichloroethane	ND	0.38	26	ND	ND
1,3-Dichlorobenzene	0.00830	-	1,402	-	5.9E-06
1,4-Dichlorobenzene	0.06600	2.0	3,001	3.3E-08	2.2E-05
2-Butanone (MEK)	0.01100	-	25,658	-	4.3E-07
Acetone	0.01700	-	59,820	-	2.8E-07
Benzene	0.00990	0.26	8.3	3.9E-08	1.2E-03
Bromoform	ND	15	465	ND	ND
Tert-butyl alcohol	ND	-	156,323	ND	ND
Carbon disulfide	0.00029	-	639	-	4.5E-07
Carbon Tetrachloride	ND	0.078	43	ND	ND
Chlorobenzene	0.00840	-	221	-	3.8E-05
Chloroform	ND	0.26	171	ND	ND
Chloromethane	ND	-	88	ND	ND
Ethylbenzene	0.00052	4.5	2,856	1.2E-10	1.8E-07
Methylene chloride	ND	1.9	290	ND	ND
Naphthalene	ND	1.7	99	ND	ND
Tetrachloroethene	0.00023	0.51	59	4.5E-10	3.9E-06
Toluene	0.00550	-	883	-	6.2E-06
Trichloroethene	0.00098	0.94	3.3	1.0E-09	2.9E-04
Trichlorofluoromethane	ND	-	977	ND	ND
o-xylene	ND	-	497	ND	ND
m,p-xylene	0.00066	-	443	-	1.5E-06
TPHs					
TPH-gas	1.9	-	627	-	3.0E-03
TPH-diesel	72	-	182	-	3.9E-01
Estimated Cumulative Risk and Hazard Index				**7E-08**	**0.4**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-43
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOC H)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	ND	2.00E+03	1.20E+05	ND	ND
Chloroform	ND	4.93E+03	3.97E+05	ND	ND
1,1-Dichloroethane	ND	6.47E+04	2.96E+06	ND	ND
1,2-Dichloroethane	ND	6.08E+03	3.95E+04	ND	ND
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	ND	----	1.74E+05	ND	ND
cis-1,2-Dichloroethene	1.3	----	2.98E+04	----	4.4E-05
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	ND	1.34E+04	1.91E+04	ND	ND
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	2.2	2.42E+04	7.09E+03	9.1E-10	3.1E-04
1,2,3-Trichloropropane	ND	6.00E+01	4.82E+03	ND	ND
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	ND	1.69E+04	1.24E+05	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				9.E-10	0.0004

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW6 from April 2013 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-44
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOC H)
Chino Airport, Chino, California

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L)		Residential Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	ND	2.29E+01	1.43E+04	ND	ND
Chloroform	ND	5.65E+01	4.73E+04	ND	ND
1,1-Dichloroethane	ND	7.41E+02	3.52E+05	ND	ND
1,2-Dichloroethane	ND	6.96E+01	4.71E+03	ND	ND
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	ND	----	2.07E+04	ND	ND
cis-1,2-Dichloroethene	1.3	----	3.55E+03	----	3.7E-04
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	ND	1.53E+02	2.28E+03	ND	ND
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	2.2	1.94E+02	8.44E+02	1.1E-08	2.6E-03
1,2,3-Trichloropropane	ND	2.57E-01	5.74E+02	ND	ND
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	ND	1.93E+02	1.48E+04	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				1.E-08	0.003

