Hangar 1 Action Memorandum

Former Naval Air Station Moffett Field, California

Prepared for:

Planetary Ventures, LLC

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EKI ENVIRONMENT & WATER, INC.

www.ekiconsult.com
577 Airport Blvd, Suite 500 • Burlingame, CA 94010

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California

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ACRONYMS AND ABBREVIATIONS

§	section
ACC	ACC Environmental Consultants
ACM	asbestos-containing materials
AM	action memorandum
ARAR	applicable or relevant and appropriate requirement
BAAQMD	Bay Area Air Quality Management District
BMP	best management practice
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CM15	Carbomastic-15
CMU	concrete masonry unit
EE/CA	Engineering Evaluation/Cost Analysis
EKI	EKI Environment & Water, Inc. (formerly known as Erler & Kalinowski, Inc.)
ESL	Environmental Screening Level
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
Draft FFS	Draft Focused Feasibility Study
HEPA	high-efficiency particulate arrestor
IC	institutional control
IR	Installation Restoration
LTMP	Long-Term Management Plan
MEW	Middlefield-Ellis-Whisman
mg/kg	milligrams per kilogram
NACE	National Association of Corrosion Engineers
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NTCRA	Non-Time-Critical Removal Action
OMM	operations, maintenance, and monitoring
PAL	project action limit
PCB	polychlorinated biphenyl
PV	Planetary Ventures, LLC
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
Site	Hangar 1, Former NAS Moffett Field, California
SSPC	Society for Protective Coatings

1 INTRODUCTION

The purpose of this Action Memorandum ("AM") is to document, for inclusion in the Administrative Record, the National Aeronautics and Space Administration's ("NASA's") decision to undertake a Non-Time-Critical Removal Action ("NTCRA") to control the release of polychlorinated biphenyls ("PCBs") and lead from the aboveground building materials within Installation Restoration ("IR") Site 29 located within the former Naval Air Station ("NAS") Moffett Field, California (Figure 1). NASA intends this NTCRA to be the Final Action at IR Site 29 ("Site" or "Hangar 1") and as a result, risks to all potential human or ecological receptors were evaluated and are addressed by this NTCRA.

This NTCRA will be performed in accordance with current United States ("U.S.") Environmental Protection Agency ("EPA") guidance documents for a NTCRA being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"). NASA has the authority to undertake response actions, including removal actions, under CERCLA, Title 42 United States Code ("USC") Section ("§") 9604 and Federal Executive Order 12580.

As site-specific investigations within IR Site 29 have not identified an urgent threat that must be addressed to prevent significant human or ecological exposure to contamination, the removal action is considered a "non-time-critical removal action" and a planning period of greater than 6 months was available for the evaluation of appropriate removal actions and to identify the appropriate extent of the removal action. As a result, NASA prepared and submitted an Engineering Evaluation/Cost Analysis ("EE/CA") that evaluated technologies and alternatives for the NTCRA at IR Site 29 (EKI, 2019). The selected removal action for the NTCRA consists of the removal of PCB- and lead-impacted paints from the structural elements (e.g., the steel frame, concrete masonry unit ("CMU") walls, and concrete floors) of Hangar 1 via a combination of media blasting, chemical stripping, and/or scraping with hand tools, followed by cleaning. Wastes from the abatement of Hangar 1 will be disposed of at an off-site facility in accordance with applicable laws and regulations.

A removal action is appropriate for existing contamination at IR Site 29 because three of the eight factors set forth within the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"; 40 Code of Federal Regulations ("CFR") Part 300) are potentially applicable to existing conditions at IR Site 29; these factors include:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;
- Actual or potential contamination of drinking water supplies or sensitive ecosystems; and
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

No nationally significant or precedent-setting issues exist for IR Site 29.

2 SITE CONDITIONS AND BACKGROUND

NASA Ames is one of several research centers within NASA, a federal agency. It is an active facility with no plans for closure or transfer. NASA Ames consists of the NASA Ames Research Center campus and the majority of the former NAS Moffett Field which was transferred from the U.S. Department of the Navy ("Navy") to NASA on July 1, 1994. The former NAS Moffett Field is a Superfund site that was listed on the National Priorities List ("NPL") in 1987.

2.1 Site Description

The former NAS Moffett Field was originally commissioned as the NAS Sunnyvale in 1933 to serve as a base for the West Coast dirigibles of the Lighter-Than-Air program and Hangar 1 was constructed to house the USS Macon dirigible. By 1950, when jet aircraft were introduced, NAS Moffett Field was the largest naval air transport base on the West Coast and became the first all-weather NAS. Between 1973 and 1994, the mission of NAS Moffett Field was to support anti-submarine warfare training and patrol squadrons (PRC, 1996). No major aircraft maintenance was conducted during this last period of operation of NAS Moffett Field, although some unit- and intermediate-level maintenance activity occurred (Harding, 2000). Between 1994 and 2002, NASA used Hangar 1 for air shows, open houses, and other various functions.

2.1.1 Removal Site Evaluation

In 1997, a relatively uncommon PCB mixture, Aroclor 1268, was detected in a sediment sample collected from a storm water settling basin that receives storm water runoff from the western portion of the Former NAS Moffett Field. In 1999, both Aroclor 1260 and 1268 were detected in a storm water sample collected from a manhole downstream of Hangar 1 (AMEC, 2013). Subsequent investigations by NASA between 1999 and 2002, determined that the Hangar 1 siding, a composite corrugated metal material commercially known as Robertson Protected Metal, contained PCBs and asbestos and that the lead-based paint used to cover both the siding and steel frame of the hangar also contained PCBs (AMEC, 2013). Bulk samples of the paint on the siding were found to contain Aroclor 1268 at concentrations greater than 6,000 milligrams per kilogram ("mg/kg") and Aroclor 1260 and 1268 were detected in samples of the interior layers of the siding at concentrations up to 5,500 mg/kg and 188,000 mg/kg, respectively. In the paint used to coat the steel support structure, lead was detected at concentrations up to 200,000 mg/kg and both Aroclor 1260 and 1268 were detected at concentrations up to 120 mg/kg and 94 mg/kg, respectively (Benchmark, 2003; AMEC, 2013).

Due to the presence of PCBs and lead in Hangar 1 building materials, the Navy designated Hangar 1 as IR Site 29 in 2003. IR Site 29 was defined to include the aboveground frame and concrete floor of the Hangar and existing exposed surface soils located outside the eastern side of the Hangar, the door opening mechanisms, and the storm water trench that surrounds the Hangar. As described in Section 2.2.1, the Navy performed a time-critical removal action ("TCRA") and a NTCRA to control the release of PCBs from Hangar 1; however, these actions did not completely eliminate the potential for future releases.

The primary purpose this NTCRA is to prevent the release of PCBs and lead from remaining impacted paints at Hangar 1. Because NASA intends this NTCRA to be the final action at IR Site

29, risks to all potential human and ecological receptors are addressed by this NTCRA. To select an appropriate removal action, NASA prepared an EE/CA (see Section 5.1.2) that assessed risks, identified cleanup goals, and evaluated technologies and alternatives for this NTCRA; this EE/CA (EKI, 2019) was submitted to the U.S. EPA and the State of California Regional Water Quality Control Board, San Francisco Bay Region ("Regional Water Board") for review and approval. As described in Section 5.1.2, the public was also provided with the opportunity to review and comment on the EE/CA.