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from well CAMW6 from April 2013 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-45
AOC HH: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	4,934	ND	ND
1,1-Dichloroethane	ND	109	4,985	ND	ND
1,1-Dichloroethene	ND	-	243	ND	ND
1,2,3-Trichlorobenzene	ND	-	223	ND	ND
1,2,3-Trichloropropane	ND	0.15	14	ND	ND
1,2,4-Trichlorobenzene	ND	1,128	167	ND	ND
1,2,4-Trimethylbenzene	ND	-	1,213	ND	ND
1,2-Dichlorobenzene	ND	-	6,285	ND	ND
1,2-Dichloroethane	ND	14	96	ND	ND
1,3-Dichlorobenzene	ND	-	5,944	ND	ND
1,4-Dichlorobenzene	ND	75	18,499	ND	ND
2-Butanone (MEK)	0.00570	-	157,902	-	3.6E-08
Acetone	0.02000	-	606,571	-	3.3E-08
Benzene	0.00550	9.6	31	5.7E-10	1.8E-04
Bromoform	ND	604	2,160	ND	ND
Tert-butyl alcohol	ND	-	2,329,496	ND	ND
Carbon disulfide	0.00037	-	2,452	-	1.5E-07
Carbon Tetrachloride	ND	2.9	172	ND	ND
Chlorobenzene	ND	-	893	ND	ND
Chloroform	ND	9.7	739	ND	ND
Chloromethane	ND	-	328	ND	ND
Ethylbenzene	0.00053	171	14,223	3.1E-12	3.7E-08
Methylene chloride	ND	177	1,965	ND	ND
Tetrachloroethene	ND	21	233	ND	ND
Toluene	0.00360	-	3,563	-	1.0E-06
Trichloroethene	0.01500	42	13	3.6E-10	1.2E-03
Trichlorofluoromethane	ND	-	3,633	ND	ND
o-xylene	ND	-	1,833	ND	ND
m,p-xylene	0.00070	-	1,630	-	4.3E-07
Estimated Cumulative Risk and Hazard Index				**9E-10**	**0.001**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-46
AOC HH: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,093	ND	ND
1,1-Dichloroethane	ND	608	1,110	ND	ND
1,1-Dichloroethene	ND	-	54	ND	ND
1,2,3-Trichlorobenzene	ND	-	53	ND	ND
1,2,3-Trichloropropane	ND	0.85	3.0	ND	ND
1,2,4-Trichlorobenzene	ND	8,543	37	ND	ND
1,2,4-Trimethylbenzene	ND	-	276	ND	ND
1,2-Dichlorobenzene	ND	-	1,414	ND	ND
1,2-Dichloroethane	ND	80	21	ND	ND
1,3-Dichlorobenzene	ND	-	1,337	ND	ND
1,4-Dichlorobenzene	ND	417	4,362	ND	ND
2-Butanone (MEK)	ND	-	37,221	ND	ND
Acetone	0.00740	-	159,019	-	4.7E-08
Benzene	0.00100	54	7	1.9E-11	1.5E-04
Bromoform	ND	3,535	491	ND	ND
Tert-butyl alcohol	ND	-	705,184	ND	ND
Carbon disulfide	ND	-	546	ND	ND
Carbon Tetrachloride	ND	16	38	ND	ND
Chlorobenzene	ND	-	200	ND	ND
Chloroform	ND	54	166	ND	ND
Chloromethane	ND	-	73	ND	ND
Ethylbenzene	ND	961	3,256	ND	ND
Methylene chloride	0.00500	999	471	5.0E-12	1.1E-05
Tetrachloroethene	ND	127	52	ND	ND
Toluene	0.00062	-	797	-	7.8E-07
Trichloroethene	ND	238	2.9	ND	ND
Trichlorofluoromethane	ND	-	807	ND	ND
o-xylene	ND	-	407	ND	ND
m,p-xylene	ND	-	362	ND	ND
Estimated Cumulative Risk and Hazard Index				**2E-11**	**0.0002**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-47
AOC HH: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,191	ND	ND
1,1-Dichloroethane	ND	2.5	1,146	ND	ND
1,1-Dichloroethene	ND	-	58	ND	ND
1,2,3-Trichlorobenzene	ND	-	33	ND	ND
1,2,3-Trichloropropane	ND	0.0	3.3	ND	ND
1,2,4-Trichlorobenzene	ND	24.0	39	ND	ND
1,2,4-Trimethylbenzene	ND	-	231	ND	ND
1,2-Dichlorobenzene	ND	-	1,319	ND	ND
1,2-Dichloroethane	ND	0.33	22	ND	ND
1,3-Dichlorobenzene	ND	-	1,257	ND	ND
1,4-Dichlorobenzene	ND	1.8	2,818	ND	ND
2-Butanone (MEK)	0.00570	-	24,088	-	2.4E-07
Acetone	0.02000	-	58,555	-	3.4E-07
Benzene	0.00550	0.22	7	2.5E-08	7.5E-04
Bromoform	ND	14	422	ND	ND
Tert-butyl alcohol	ND	-	156,308	ND	ND
Carbon disulfide	0.00037	-	564	-	6.6E-07
Carbon Tetrachloride	ND	0.068	38	ND	ND
Chlorobenzene	ND	-	197	ND	ND
Chloroform	ND	0.23	154	ND	ND
Chloromethane	ND	-	77	ND	ND
Ethylbenzene	0.00053	4.0	2,617	1.3E-10	2.0E-07
Methylene chloride	ND	1.9	275	ND	ND
Tetrachloroethene	ND	0.47	52	ND	ND
Toluene	0.00360	-	786	-	4.6E-06
Trichloroethene	0.01500	0.94	3.0	1.6E-08	5.1E-03
Trichlorofluoromethane	ND	-	859	ND	ND
o-xylene	ND	-	436	ND	ND
m,p-xylene	0.00070	-	389	-	1.8E-06
Estimated Cumulative Risk and Hazard Index				**4E-08**	**0.006**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-48
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.9	2.00E+03	1.20E+05	9.5E-09	1.6E-05
Chloroform	3.9	4.93E+03	3.97E+05	7.9E-09	9.8E-06
1,1-Dichloroethane	0.3	6.47E+04	2.96E+06	4.6E-11	1.0E-07
1,2-Dichloroethane	0.26	6.08E+03	3.95E+04	4.3E-10	6.6E-06
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	3.5	----	1.74E+05	----	2.0E-05
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	0.89	1.34E+04	1.91E+04	6.6E-10	4.7E-05
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	1.2	2.42E+04	7.09E+03	5.0E-10	1.7E-04
1,2,3-Trichloropropane	22	6.00E+01	4.82E+03	3.7E-06	4.6E-03
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	ND	1.69E+04	1.24E+05	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				4.E-06	0.005