2.1.2 Site Location and Characteristics

The former NAS Moffett Field is located approximately 35 miles south of San Francisco, 10 miles north of San Jose, and approximately 1 mile south of San Francisco Bay (United States Geological Survey Topographic Map (1:24,000) for Mountain View, California (2018)); it is bounded to east by the City of Sunnyvale, to the west and south by the City of Mountain View, and to the north by San Francisco Bay (Figure 1).

The former NAS Moffett Field is located in a Mediterranean climate with dry warm summers and mild winters. Temperatures vary from an average high of 79 degrees Fahrenheit (°F) in July and August to an average low of 39°F in December. Average precipitation is 14.72 inches per year and occurs almost entirely between late fall and early spring; between December and March precipitation rates generally average between 2 and 3.5 inches per month.

Hangar 1 (IR Site 29 (Building 001), Moffett Field, CA, 94305; approximately 37.41 degrees North, -122.05 degrees West) is a large steel structure measuring approximately 1,133 feet long by 308 feet wide and 198 feet tall; the area surrounding Hangar 1 is paved, with the exception of several small areas of bare soil located on the eastern side of the hangar (Figure 2). A trench drain that discharges to the storm drain system surrounds the perimeter of Hangar 1.

Hangar 1 is located within the NASA Research Park portion of the NASA Ames Research Center, just west of the airfield runways within between Sayre Avenue and Cummings Avenue and is bounded to the north by Bushnell Street and to the south by Wescoat Road. Existing buildings within the NASA Research Park are used for a variety of commercial/light industrial purposes including office space, retail and business services, airfield operations, vehicle maintenance, research facilities and storage; offices, residences, public areas, and industrial facilities are all located within a one-mile radius of Hangar 1.

The nearest surface water body to Hangar 1 is NASA's storm water settling basin that is located approximately 2,000 feet northwest of Hangar 1 (Figure 1); next to the storm water settling basin are NASA's Eastern and Western Diked Marshes, NASA's Stormwater Retention Pond, and the Mid-Peninsula Open Space District's Stevens Creek Shoreline Nature Study Area. Stevens Creek is located approximately 4,300 feet west of Hangar 1.

Hangar 1 is located within the Middlefield-Ellis-Whisman ("MEW") Vapor Intrusion ("VI") Study Area (U.S. EPA, 2010) and the Navy's West-Side Aquifers Treatment System Area (i.e., IR Site 28) and the Hangar 1 Fuel Pits (a portion of the Navy's IR Site 24) are located beneath the footprint of the Hangar 1 structure (Figure 2). As the risks associated with the MEW VI Study Area and IR Sites 24 and 28 are related to soil, groundwater, and soil vapor impacts due to historical activities and not the aboveground contamination of the Hangar 1 structure, these areas are not discussed further herein.

2.1.3 Release or Threatened Release into the Environment

In removing the siding from Hangar 1, the Navy's NTCRA (Section 2.2.1.3) removed the predominant source of PCBs at Hangar 1. However, as described in Section 2.2.1.3, existing PCB- and lead-impacted paints on the structural elements of Hangar 1 (e.g., the structural steel members and CMU walls) were encapsulated with a weather-resistant epoxy (i.e., Carbomastic-15 or "CM15") and not removed.

Recent inspections and sampling (Section 2.2.2) have demonstrated failure of the epoxy coating and the release of PCBs and lead from impacted paint at Hangar 1. The presence of CERCLA hazardous substances (i.e., PCBs and lead) at elevated levels in the existing paint on the structural elements of Hangar 1 and the failure of the Navy's CM15 coating led the U.S. EPA to declare the release or threat of release of the contaminants in the building materials at Hangar 1 to be "an imminent and substantial endangerment to the public" (U.S. EPA, 2016b).

Potential future receptors include commercial and industrial workers, the public, and ecological receptors such as worms and other invertebrates as well as nesting birds that may eat those invertebrates. Identified potential human exposure pathways include: dermal contact as well as inhalation and ingestion of particulates. Outside of the Hangar 1 footprint, particulates from Hangar 1 could contaminate exposed surface soil outside the hangar and surface water runoff containing particulates could contaminate nearby surface water bodies and/or sediments. Human receptors outside of Hangar 1 could be exposed to contaminated particulates from dermal contact, inhalation, and ingestion of particulates and impacted soils and sediments and ecological receptors may be exposed to contaminated particulates by direct contact and ingestion.[1]

The purpose of this NTCRA is to remove PCB- and lead-impacted paints at Hangar 1, thereby eliminating potential future risks to human health and the environment from these chemicals.

2.1.4 National Priorities List Status

In 1987, the U.S. EPA placed NAS Moffett Field on the NPL and on 10 September 1990 the Navy signed a Federal Facilities Agreement ("FFA") with the U.S. EPA and Regional Water Board to conduct remedial actions at NAS Moffett Field pursuant to CERCLA regulations (U.S. EPA, 1990). This agreement was amended in December 1993 (U.S. EPA, 1993).

In 2014, NASA, U.S. EPA Region IX and the Regional Water Board entered into the NASA Moffett FFA (U.S. EPA, 2014). The NASA Moffett FFA provides the roles and responsibilities of the parties for implementing response actions for NASA sites identified in the NASA Moffett FFA in accordance with applicable environmental requirements of CERCLA, the NCP, Resource Conservation and Recovery Act ("RCRA"), and applicable state law. Under the NASA Moffett FFA, NASA is the lead agency for implementing response actions, and the U.S. EPA and the Regional Water Board are the lead regulatory oversight agencies.

In letters to the U.S. EPA dated 23 October 2015 and 22 December 2015, NASA confirmed that it would assume the Navy's obligations with respect to IR Site 29 (defined as including the

[1] Ingestion may occur by the direct ingestion of PCB- and lead-impacted materials (e.g., by worms or other small animals living in soils and/or sediments) and the ingestion of these animals by other animals such as birds.

aboveground frame and concrete floor of the Hangar and existing exposed surface soils located outside the eastern side of the Hangar, the door opening mechanisms, and the storm water trench that surrounds the Hangar); NASA has not accepted responsibility for any of the contamination that may exist in the soil or groundwater beneath Hangar 1. NASA, the U.S. EPA, and the Regional Water Board amended the NASA Moffett FFA to include IR Site 29.

2.2 Other Actions to Date

2.2.1 Previous Removal Actions

Between 2003 and 2012, two time-critical removal actions ("TCRAs") and one NTCRA were implemented to mitigate known PCB, lead, and asbestos impacts at Hangar 1. Additional details regarding these removal actions are provided below.

2.2.1.1 Sediment TCRA Conducted by NASA

In September 2003, NASA implemented a TCRA to remove sediments contaminated with PCBs from the storm water collection trench located around the perimeter of Hangar 1 (TT, 2004). The TCRA also removed potentially affected sediments present on paved surfaces immediately surrounding the structure.

2.2.1.2 Structure TCRA Conducted by Navy

As an interim action prior to the development and implementation of a more permanent response action for Hangar 1, the Navy implemented a TCRA on the Hangar 1 structure to control the migration of PCBs from Hangar 1 to the storm drain system and the environment (TT, 2004). Between 15 September 2003 and 6 February 2004, the Navy:

- Cleaned the exterior of the hangar by pressure washing to remove grease, oil, and dirt that may have inhibited adhesion of the selected coating material;
- Coated the exterior siding with asphalt emulsion;
- Cleaned the paved area around the hangar by pressure washing followed by coating; and
- Installed a chain-link security fence to control access.