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-49
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L) Carcinogenic	Residential On-Site Groundwater RBSL[1] (µg/L) Non-carcinogenic	Residential Risk Screen: Maximum Estimated Risk[2]	Residential Risk Screen: Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.9	2.29E+01	1.43E+04	8.3E-08	1.3E-04
Chloroform	3.9	5.65E+01	4.73E+04	6.9E-08	8.2E-05
1,1-Dichloroethane	0.3	7.41E+02	3.52E+05	4.0E-10	8.5E-07
1,2-Dichloroethane	0.26	6.96E+01	4.71E+03	3.7E-09	5.5E-05
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	3.5	----	2.07E+04	----	1.7E-04
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	0.89	1.53E+02	2.28E+03	5.8E-09	3.9E-04
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	1.2	1.94E+02	8.44E+02	6.2E-09	1.4E-03
1,2,3-Trichloropropane	22	2.57E-01	5.74E+02	8.6E-05	3.8E-02
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	ND	1.93E+02	1.48E+04	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				9.E-05	0.04

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-50
AOC JJ: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	14,504	ND	ND
1,1-Dichloroethane	ND	311	14,126	ND	ND
1,1-Dichloroethene	ND	-	710	ND	ND
1,2,3-Trichlorobenzene	ND	-	449	ND	ND
1,2,3-Trichloropropane	ND	0.35	40	ND	ND
1,2,4-Trichlorobenzene	ND	1,128	481	ND	ND
1,2,4-Trimethylbenzene	ND	-	2,977	ND	ND
1,2-Dichlorobenzene	ND	-	16,613	ND	ND
1,2-Dichloroethane	ND	39	276	ND	ND
1,3-Dichlorobenzene	ND	-	15,802	ND	ND
1,4-Dichlorobenzene	ND	217	37,877	ND	ND
2-Butanone (MEK)	ND	-	323,722	ND	ND
Acetone	0.01600	-	842,079	-	1.9E-08
Benzene	0.00045	27	89	1.7E-11	5.0E-06
Bromoform	ND	1,276	5,402	ND	ND
Tert-butyl alcohol	ND	-	2,333,792	ND	ND
Carbon disulfide	0.00066	-	6,954	-	9.5E-08
Carbon Tetrachloride	ND	8.4	474	ND	ND
Chlorobenzene	ND	-	2,452	ND	ND
Chloroform	ND	28	1,941	ND	ND
Chloromethane	ND	-	945	ND	ND
Ethylbenzene	ND	454	33,920	ND	ND
Methylene chloride	ND	455	3,749	ND	ND
Naphthalene	ND	74	1,020	ND	ND
Tetrachloroethene	ND	37	646	ND	ND
Toluene	0.00160	-	9,788	-	1.6E-07
Trichloroethene	ND	112	36	ND	ND
Trichlorofluoromethane	ND	-	10,511	ND	ND
o-xylene	ND	-	5,329	ND	ND
m,p-xylene	ND	-	4,748	ND	ND
TPHs					
TPH-gas	ND	-	7,086	ND	ND
TPH-diesel	335	-	2,005	-	1.7E-01
Estimated Cumulative Risk and Hazard Index				**2E-11**	**0.2**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 2 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-51
AOC JJ: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	3,431	ND	ND
1,1-Dichloroethane	ND	1,859	3,382	ND	ND
1,1-Dichloroethene	ND	-	168	ND	ND
1,2,3-Trichlorobenzene	ND	-	119	ND	ND
1,2,3-Trichloropropane	ND	2.2	10	ND	ND
1,2,4-Trichlorobenzene	ND	8,543	115	ND	ND
1,2,4-Trimethylbenzene	ND	-	745	ND	ND
1,2-Dichlorobenzene	ND	-	4,067	ND	ND
1,2-Dichloroethane	ND	238	66	ND	ND
1,3-Dichlorobenzene	ND	-	3,861	ND	ND
1,4-Dichlorobenzene	ND	1,289	9,966	ND	ND
2-Butanone (MEK)	ND	-	85,146	ND	ND
Acetone	0.01600	-	241,589	-	6.6E-08
Benzene	0.00045	162	21	2.8E-12	2.1E-05
Bromoform	ND	8,324	1,345	ND	ND
Tert-butyl alcohol	ND	-	707,021	ND	ND
Carbon disulfide	0.00066	-	1,665	-	4.0E-07
Carbon Tetrachloride	ND	50	114	ND	ND
Chlorobenzene	ND	-	593	ND	ND
Chloroform	ND	167	476	ND	ND
Chloromethane	ND	-	225	ND	ND
Ethylbenzene	ND	2,773	8,562	ND	ND
Methylene chloride	ND	2,805	1,004	ND	ND
Naphthalene	ND	481	244	ND	ND
Tetrachloroethene	ND	250	156	ND	ND
Toluene	0.00160	-	2,367	-	6.8E-07
Trichloroethene	ND	683	8.7	ND	ND
Trichlorofluoromethane	ND	-	2,500	ND	ND
o-xylene	ND	-	1,265	ND	ND
m,p-xylene	ND	-	1,127	ND	ND
TPHs					
TPH-gas	ND	-	1,734	ND	ND
TPH-diesel	281	-	483	-	5.8E-01
Estimated Cumulative Risk and Hazard Index				**3E-12**	**0.6**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.

1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.

2 Protective of the dermal contact, ingestion, and inhalation pathways.

3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-52
AOC JJ: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	3,465	ND	ND
1,1-Dichloroethane	ND	7.2	2,960	ND	ND
1,1-Dichloroethene	ND	-	167	ND	ND
1,2,3-Trichlorobenzene	ND	-	48	ND	ND
1,2,3-Trichloropropane	ND	0.0015	10	ND	ND
1,2,4-Trichlorobenzene	ND	24	105	ND	ND
1,2,4-Trimethylbenzene	ND	-	433	ND	ND
1,2-Dichlorobenzene	ND	-	2,851	ND	ND
1,2-Dichloroethane	ND	0.909	61	ND	ND
1,3-Dichlorobenzene	ND	-	2,751	ND	ND
1,4-Dichlorobenzene	ND	5.0	4,149	ND	ND
2-Butanone (MEK)	ND	-	35,518	ND	ND
Acetone	0.01600	-	65,881	-	2.4E-07
Benzene	0.00045	0.62	21	7.2E-10	2.2E-05
Bromoform	ND	29	816	ND	ND
Tert-butyl alcohol	ND	-	156,388	ND	ND
Carbon disulfide	0.00066	-	1,460	-	4.5E-07
Carbon Tetrachloride	ND	0.196	91	ND	ND
Chlorobenzene	ND	-	467	ND	ND
Chloroform	ND	0.66	328	ND	ND
Chloromethane	ND	-	210	ND	ND
Ethylbenzene	ND	10.4	4,673	ND	ND
Methylene chloride	ND	1.9	379	ND	ND
Naphthalene	ND	2.6	224	ND	ND
Tetrachloroethene	ND	0.81	126	ND	ND
Toluene	0.00160	-	1,864	-	8.6E-07
Trichloroethene	ND	0.94	8	ND	ND
Trichlorofluoromethane	ND	-	2,366	ND	ND
o-xylene	ND	-	1,221	ND	ND
m,p-xylene	ND	-	1,094	ND	ND
TPHs					
TPH-gas	ND	-	1,222	ND	ND
TPH-diesel	281	-	397	-	7.1E-01
Estimated Cumulative Risk and Hazard Index				**7E-10**	**0.7**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
TPH - Total petroleum hydrocarbon
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of TPH-diesel. TPH-diesel = 95%UCL 0 to 10 feet bgs.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-53
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.9	2.00E+03	1.20E+05	9.5E-09	1.6E-05
Chloroform	3.9	4.93E+03	3.97E+05	7.9E-09	9.8E-06
1,1-Dichloroethane	0.3	6.47E+04	2.96E+06	4.6E-11	1.0E-07
1,2-Dichloroethane	0.26	6.08E+03	3.95E+04	4.3E-10	6.6E-06
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	3.5	----	1.74E+05	----	2.0E-05
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	0.89	1.34E+04	1.91E+04	6.6E-10	4.7E-05
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	1.2	2.42E+04	7.09E+03	5.0E-10	1.7E-04
1,2,3-Trichloropropane	22	6.00E+01	4.82E+03	3.7E-06	4.6E-03
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	ND	1.69E+04	1.24E+05	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				4.E-06	0.005