2.2.1.3 Structure NTCRA Conducted by Navy

In the process of developing a more permanent response action for the PCB and lead contamination at Hangar 1, in 2008, the Navy prepared an EE/CA (Navy, 2008a) that evaluated 13 removal action alternatives based on their implementability and effectiveness at protecting human health and the environment. Based on this comparative analysis, the recommended alternative to limit the migration of contaminants present within the Hangar 1 building materials was to:

- Remove all interior structures and siding from Hangar 1;
- Demolish all interior structures and dispose of the contaminated and non-contaminated debris at appropriate off-site disposal or recycling facilities; and
- Clean the steel structure and remaining interior structures (e.g., the stem wall around the perimeter of the hangar and CMU walls around the electrical vaults) and encapsulate PCB-containing paints on the steel structure and other remaining

interior elements (e.g., the CMU walls) using a weather-resistant epoxy-based coating (Navy, 2008a).

The Navy subsequently prepared an *Action Memorandum for Installation Restoration Site 29, Hangar 1* ("Action Memorandum"; Navy, 2008b) to document the Navy's decision to undertake a NTCRA based on the recommended alternative outlined in the 2008 EE/CA.

The NTCRA Work Plan (Navy, 2010) described collection of (1) pre- and post-removal action soil samples from the unpaved areas adjacent to the hangar; (2) sediment samples from the storm drain trenches in the hangar, if any remained; and (3) confirmation wipe samples from the concrete floor and the storm drain trench to assess the adequacy of the decontamination methods and confirm that PCB and lead concentrations were below Project Action Levels ("PALs").

The PALs for the NTCRA (AMEC, 2010; AMEC, 2013) were as follows:

- In exposed soil: 1 mg/kg for PCBs (i.e., the self-implementing cleanup level for high-occupancy areas per 40 CFR §761.61(a)(4)(i)(A)), 800 mg/kg for lead, and less than 1% chrysotile asbestos;
- In wipe samples of the storm drain trench and floor: 10 micrograms per 100 square centimeters ("ug/100 cm^2") for PCBs (i.e., the self-implementing cleanup level for high-occupancy areas per 40 CFR §761.61) and 40 micrograms per square foot ("ug/ft^2") for lead (i.e., the lead clearance level for residential houses and/or child-occupied facilities as described in 40 CFR §745.227(e)(8)(viii)[2]; and
- In wipe samples from salvaged historic artifacts: 10 ug/100 cm^2 for PCBs (i.e., the self-implementing cleanup level for high-occupancy areas per 40 CFR §761.61) and 250 ug/ft^2 for lead (i.e., the criteria for horizontal surfaces in public buildings and residences as described in Title 17 of the California Code of Regulations, Division 1, Chapter 8, Section 35035(b)).

The NTCRA Work Plan did not require the collection of wipe samples from the hangar structure (e.g., the structural steel, the CMU walls, the concrete stem wall) "*because the removal action will include either total removal or containment of the source*" (Navy, 2008a) and as a result, no wipe cleanup criteria were established for these surfaces. In addition, as bulk concrete and other structural materials were not sampled as part of the NTCRA, PALs were not established for these media.

In 2010, the Navy conducted a coating condition survey and collected baseline soil samples from the exposed soil adjacent to Hangar 1 and baseline sediment samples from the storm water conveyance system surrounding the hangar to document existing environmental conditions prior to implementation of the NTCRA.

As part of the pre-NTCRA baseline sampling activities, a total of 55 soil samples were collected from exposed soils adjacent to Hangar 1. Of the 35 samples collected between 0 and 0.5 feet

[2] While the U.S. EPA has not promulgated a clearance standard for lead-impacted dust at commercial/industrial facilities, the Navy selected the TSCA 403 clearance standard for lead (i.e., 40 ug/ft^2) even though this standard was established for residential housing and child-occupied facilities (40 CFR §745.227(e)(8)(viii)).

below ground surface, Aroclor 1268 was detected in 20 samples at concentrations greater than the PAL of 1 mg/kg.[3] At the locations where PCBs were detected above the PAL, the material between depths of 0.5 and 1 feet below ground surface was also analyzed for PCBs; in these 20 samples, detected PCB concentrations were below the PAL.

Four pre-NTCRA baseline sediment samples were collected from the northeast, southeast, northwest, and southwest corners of the storm water conveyance system and analyzed for PCBs, lead, and asbestos. Total PCBs concentrations in these sediment samples ranged from 4.0 mg/kg to 89 mg/kg. Lead was detected at concentrations ranging from 740 mg/kg to 2,000 mg/kg. Asbestos was identified at a concentration of less than 0.1% in one sediment sample and was not detected in the remaining three samples (AMEC, 2013). In addition, a sediment sample was collected from the sediment that had accumulated in the clam shell door rail tracks and analyzed for PCBs and lead; in this sample PCBs were detected at a concentration of 12 mg/kg and lead was detected at a concentration of 240 mg/kg (AMEC, 2013).

From June 2010 through June 2013, the Navy addressed PCB and lead contamination at Hangar 1 by:

- Preserving and decontaminating historic artifacts;
- Removing hangar windows, doors, siding, and other exterior components;
- Removing the hangar siding and roof;
- Demolishing and deconstructing the interior structures of the hangar;
- Removing all debris and disposing or recycling it at appropriate off-site disposal facilities;
- Abrasive blasting of paints from subfloor utility vaults inside the hangar;
- Pressure washing the remaining hangar structure and interior structures;
- Removing PCB-containing paint on the concrete foundation stem walls by ultra-high-pressure water blasting and abrasive methods and coating the resulting surfaces with a penetrating sealer to help protect the concrete surface from rain water degradation;
- Coating the structural steel frame and other structures within the hangar that were not demolished with a primer and finish coat of Carbomastic -15, a weather-resistant epoxy, to encapsulate the PCB- and lead-containing paints;
- Removing sediment from the storm drain trenches and pressuring washing the trenches;
- Excavating PCB- and lead-impacted soil near Hangar 1; and
- Washing the concrete floors.

Confirmation soil samples were collected from the exposed soil outside Hangar 1 and analyzed for PCBs, lead, and asbestos. Confirmation wipe samples were collected from the concrete floor and trenches and salvaged historic artifacts and analyzed for PCBs and lead.

As described in the *Final After Action Completion Report for Non-Time-Critical Removal Action for Polychlorinated Biphenyl (PCB) Contamination* ("NTCRA Completion Report"; AMEC, 2013),

[3] Bulk samples are reported as a mass of compound divided by mass of material sampled (e.g., mg/kg).

two rounds of excavation and confirmation sampling were required to meet the PALs for soil. At the 23 locations where wipe samples were collected from the concrete storm water trench, PCB concentrations were all less than the PAL (i.e., 10 ug/100 cm^2) and lead concentrations were less than the PAL (i.e., 40 ug/ft^2) at 21 locations.[4,5] The lead PAL of 250 ug/ft^2 for lead in wipe samples was not met for every item returned to NASA (AMEC, 2013). In the wipe samples collected from the concrete floor, PCB concentrations were all less than the PAL and lead concentrations exceeded the PAL at several locations. Areas where the concrete floor did not meet the lead PAL were recleaned and resampled, sometimes multiple times.

Because the selected PAL for lead (i.e., 40 ug/ft^2) was not directly applicable to future anticipated conditions at Hangar 1,[6] Navy consulted with the EPA and Regional Water Board regarding cleaning the areas that were greater than the PAL for lead and comparing the wipe sampling data to the lead PAL. Based on these discussions, eight sections of the floor were recleaned and resampled and the geometric mean[7] of the final wipe sampling results at each location was compared to the lead PAL. On conclusion of recleaning the concrete floors, the geometric mean of the final lead confirmation samples was 31.6 ug/ft^2, below the PAL of 40 ug/ft^2.[8]

Following implementation of the NTCRA, the Navy prepared a *Long-Term Management Plan* ("LTMP"; Navy, 2013b) to provide information and guidance to ensure that the implemented remedy (i.e., the encapsulation of remaining PCB- and lead-containing paints) remained effective. The Navy evaluated the implementation of institutional controls[9] ("ICs") to support the long-term management of Hangar 1 against a No Action alternative in its *Draft Focused Feasibility Study* ("Draft FFS") for IR Site 29 (Navy, 2013a) and concluded that the implementation of ICs was rated higher overall in satisfying the balancing criteria. Based on this evaluation, the Navy prepared a *Proposed Plan for Hangar 1* ("Proposed Plan"; Navy, 2013c) that proposed the implementation of ICs for Hangar 1. The Draft FFS has not been finalized or approved by the U.S. EPA or Regional Water Board and a Record of Decision ("ROD") for Hangar 1 based on the Proposed Plan has not been prepared.

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[4] At the two trench sampling locations where lead concentrations were greater than the PAL, the reported concentrations were 52 ug/ft^2 and 54 ug/ft^2.

[5] Wipe samples are reported as a mass of compound divided by the area over which the wipe sample was collected (e.g., ug/100 cm^2). The use of /100 cm^2 or /ft^2 for PCBs and lead wipe sample results, respectively, is tied to the screening criterion for these compounds.

[6] See footnote 2.

[7] Because lead concentrations in the confirmation wipe samples were lognormally distributed, the Navy argued that the geometric mean is the appropriate statistic to compare against the lead PAL.

[8] In the final wipe confirmation samples, lead concentrations exceeded the PAL at 15 of the 41 locations; at these locations, lead concentrations range between 42 ug/ft^2 and 150 ug/ft^2, except one location (H19) where the measured concentration was 440 ug/ft^2.

[9] ICs are non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for exposure to contamination and/or protect the integrity of a response action. ICs typically are designed to work by providing information that guides human behavior at a site or by limiting land and/or resource use. ICs may also include educational media to inform the public of the hazards associated with a site. The educational media may include, but is not limited to, fact sheets and notices distributed to the public, formal educational seminars, and press releases.

As NASA has assumed the Navy's obligations with respect to the aboveground elements of Hangar 1 (IR Site 29), NASA is currently implementing elements of the Navy's LTMP to document the condition of the CM15 coating and assess the effectiveness of the implemented remedy.

As the NTCRA that will be performed under this AM involves the removal of all PCB- and lead-impacted paint from the Hanger 1 structural elements (e.g., the steel frame, CMU walls, and concrete floors), it is NASA's intention that the NTCRA completion report for this work will serve as the final decision document for Hangar 1 and that the other documents prepared by the Navy (e.g., Draft FFS (Navy, 2013a), Proposed Plan (Navy, 2013c) and Long-Term Management Plan (Navy, 2013b)) will no longer be required.

2.2.2 Current Conditions

During pre-lease negotiations between NASA and Planetary Ventures, LLC ("PV"), NASA indicated that the CM15 epoxy coating had deteriorated in several areas. As a result, PV's consultants performed a visual screening inspection of the CM15 epoxy coating, collected wipe and bulk samples of building materials within the Hangar 1 structure, and collected samples of the sediment that had accumulated on the concrete floor and accessible storm drain trenches. The results of the visual inspection and sampling are presented in ACC Environmental Consultants' ("ACC's") *PCB, Lead, and Asbestos Sampling Report*, dated 24 February 2015 (ACC, 2015) and summarized briefly below. The visual inspection encompassed the ground and mezzanine levels and roof-top catwalk area; sampling was limited to areas that could be accessed from the ground and mezzanine levels of Hangar 1.

2.2.2.1 Visual Inspection of Structure

During the visual inspections conducted during April and June 2014, the following four general issues related to the CM15 epoxy coating were reported:

- Isolated coating failure, where the epoxy coating had delaminated from the existing substrate;
- Epoxy coating deterioration around edges and separation of the underlying substrate from the structure (e.g., peeling paint);
- Evidence of rust-related breakthrough of the coatings; and
- Missing or thinly applied coatings.

Several photographs of the deteriorated CM15 epoxy coatings ACC observed in 2014 are included in Photo Log 4 of ACC's *PCB, Lead, and Asbestos Sampling Report*, dated 24 February 2015 (ACC, 2015).

2.2.2.2 Structure Sampling and Analysis

During April and August 2014, wipe samples were collected from accessible various surfaces within Hangar 1 including the floor. During the August 2014 sampling event, 12 wipe samples were also collected from unpainted surfaces upwind and downwind of the Hangar 1 structure (6 upwind and 6 downwind) to assess whether the lead and PCBs reported in the wipe samples collected from accessible surfaces at Hangar 1 were potentially from an off-Site source.

The wipe samples collected in August were analyzed for Aroclor 1254, Aroclor 1260, Aroclor 1268, and CAM 17 metals; wipe samples collected in April were not analyzed for Aroclor 1268. The PCB and lead results for these samples are summarized below. Wipe samples are reported as a mass of compound divided by the area over which the wipe sample was collected (e.g., ug/100 cm^2). The use of /100 cm^2 or /ft^2 for PCBs and lead wipe sample results, respectively, is tied to the screening criterion for these compounds.

A brief summary of the sampling results for PCBs, lead,[10] and asbestos is presented below; additional details (e.g., summary tables, etc.) can be found in ACC's *PCB, Lead, and Asbestos Sampling Report* (ACC, 2015), a portion of which is included in the EE/CA (see Section 5.1.2).

PCBs: Sixteen wipe samples were collected from the concrete floor of the Hangar in 2014; eight wipe samples were collected where the floor looked visibly clean and eight were collected from areas of sediment accumulation where water had ponded (ACC, 2015). In the eight wipe samples collected from the visibly clean areas of the concrete floor,[11] PCBs were not detected above an analytical reporting limit of 0.005 ug/100 cm^2. In the eight wipe samples collected from the areas where sediment had accumulated, Aroclor 1268 was the only detected Aroclor. Aroclor 1268 concentrations ranged from 100 ug/100 cm^2 to 740 ug/100 cm^2 in the four samples that were analyzed for this Aroclor.[12]

A total of eight wipe samples were collected from horizontal structural steel members where sediment had accumulated due to water ponding; in these samples, Aroclor 1268 was detected in one sample at a concentration of 0.78 ug/100 cm^2. PCBs were not detected in the 11 wipe samples collected from the intact epoxy-coated paints, in the 6 wipe samples collected from the structural steel below deteriorated epoxy-coatings, or in the wipe sample collected from the unencapsulated original paint.