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-54
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L) Carcinogenic	Residential On-Site Groundwater RBSL[1] (µg/L) Non-carcinogenic	Residential Risk Screen: Maximum Estimated Risk[2]	Residential Risk Screen: Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.9	2.29E+01	1.43E+04	8.3E-08	1.3E-04
Chloroform	3.9	5.65E+01	4.73E+04	6.9E-08	8.2E-05
1,1-Dichloroethane	0.3	7.41E+02	3.52E+05	4.0E-10	8.5E-07
1,2-Dichloroethane	0.26	6.96E+01	4.71E+03	3.7E-09	5.5E-05
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	3.5	----	2.07E+04	----	1.7E-04
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	0.89	1.53E+02	2.28E+03	5.8E-09	3.9E-04
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	1.2	1.94E+02	8.44E+02	6.2E-09	1.4E-03
1,2,3-Trichloropropane	22	2.57E-01	5.74E+02	8.6E-05	3.8E-02
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	ND	1.93E+02	1.48E+04	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				9.E-05	0.04

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-55
AOC J-K: Risk Evaluation for Commercial Workers
(Soils, 0-2 feet bgs)

Chemical	RME[1] (mg/kg)	Commercial Soil RBSLs (mg/kg)		Commercial Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	5,642	ND	ND
1,1-Dichloroethane	ND	125	5,685	ND	ND
1,1-Dichloroethene	ND	-	277	ND	ND
1,2,3-Trichlorobenzene	ND	-	246	ND	ND
1,2,3-Trichloropropane	ND	0.17	16	ND	ND
1,2,4-Trichlorobenzene	ND	1,128	191	ND	ND
1,2,4-Trimethylbenzene	ND	-	1,367	ND	ND
1,2-Dichlorobenzene	ND	-	7,128	ND	ND
1,2-Dichloroethane	ND	16	110	ND	ND
1,3-Dichlorobenzene	ND	-	6,745	ND	ND
1,4-Dichlorobenzene	ND	86	20,493	ND	ND
2-Butanone (MEK)	0.02400	-	174,944	-	1.4E-07
Acetone	0.02000	-	640,645	-	3.1E-08
Benzene	0.02100	11	35	1.9E-09	6.0E-04
Bromoform	ND	671	2,439	ND	ND
Tert-butyl alcohol	0.00610	-	2,330,312	-	2.6E-09
Carbon disulfide	ND	-	2,797	ND	ND
Carbon Tetrachloride	0.014	3.4	196	4.1E-09	6.9E-05
Chlorobenzene	ND	-	1,016	ND	ND
Chloroform	0.01100	11	837	9.9E-10	1.3E-05
Chloromethane	ND	-	374	ND	ND
Ethylbenzene	0.00089	194	15,989	4.6E-12	5.6E-08
Methylene chloride	ND	200	2,161	ND	ND
Naphthalene	0.00120	54	428	2.2E-11	2.8E-06
Tetrachloroethene	0.00043	23	265	1.9E-11	1.6E-06
Toluene	0.01100	-	4,053	-	2.7E-06
Trichloroethene	0.00640	48	15	1.3E-10	4.4E-04
Trichlorofluoromethane	ND	-	4,149	ND	ND
o-xylene	ND	-	2,094	ND	ND
m,p-xylene	0.00120	-	1,863	-	6.4E-07
Estimated Cumulative Risk and Hazard Index				**7E-09**	**0.001**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of carbon tetrachloride, which is 95%UCL all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-56
AOC J-K: Risk Evaluation for Construction Workers
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Construction Worker Soil RBSLs (mg/kg)		Construction Worker Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,259	ND	ND
1,1-Dichloroethane	ND	699	1,276	ND	ND
1,1-Dichloroethene	ND	-	62	ND	ND
1,2,3-Trichlorobenzene	ND	-	59	ND	ND
1,2,3-Trichloropropane	ND	1.0	3.5	ND	ND
1,2,4-Trichlorobenzene	ND	8,543	43	ND	ND
1,2,4-Trimethylbenzene	ND	-	315	ND	ND
1,2-Dichlorobenzene	ND	-	1,618	ND	ND
1,2-Dichloroethane	ND	92	25	ND	ND
1,3-Dichlorobenzene	ND	-	1,530	ND	ND
1,4-Dichlorobenzene	ND	480	4,894	ND	ND
2-Butanone (MEK)	0.02400	-	41,764	-	5.7E-07
Acetone	0.02000	-	170,265	-	1.2E-07
Benzene	0.02100	62	7.8	3.4E-10	2.7E-03
Bromoform	ND	3,977	559	ND	ND
Tert-butyl alcohol	0.00610	-	705,538	-	8.6E-09
Carbon disulfide	ND	-	628	ND	ND
Carbon Tetrachloride	0.014	19	44	7.2E-10	3.1E-04
Chlorobenzene	ND	-	229	ND	ND
Chloroform	0.01100	62	190	1.8E-10	5.8E-05
Chloromethane	ND	-	84	ND	ND
Ethylbenzene	0.00089	1,100	3,699	8.1E-13	2.4E-07
Methylene chloride	ND	1,141	525	ND	ND
Naphthalene	0.00120	334	96	3.6E-12	1.2E-05
Tetrachloroethene	0.00043	140	60	3.1E-12	7.2E-06
Toluene	0.01100	-	914	-	1.2E-05
Trichloroethene	0.00640	272	3.3	2.4E-11	1.9E-03
Trichlorofluoromethane	ND	-	928	ND	ND
o-xylene	ND	-	468	ND	ND
m,p-xylene	0.00120	-	416	-	2.9E-06
Estimated Cumulative Risk and Hazard Index				**1E-09**	**0.005**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of carbon tetrachloride, which is 95%UCL all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-05).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-57
AOC J-K: Risk Evaluation for Residents
(Soils, 0-10 feet bgs)

Chemical	RME[1] (mg/kg)	Residential Soil RBSLs (mg/kg)		Residential Risk	
		Carcinogenic	Non-carcinogenic	Risk Estimate[3]	Hazard Quotient[3]
VOCs					
1,1,1-Trichloroethane	ND	-	1,361	ND	ND
1,1-Dichloroethane	ND	2.9	1,297	ND	ND
1,1-Dichloroethene	ND	-	67	ND	ND
1,2,3-Trichlorobenzene	ND	-	35	ND	ND
1,2,3-Trichloropropane	ND	0.0015	3.8	ND	ND
1,2,4-Trichlorobenzene	ND	24	44	ND	ND
1,2,4-Trimethylbenzene	ND	-	254	ND	ND
1,2-Dichlorobenzene	ND	-	1,469	ND	ND
1,2-Dichloroethane	ND	0.38	26	ND	ND
1,3-Dichlorobenzene	ND	-	1,402	ND	ND
1,4-Dichlorobenzene	ND	2.0	3,001	ND	ND
2-Butanone (MEK)	0.02400	-	25,658	-	9.4E-07
Acetone	0.02000	-	59,820	-	3.3E-07
Benzene	0.02100	0.26	8.3	8.2E-08	2.5E-03
Bromoform	ND	15.3	465	ND	ND
Tert-butyl alcohol	0.00610	-	156,323	-	3.9E-08
Carbon disulfide	ND	-	639	ND	ND
Carbon Tetrachloride	0.014	0.078	43	1.7E-07	3.2E-04
Chlorobenzene	ND	-	221	ND	ND
Chloroform	0.01100	0.26	171	4.3E-08	6.4E-05
Chloromethane	ND	-	88	ND	ND
Ethylbenzene	0.00089	4.5	2,856	2.0E-10	3.1E-07
Methylene chloride	ND	1.9	290	ND	ND
Naphthalene	0.00120	1.7	99	7.2E-10	1.2E-05
Tetrachloroethene	0.00043	0.51	59	8.4E-10	7.3E-06
Toluene	0.01100	-	883	-	1.2E-05
Trichloroethene	0.00640	0.94	3.3	6.8E-09	1.9E-03
Trichlorofluoromethane	ND	-	977	ND	ND
o-xylene	ND	-	497	ND	ND
m,p-xylene	0.00120	-	443	-	2.7E-06
Estimated Cumulative Risk and Hazard Index				**3E-07**	**0.005**

Definitions:

bgs - below ground surface
mg/kg - Milligrams per kilogram.
VOCs - Volatile organic compounds.
RBSL - Risk-based screening level
RME - Reasonable maximum exposure.