Bulk material collected for analysis of PCBs included original paint on steel beneath intact epoxy coating, CMU wall surfaces, coated stem walls, floor coatings, bituminous concrete expansion joints, sediments in the floor drain and trench, expansion joint caulking, concrete floor and paint on the floor, leveling compounds, and other paints. Bulk samples are reported as a mass of compound divided by mass of material sampled (e.g., mg/kg). PCBs were detected in almost every type of bulk material tested. The highest concentrations of PCBs were reported in the original paint beneath the encapsulated steel and beneath the encapsulated CMU wall where total PCBs were reported at concentrations up to 114.5 mg/kg and 1,900 mg/kg, respectively.

As PCBs were not detected above the analytical reporting limit in any of upwind or downwind wipe samples, ACC concluded that it was unlikely that the PCBs observed in the wipe samples collected within the Hangar 1 structure were from an off-Site source.

[10] Only the lead results are discussed herein as lead is the primary risk driver for metals in surficial dust on the Hangar 1 structure and (2) regulatory guidelines/screening levels are not available for the other CAM 17 metals in wipe samples. Information about the wipe sampling results for other CAM 17 metals is included in ACC's *PCB, Lead, and Asbestos Sampling Report* (ACC, 2015).

[11] Four of the samples were analyzed for Aroclor 1268 and four were not.

[12] Four of the samples were not analyzed for Aroclor 1268.

Lead: Lead was detected in all the wipe samples collected from accessible exposed surfaces within Hangar 1. Additional information regarding these samples is presented below.

In the wipe samples collected from encapsulated paint surfaces (11 samples), below areas where deteriorated encapsulated paint was observed (6 samples), exposed original paint (1 sample), the base of structural steel columns where sediment had accumulated due to water ponding (6 samples), and horizontal steel surfaces where ponding was observed (8 samples), lead was detected at concentrations greater than the NTCRA PAL (40 ug/ft^2) in one or more of the samples collected from each of the sampled surfaces. The highest lead concentrations were measured in the wipe samples collected from the base of the structural steel columns where sediment had accumulated due to water ponding; in these samples, lead concentrations ranged from 85 ug/ft^2 to 30,000 ug/ft^2.

In the 8 wipe samples collected from the visibly clean areas of the concrete floor the maximum lead concentration was 290 ug/ft^2 and the geometric mean was 124.6 ug/ft^2. In the 8 wipe samples collected from the floor where sediment had accumulated due to water ponding, lead concentrations ranged from 320 ug/ft^2 to 6,100 ug/ft^2 and the geometric mean of these samples was 868.6 ug/ft^2.

Bulk material collected for analysis of lead included original paint beneath intact epoxy coating on steel, CMU wall surfaces, coated stem walls, floor coating and gray paint, and bituminous concrete expansion joints. The highest lead concentrations were reported in the original paint beneath the encapsulated steel and beneath the encapsulated CMU wall where lead was reported at concentrations up to 250,000 mg/kg and 54,000 mg/kg, respectively.

As the reported lead concentrations in the upwind and downwind wipe samples were relatively low (i.e., ranging from 3.8 ug/ft^2 to 200 ug/ft^2), ACC concluded that it was unlikely that the elevated lead concentrations observed in the wipe samples collected within the Hangar 1 structure (see below) were from an ambient or off-Site source.

Asbestos: In the 38 bulk material samples collected of the encapsulated paints, floor coatings, concrete stem walls, CMU walls, expansion joints, leveling compounds, surficial sediments, gaskets and adhesives, asbestos was only detected in one sample from a dark brown adhesive on a CMU wall on the western side of Hangar 1. The adhesive covered an area of approximately 40 square feet and contained approximately 2% chrysotile asbestos.

2.3 State and Local Authorities' Roles

This section discusses the roles of regulatory agencies with potential involvement in the NTCRA for IR Site 29.

2.3.1 State and Local Actions to Date

NASA is the lead federal agency at IR Site 29 and has the authority to undertake response actions, including removal actions, under CERCLA, Title 42 USC § 9604 and Federal Executive Order 12580. The U.S. EPA Region IX and the State of California (through the Regional Water Board) provide regulatory oversight of NASA's CERCLA activities at IR Site 29.

2.3.2 Potential for Continued State/Local Response

It is expected that the U.S. EPA and Regional Water Board will continue to provide technical advice, environmental regulatory oversight, and assistance with implementation of this NTCRA.

3 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND REGULATORY AUTHORITIES

In accordance with the NCP at 40 CFR § 300.415(b)(2), the following factors must be considered in evaluating the appropriateness of a removal action to address threats to public health and the environment:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;
- Actual or potential contamination of drinking water supplies or sensitive ecosystems;
- Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers, that may pose a threat of release;
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;
- Threat of fire or explosion;
- Availability of other appropriate federal or state response mechanisms to respond to the release;
- Other situations or factors that may pose threats to public health or welfare of the United States or the environment.

This section discusses threats to public health or welfare and the environment from contamination at IR Site 29.

3.1 Threats to Public Health or Welfare

The following public health or welfare threat listed in 40 CFR § 300.415(b)(2) applies to conditions at IR Site 29:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

As outlined in the streamlined risk evaluation presented in the EE/CA (see Section 5.1.2; EKI, 2019):

- potential future human receptors include commercial and industrial workers and the public;
- potentially impacted exposure media include particulates from degradation of contaminated paint/CM15 coatings at IR Site 29 and soil and sediments outside Hangar 1 that may have been impacted by particulates from degradation of contaminated paint/CM15 coatings at IR Site 29; and
- potential exposure pathways include dermal contact and/or the inhalation and/or ingestion of contaminated particulates and or impacted soil and sediments outside the hangar.

As the Hangar 1 structure is not currently occupied, the immediacy of potential threats to public health or welfare is low and the removal of impacted paints at Hangar 1, as proposed in this AM, will mitigate potential future threats to public health.

3.2 Threats to the Environment

The following environmental threats listed in 40 CFR § 300.415(b)(2) apply to conditions at IR Site 29:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;
- Actual or potential contamination of drinking water supplies or sensitive ecosystems; and
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

The streamlined risk evaluation presented in the EE/CA (see Section 5.1.2; EKI, 2019) concluded that:

- potential future ecological receptors include worms and other invertebrates as well as nesting birds that may eat those invertebrates;
- potentially impacted media include particulates from degradation of contaminated paint/CM15 coatings at IR Site 29, soil and sediments outside Hangar 1 that may have been impacted by particulates from degradation of contaminated paint/CM15 coatings at IR Site 29, storm water runoff, and nearby surface water bodies; and
- potential exposure pathways for ecological receptors include direct contact and ingestion.[13]

While particulates from the degradation of contaminated paint/CM15 coatings are not likely to contaminate drinking water supplies, these particulates (and/or soil and sediments impacted by these particulates) may affect nearby sensitive ecosystems (e.g., wetlands and burrowing owl habitat); heavy rain and winds are the primary mechanisms by which these particulates may be transported to these ecosystems.

Given that most of the contaminated paint at IR Site 29 is encapsulated, the immediacy of these environmental threats is low.

[13] Ingestion may occur by the direct ingestion of PCB- and lead- impacted materials (e.g., by worms or other small animals living in soils and/or sediments) and the ingestion of these animals by other animals such as birds.

4 ENDANGERMENT DETERMINATION

The presence of CERCLA hazardous substances (i.e., PCBs and lead) at elevated levels in existing paints on the structural elements of Hangar 1 and the failure of the installed CM15 coating led the U.S. EPA to declare the release or threat of release of the contaminants in the building materials at Hangar 1 to be “an imminent and substantial endangerment to the public” (U.S. EPA, 2016b). If no action is taken by NASA, further degradation of the existing CM15 epoxy coating would occur which could result in potentially unacceptable risks to human and ecological receptors.