Notes:

- A dash indicates a goal not calculated as appropriate toxicity data not available.
1 Conservatively based on maximum from all depths with exception of carbon tetrachloride, which is 95%UCL all depths.
2 Protective of the dermal contact, ingestion, and inhalation pathways.
3 Risks estimated by dividing RME concentration by the chemical-specific RBSL and multiplying by the target risk (1E-06).
Hazard quotient estimated by dividing RME concentration by the noncarcinogenic soil RBSL.

Table 6-58
Maximum Estimated Risk for Potential Commercial On-SiteVapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Commercial On-Site Groundwater RBSL (µg/L)		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[2]	Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.67E+06	1.37E+07	ND	ND
Acetone	ND	----	2.04E+09	ND	ND
Methyl ethyl ketone	ND	----	2.43E+08	ND	ND
Benzene	ND	3.62E+03	1.12E+04	ND	ND
Bromodichloromethane	ND	4.05E+06	4.28E+08	ND	ND
Bromomethane	ND	----	1.39E+07	ND	ND
Carbon Disulfide	ND	----	1.72E+06	ND	ND
Chlorobenzene	ND	----	2.39E+05	ND	ND
Carbon Tetrachloride	1.9	2.00E+03	1.20E+05	9.5E-09	1.6E-05
Chloroform	3.9	4.93E+03	3.97E+05	7.9E-09	9.8E-06
1,1-Dichloroethane	0.3	6.47E+04	2.96E+06	4.6E-11	1.0E-07
1,2-Dichloroethane	0.26	6.08E+03	3.95E+04	4.3E-10	6.6E-06
1,3-Dichlorobenzene	ND	----	1.21E+06	ND	ND
1,1-Dichloroethene	3.5	----	1.74E+05	----	2.0E-05
cis-1,2-Dichloroethene	ND	----	2.98E+04	ND	ND
trans-1,2-Dichloroethene	ND	----	3.00E+05	ND	ND
1,2-Dichloropropane	0.89	1.34E+04	1.91E+04	6.6E-10	4.7E-05
Methylene Chloride	ND	9.90E+04	1.41E+06	ND	ND
tert-Butyl alcohol	ND	----	8.19E+09	ND	ND
Toluene	ND	----	1.22E+06	ND	ND
1,1,2-Trichloroethane	ND	1.39E+04	1.59E+03	ND	ND
Trichloroethene	1.2	2.42E+04	7.09E+03	5.0E-10	1.7E-04
1,2,3-Trichloropropane	22	6.00E+01	4.82E+03	3.7E-06	4.6E-03
Trichlorofluoromethane	ND	----	1.17E+06	ND	ND
1,1,2,2-Tetrachloroethane	ND	8.28E+03	1.37E+06	ND	ND
Tetrachloroethene	ND	1.69E+04	1.24E+05	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				4.E-06	0.005

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk =(groundwater concentration/cancer groundwater screening level) x 10^{-5}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-59
Maximum Estimated Risk for Potential Residential On-Site Vapor Intrusion Exposures from Groundwater (AOCs G, J-K, HH, JJ)

Chemical	Maximum Detect[1] µg/L	Residential On-Site Groundwater RBSL[1] (µg/L) Carcinogenic	Residential On-Site Groundwater RBSL[1] (µg/L) Non-carcinogenic	Residential Risk Screen: Maximum Estimated Risk[2]	Residential Risk Screen: Maximum Estimated Hazard Quotient[3]
1,4-Dioxane	ND	1.91E+04	1.64E+06	ND	ND
Acetone	ND	----	2.43E+08	ND	ND
Methyl ethyl ketone	ND	----	2.90E+07	ND	ND
Benzene	ND	4.14E+01	1.34E+03	ND	ND
Bromodichloromethane	ND	4.63E+04	5.09E+07	ND	ND
Bromomethane	ND	----	1.65E+06	ND	ND
Carbon Disulfide	ND	----	2.04E+05	ND	ND
Chlorobenzene	ND	----	2.85E+04	ND	ND
Carbon Tetrachloride	1.9	2.29E+01	1.43E+04	8.3E-08	1.3E-04
Chloroform	3.9	5.65E+01	4.73E+04	6.9E-08	8.2E-05
1,1-Dichloroethane	0.3	7.41E+02	3.52E+05	4.0E-10	8.5E-07
1,2-Dichloroethane	0.26	6.96E+01	4.71E+03	3.7E-09	5.5E-05
1,3-Dichlorobenzene	ND	----	1.44E+05	ND	ND
1,1-Dichloroethene	3.5	----	2.07E+04	----	1.7E-04
cis-1,2-Dichloroethene	ND	----	3.55E+03	ND	ND
trans-1,2-Dichloroethene	ND	----	3.58E+04	ND	ND
1,2-Dichloropropane	0.89	1.53E+02	2.28E+03	5.8E-09	3.9E-04
Methylene Chloride	ND	4.04E+02	1.68E+05	ND	ND
tert-Butyl alcohol	ND	----	9.74E+08	ND	ND
Toluene	ND	----	1.45E+05	ND	ND
1,1,2-Trichloroethane	ND	1.60E+02	1.90E+02	ND	ND
Trichloroethene	1.2	1.94E+02	8.44E+02	6.2E-09	1.4E-03
1,2,3-Trichloropropane	22	2.57E-01	5.74E+02	8.6E-05	3.8E-02
Trichlorofluoromethane	ND	----	1.39E+05	ND	ND
1,1,2,2-Tetrachloroethane	ND	9.48E+01	1.63E+05	ND	ND
Tetrachloroethene	ND	1.93E+02	1.48E+04	ND	ND
Maximum Estimated Cumulative Risk and Hazard Index[4]				9.E-05	0.04