5 PROPOSED REMOVAL ACTION AND ESTIMATED COST

This section (1) describes the proposed removal action to address existing contamination at IR Site 29, (2) discusses alternative actions considered in the EE/CA and applicable or relevant and appropriate requirements ("ARARs"), and (3) presents the timeframe and estimated cost for the proposed removal action.

5.1 Proposed Action

The Remedial Action Objective ("RAO") for this NTCRA is to control the release of PCBs and lead from remaining impacted paints at Hangar 1, thereby reducing potential risks to human health and the environment from these chemicals. This NTCRA (identified as Alternative 3 in the EE/CA) proposed to meet this RAO by removing all existing PCB- and lead-impacted paint from the structural elements (e.g., the steel frame, CMU walls, and concrete floors) of Hangar 1 via a combination of media blasting,[14] chemical stripping,[15] and/or scraping with hand tools, followed by cleaning (e.g., high-efficiency particulate arrestor ("HEPA") vacuuming and wiping). The removal of PCB-impacted paints from the Hangar 1 structure is consistent with current Toxic Substances Control Act ("TSCA") PCB regulations.[16]

The NTCRA will also address (1) the concrete floor of the hangar if impacts are found in this bulk material and (2) asbestos-containing materials ("ACM") where encountered. However, the NTCRA will not address: (1) exposed soil adjacent to Hangar 1,[17] (2) potential risks from building

[14] Media blasting is a process in which an abrasive media (e.g., sand, copper slag, plastic beads, walnut shells) is introduced into compressed air. The compressed air/abrasive media mixture is then directed through a nozzle at high-velocity towards a desired surface coated with paint or other coatings (e.g., rust) to remove these coatings from the desired surface. It is currently anticipated that a copper slag abrasive media will be used for the abatement of Hangar 1.

[15] Chemical stripping is a process that involves the brushing, troweling, or spraying the chemical stripper onto the coated structure. After a period of between 8- and 24-hours, the chemical and dissolved paint, which has a sludge-like consistency, will be manually scrapped from the coated surface. As there are many different chemical strippers that could potentially be used for the abatement of Hangar 1 and the formulation(s) that will be used is not known at this time, whichever chemical strippers are selected for the abatement of Hangar 1 will be used in accordance with manufacturer instructions and all wastes from chemical stripping (e.g., the sludge-like paints) will be collected, characterized, stored, and disposed of in accordance with applicable laws and regulations.

[16] Although compliant with the laws existing at the time it was applied, paint containing PCBs at concentrations greater than 50 mg/kg is not currently authorized for use under TSCA PCB regulations.

[17] The removal action will not address the soil adjacent to Hangar 1 as it was remediated during the performance of the Navy's NTRCA and because baseline soil sampling data collected from a portion of the unpaved area during the Pilot Study (ACC, 2017) were consistent with the Navy's confirmation soil sampling results (in the 58 confirmation soil samples collected by the Navy, only one sample exceeded the commercial/industrial land use criterion of 320 mg/kg (the reported value was 690 mg/kg and the next highest reported value was 280 mg/kg) and the 95% UCL for the collected lead data was 113 mg/kg). However, exposed soil adjacent to Hangar 1 will be addressed if (1) baseline sampling indicates that the exposed soil has been impacted by degradation of the CM15 epoxy coating (i.e., if PCB or lead concentrations in the baseline samples exceed 1 mg/kg and/or 320 mg/kg, respectively) or (2) the NTCRA results in impacts to the exposed soil (e.g., there is a breach in containment that results in impacts to exposed soil adjacent to the breach). In the event that impacts to exposed soil are determined during baseline sampling or the proposed NTCRA results in impacts to exposed soil, the extent of impacts will be

materials in nearby structures (e.g., Buildings 32 and 33), or (3) other chemicals of concern that may be present in the subsurface (i.e., in soil, groundwater, or soil vapor).

In total, it is estimated that existing visible paint and coatings will be removed from approximately 1,800,000 square feet of structural steel elements and approximately 36,000 square feet of CMU walls within the Hangar 1 structure. Once all visible paint has been removed and a qualified surface coating inspector has confirmed that the abated structural steel elements meet the National Association of Corrosion Engineers ("NACE") 3 / Society for Protective Coatings ("SSPC")-SP-6 surface preparation and visual cleanliness standard, confirmation samples (i.e., wipe samples analyzed for PCBs and lead), will be collected to demonstrate that the cleanup goals have been met. Wastes from abatement activities will be disposed of at permitted off-site disposal facilities in accordance with applicable laws and regulations. No monitoring or inspections of the aboveground structure will be required if the cleanup goals are met.

The following activities will be the key components of this alternative and will be further described in a forthcoming work plan or other appropriate project documentation:

- Erection of scaffolding and construction of negative pressure containment enclosures;
- Media blasting, chemical stripping, and cleaning of the structural steel elements of the Hangar 1 structure, the CMU walls, and the stem walls and/or concrete floors, as necessary;
- Visual inspections and confirmation sampling of the abated surfaces to confirm that the abated surfaces meet the SSPC surface preparation and cleanliness standards and that residual chemical concentrations are consistent with the cleanup goals;
- Perimeter air monitoring;
- Personnel health and safety monitoring;
- Personnel and equipment decontamination;
- Recoating the abated surfaces with protective coatings[18]; and
- Management, characterization, and off-site disposal of abatement wastes at permitted hazardous and/or non-hazardous waste facilities.

Cleanup goals were identified in the EE/CA (EKI, 2019) for the removal of (1) impacted paints from non-porous (e.g., structural steel) and porous (e.g., CMU walls and the concrete floor) building materials, (2) impacted soil (if baseline sampling data indicates that the exposed soil outside Hangar 1 has been impacted by degradation of the CM15 epoxy coating), and (3) ACM; these cleanup goals are summarized in the table below. Additional details about these cleanup goals are presented in the EE/CA.

evaluated and on completion of remediation activities, impacted soil will be excavated and disposed of at a permitted off-Site facility that is being operated in accordance with the CERCLA Off-Site Rule.

[18] To prevent degradation of the steel.

Substrate	Chemicals	Elements	Cleanup Goals
Non-Porous Surfaces	• PCBs • Lead	• Visual Inspection by qualified NACE/SSPC surface coating inspector • Collection and analysis of wipe confirmation samples	• No visible paint remains • Achievement of NACE 3/SSPC SP-6 surface preparation and visible cleanliness standard • PCBs: ≤10 ug/100 cm^2 (high occupancy areas (a)) and <100 ug/100 cm^2 (low occupancy areas (b)) • Lead: <250 ug/ft^2
Porous Surfaces	• PCBs • Lead	• Visual Inspection by qualified NACE/SSPC surface coating inspector • Collection and analysis of bulk confirmation samples	• No visible paint remains • PCBs: ≤1 mg/kg (high occupancy areas (a)) and ≤25 mg/kg (low occupancy areas (b)) • Lead: ≤320 mg/kg
Soil	• PCBs • Lead	• Collection and analysis of bulk confirmation samples[19]	• PCBs: ≤1 mg/kg • Lead: ≤320 mg/kg
ACM	• Asbestos	• Visual Inspection by qualified asbestos inspector	• No ACM remains and that the abated area has been adequately cleaned[20]

Notes

(a) Pursuant to 40 CFR §761.3, high occupancy areas are areas where individuals may be present, without dermal or respiratory protection, for 840 hours or more per year (an average of 16.8 hours or more per week) for non-porous surfaces and for 335 hours or more per year (an average of 6.7 hours or more per week) for porous surfaces and bulk PCB remediation waste.