Acronyms and Abbreviations:

µg/L - micrograms per liter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] Maximum concentration from wells CAMW25 and CAMW27 from June 2015 to April 2017.

[2] Estimated cancer risk = (groundwater concentration/cancer groundwater screening level) x 10^{-6}.

[3] Estimated hazard = (groundwater concentration/non-cancer groundwater screening level).

[4] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

Table 6-60
Maximum Estimated Risk for Potential Commercial Vapor Intrusion Exposures from Soil Gas in AOCs J-K (2005 J1 Results Replaced with 2016 Data)[1]
Chino Airport, Chino, California

Chemical	Maximum Detect ($\mu g/m^3$)	Default Commercial Soil Gas Screening Levels ($\mu g/m^3$)[2]		Commercial Risk Screen	
		Carcinogenic	Non-carcinogenic	Maximum Estimated Risk[3]	Maximum Estimated Hazard Quotient[4]
Acetone	26.40	----	2.80E+08	----	9.4E-08
Benzene	6.90	8.40E+03	2.60E+04	8.2E-09	2.7E-04
Carbon disulfide	40.50	----	6.20E+06	----	6.5E-06
Carbon tetrachloride	69.80	5.80E+03	3.60E+05	1.2E-07	1.9E-04
Chloroform (Trichloromethane)	7.13	1.06E+04	8.60E+05	6.7E-09	8.3E-06
Cyclohexane	7.84	----	5.20E+07	----	1.5E-07
Dichlorodifluoromethane	6.48	----	8.80E+05	----	7.4E-06
Ethylbenzene	12.20	9.80E+04	8.80E+06	1.2E-09	1.4E-06
n-Hexane	7.19	----	6.20E+06	----	1.2E-06
Propene	4.30	----	2.60E+07	----	1.7E-07
Tetrachloroethene	42.00	4.00E+04	3.60E+05	1.1E-08	1.2E-04
Tetrahydrofuran	6.24	----	1.76E+07	----	3.5E-07
Toluene (Methyl benzene)	42.90	----	2.60E+06	----	1.7E-05
Trichloroethene	39.00	6.00E+04	1.76E+04	6.5E-09	2.2E-03
Trichlorofluoromethane	14.10	----	1.06E+07	----	1.3E-06
1,2,4-Trimethylbenzene	10.20	----	5.20E+05	----	2.0E-05
1,3,5-Trimethylbenzene	7.08	----	5.20E+05	----	1.4E-05
o-Xylene	14.00	----	8.80E+05	----	1.6E-05
m,p-Xylenes	39.80	----	8.80E+05	----	4.5E-05
n-Heptane	8.68	----	3.60E+06	----	2.4E-06
Naphthalene	24.50	7.20E+03	2.60E+04	3.4E-08	9.4E-04
Maximum Estimated Cumulative Risk and Hazard Index[5]				2.E-07	0.004

Acronyms and Abbreviations:

$\mu g/m^3$ - micrograms per cubic meter

---- = screening criteria not calculated as appropriate toxicity data is not available.

Notes:

[1] For location J1, older 2005 data was replaced with shallower 2016 data.

[2] Listed soil gas screening criteria are the default soil gas RBSLs summarized in Appendix B.

[3] Estimated cancer risk =(soil gas concentration/cancer soil gas screening level) x 10^{-5}.

[4] Estimated hazard = (soil gas concentration/non-cancer soil gas screening level).

[5] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.