(b) Pursuant to 40 CFR §761.3, low-occupancy areas are areas where individuals may be present, without dermal or respiratory protection, for less than 840 hours per year (an average of less than 16.8 hours per week) for non-porous surfaces and for less than 335 hours per year (an average of less than 6.7 hours per week) for porous surfaces and bulk PCB remediation waste.

For abated non-porous surfaces (e.g., the steel structure), the cleanup goals for PCBs (i.e., ≤10 ug/100 cm^2 and <100 ug/100 cm^2) are equal to the unrestricted use surface cleanup standards for high and low occupancy areas (40 CFR §761.61(a)(4)(ii)) and the cleanup goal for lead (<250 ug/ft^2) is equal to the dust-lead hazard level (40 CFR §745.65(b)) and California Code of Regulations ("CCR") Title 17 lead-contaminated dust level for interior horizontal surfaces (CCR Title 17 §35035(b)).

For abated porous surfaces (e.g., CMU walls and concrete) and soil, the cleanup goals for PCBs (i.e., ≤1 mg/kg and ≤25 mg/kg) are equal to the unrestricted use cleanup standards for high and low occupancy areas (40 CFR §761.61(a)(4)(iii)[21]) and the cleanup goal for lead (320 mg/kg) is

[19] As discussed in footnote 17, the NTCRA will not address the soil adjacent to Hangar 1 unless baseline sampling indicates that the exposed soil has been impacted by degradation of the CM15 epoxy coating or the NTCRA results in impacts to the exposed soil.

[20] As the abated Hangar 1 structure will not be enclosed immediately following abatement and recoating activities, clearance air samples for asbestos will not be collected.

[21] The U.S. EPA's risk-based disposal letter for PCB bulk product waste at the Ranier Commons Facility (U.S. EPA, 2013), classified concrete beneath PCB-containing paint as a PCB Remediation Waste. 40 CFR §761.61(a)(4)(iii)

the Regional Water Board Environmental Screening Level ("ESL") for lead in soil under a Commercial/Industrial Land Use Scenario (Regional Water Board, 2019).

Because risks from PCBs and lead are assessed based on exposures to "representative concentrations" of these chemicals, the 95% upper confidence limit ("UCL") of the mean concentrations of PCBs and lead in the confirmation samples will be compared to the cleanup goals listed above (U.S. EPA, 2001; DTSC, 2018). The U.S. EPA's ProUCL program (version 5.1.002 or greater; U.S. EPA, 2016a) will be used to calculate 95% UCLs.

Because it is possible that abated non-porous surfaces may be "re-contaminated" with impacted dust from nearby areas during cleaning activities,[22] additional cleaning of specific areas may be necessary to achieve the cleanup goals. To increase the likelihood that the 95% UCL of the mean PCB and lead concentrations within a given abatement area are less than the cleanup goals, the following re-cleaning guidelines will be followed. In the event that:

- A confirmation wipe sample exceeds five times the cleanup goals (i.e., 50 ug/100 cm^2 for PCBs and 1,250 ug/ft^2 for lead), the area will be wiped and/or HEPA vacuumed again and resampled and if the results for the confirmation wipe samples still exceed five times the cleanup goals, additional blasting and cleaning may be conducted in consultation with the Regulatory Agencies; or
- More than 10% of the confirmation wipe samples within a defined abatement area[23] exceed three times the cleanup goal (i.e., 30 ug/100 cm^2 for PCBs and 750 ug/ft^2 for lead), the areas exceeding three times the cleanup goal will be wiped and/or HEPA vacuumed again and resampled and if the results for the confirmation wipe samples still exceed three times the cleanup goal, additional blasting and cleaning may be conducted in consultation with the Regulatory Agencies.

Based on the results from the Pilot Scale Abatement Study of Hangar 1 ("Pilot Study"; ACC, 2017) it is anticipated that the cleanup goals will be met.

5.1.1 Contribution to Remedial Performance

This NTCRA is intended to address the potential ongoing release of contaminants from impacted paint on the aboveground building materials at Hangar 1 (i.e., IR Site 29), thereby

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refers to §761.61(a)(4)(i) which provides a cleanup goal of 1 mg/kg for bulk remediation waste for high occupancy areas (i.e., unrestricted use for both commercial and residential use). Bulk samples of abated porous materials will be collected after the surfaces have been blasted and cleaned to remove residual particulates that may remain after abatement activities. Single depth bulk samples of the substrate beneath abated surfaces of porous materials will be collected in general accordance with the U.S. EPA's Standard Operating Procedure for Sampling Porous Surfaces for PCBs (U.S. EPA, 2011).

[22] it is unlikely that small amounts of impacted dust will significantly affect chemical concentrations in the confirmation bulk media samples and as a result, guidance for when additional cleaning of the abated porous surfaces is not necessary.

[23] Each defined abatement area will be based on (1) the media being abated, (2) the location of said media (e.g., near the floor, near the roof, etc.), and (3) the abatement enclosures that will be constructed during abatement activities. Additional details regarding each defined abatement area will be developed in the sampling and analysis plan that will be prepared for the NTCRA work plan.

mitigating ecological risks and human health risks[24,25] to levels consistent with the existing land use for this area in the NASA EIS (NASA, 2002).

NASA intends the NTCRA to be the final action for IR Site 29 because the NTCRA will remove the impacted paint from the aboveground building materials at IR Site 29. Because the abatement of the Hangar 1 structure will remove the impacted paint (i.e., the source of PCBs and lead to the environment) from the Hangar 1 structure, it will eliminate the need for the long-term monitoring (i.e., the need for coating inspections and maintenance, and for monitoring sediment in the storm drains[26]) required in the Navy's LTMP (Navy, 2013b).

5.1.2 Engineering Evaluation/Cost Analysis

The EE/CA for IR Site 29 (EKI, 2019) was finalized in December 2019 and includes input from the U.S. EPA, the Regional Water Board, and the public. The EE/CA evaluated technologies and alternatives that would be used to achieve the RAO for IR Site 29. The following alternatives were evaluated in the EE/CA to address impacted paint on the structural elements of IR Site 29:

- Alternative 1: No Action[27]
- Alternative 2: Implementation of Institutional Controls
- Alternative 3: Abatement – Media Blasting and Cleaning.

Under Alternative 1, no additional actions will be taken at IR Site 29 and as a result, this alternative would leave the PCB-, lead-, and asbestos-containing building material present at Hangar 1 in their existing state with no requirement for follow-up inspections or maintenance of the existing CM15 epoxy coating. Under this alternative, no further actions to prevent the release of PCBs, lead, or asbestos to the environment will be performed and any future releases would not be mitigated or monitored.

Under Alternative 2, the property owner and/or tenant would (1) conduct operations, maintenance, and monitoring ("OMM") activities (e.g., spot abatement, repair, and recoating activities) and (2) implement ICs to maintain the protectiveness of the NTCRA implemented by the Navy (i.e., the integrity of the CM15 epoxy coating) and limit the exposure of potential receptors to hazardous substances. The requirement to implement the ICs would remain in place unless future response actions are taken that would allow for unrestricted use of the

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[24] The cleanup goals for the aboveground building materials proposed in this Action Memorandum will allow the aboveground building materials at Hangar 1 to be available for unrestricted use for PCBs and commercial/industrial use for lead in porous materials.

[25] As discussed above, the NTCRA will not address soil adjacent to Hangar 1 as it was remediated during the performance of the Navy's NTCRA (AMEC, 2013). If however, the exposed soil has been impacted by degradation of the CM15 epoxy coating (see Section 2.1.3) or the planned NTCRA results in impacts to the exposed soil, the project will achieve the TSCA unrestricted use criterion for high occupancy areas for PCB Remediation Waste (i.e., 1 mg/kg; 40 CFR §761.61(a)(4)(iii)) and the current RSL/ESL for lead under a Commercial/Industrial Land Use Scenario.

[26] Per the Long-Term Monitoring Plan, the purpose of the sediment monitoring is to monitor for contaminated paint chips or corrosion particulates in the storm water runoff (i.e., to detect failure of the CM15 epoxy coating).

[27] The no action alternative is required by the NCP (40 CFR §300.430(e)(6)). The purpose of the no action alternative is to provide a baseline that can be used to judge the effectiveness of the other removal action alternatives.

property. This Alternative achieves the RAO of controlling the release of PCBs and lead from remaining impacted paints at Hangar 1 through encapsulation.

Under Alternative 3, existing PCB- and lead-impacted paints would be removed from the structural elements (e.g., the steel frame, CMU walls, and concrete floors) of Hangar 1 via a combination of media blasting, chemical stripping, and/or scraping with hand tools, followed by cleaning (e.g., by HEPA vacuuming and wiping).

The alternatives were evaluated and compared using the nine NCP evaluation criteria. Alternative 3 was chosen as the preferred alternative because it meets the two threshold criteria of overall protection of human health and the environment and compliance with ARARs and provides the best balance of long-term protectiveness and permanence, short-term exposure, implementability, and cost. Alternative 3 will not require future long-term monitoring or ICs because impacted paints will be removed and disposed of at a permitted off-site disposal facility in accordance with applicable laws and regulations.

The Final EE/CA was reviewed by the U.S. EPA and Regional Water Board (i.e., State) and the agencies concurred that Alternative 3 is an appropriate removal action (U.S. EPA, 2020). In addition, NASA provided a DRAFT of the Final EE/CA to the public for review between 15 August 2019 and 13 September 2019 and held a public meeting to discuss the EE/CA on 27 August 2019 (see Appendix A for the Press Release and Public Meeting Notice). Written comments received by NASA during the public comment period, and responses to all significant comments, are included in the attached responsiveness summary. No significant public comments were received on the DRAFT of the Final EE/CA.

5.1.3 ARARs

This section describes federal and state ARARs for the NTCRA. Only substantive requirements were considered in the evaluation of ARARs for this NTCRA because on-site CERCLA response actions do not need to follow administrative requirements such as issuance of permits, documentation, reporting, and approval or consultation with administrative bodies. As such, administrative requirements are not ARARs and are not identified.[28]

As the lead federal agency, NASA identified federal and state ARARs for the NTCRA in the Final EE/CA. The U.S. EPA and Regional Water Board reviewed the ARARs presented in the Draft EE/CA and proposed additional ARARs for consideration; NASA evaluated the proposed ARARs and included those that were Applicable or Relevant and Appropriate in the Final EE/CA. The federal and state ARARs accepted by NASA for the NTCRA are identified below.

There are three types of ARARs, namely chemical-, location-, and action-specific. Chemical-specific ARARs set limits on concentrations of specific hazardous substances, contaminants, and pollutants in the environment; additional details about applicable chemical-specific ARARs for the proposed NTCRA are provided in Section 5.1.3.1, below. Location-specific ARARs are requirements for activities based on characteristics of the site (e.g., wetlands, historic sites); additional details about applicable location-specific ARARs for the proposed NTCRA are provided in Section 5.1.3.2. The final type of ARARs, action-specific ARARs, are technology-

[28] However, the conditions included in the permits, etc. must be followed.

based restrictions that are triggered by the type of action under consideration; additional details about applicable action-specific ARARs are provided in Section 5.1.3.3.

The NTCRA will comply with all substantive provisions of the chemical-, location-, and action-specific ARARs identified in Table 5-1 through Table 5-3.

5.1.3.1 Chemical-Specific ARARs

Based on the results of the Pilot Study (ACC, 2017), it is anticipated that the removal of all visible paints and coatings from the structural steel elements and concrete surfaces (e.g., CMU walls) and attainment of a NACE 3 / SSPC-SP 6 cleanliness standard for the abated structural steel elements will be sufficient to: reduce residual PCB concentrations below TSCA unrestricted use levels (i.e., ≤10 ug/100 cm^2 for the abated structural steel elements and 1 mg/kg for the decontaminated concrete surfaces[29] (40 CFR §761.61(a)(4)(i) and (ii))) and lead concentrations below the Cleanup Goals (i.e., <250 ug/ft^2 for the abated structural steel elements and 320 mg/kg for the substrate beneath the abated concrete surfaces) and lead hazard levels (66 FR 1205, CCR Title 17, Division 1, Chapter 8, §35035 and §35036).

ARARs involving surface water, drinking water, and groundwater requirements (i.e., 40 CFR §122.44(d), and §131.38); California Health and Safety Code §25349.5 - §25349.14; California State Water Resources Control Board Resolution 88-63; California Water Code §13240, §13241, and §13242[30] will be met through the implementation of Best Management Practices ("BMPs"; e.g., filters and/or barriers at stormwater inlets) identified in a site-specific Storm Water Management Plan (as required pursuant the National Pollutant Discharge Elimination System ("NPDES") Industrial General Permit) during the removal action.

Under this alternative, several Bay Area Air Quality Management District ("BAAQMD") regulations related to particulates, lead, asbestos, and sandblasting (i.e., BAAQMD Regulation 6 Rule 1, Regulation 11 Rule 1, Regulation 11 Rule 2, and Regulation 12 Rule 4) are applicable. Implementation of engineering controls such as the use of fully encapsulating enclosures and the maintenance of negative air pressures within the enclosures will limit potential particulate emissions. Perimeter air monitoring data collected during abatement activities will assist in evaluating the success of the engineering control measures and in demonstrating that the air quality ARARs have been achieved.

Abatement wastes generated in the course of these activities will be characterized and disposed of properly in compliance with RCRA and non-RCRA hazardous waste ARARs (i.e., 40 CFR §262.11; CCR Title 22 §66261.3(a)(2)(C) and (F), §66261.21, §66261.22(a)(1), §66261.22(a)(3) and (4), §66261.23, §66261.24(a)(1) through (8), §66261.100, §66261.101, §66262.11, §66262.34, §66264.13 (a) and (b), §66268.1(f), §66268.40, and §66268.105). In the

[29] As outlined in the U.S. EPA's risk-based disposal letter for PCB bulk product waste at the Rainier Commons Facility (U.S. EPA, 2013), if PCBs are detected in the substrate beneath a PCB Bulk Product Waste, the substrate is defined as a PCB remediation waste that must be addressed in the manner prescribed in 40 CFR §761.61.

[30] While discharges to drinking water, groundwater, and surface water bodies are not planned, particulates from the Abatement of Hangar 1 could be transported aerially into nearby surface water bodies or deposited onto surfaces outside of the hangar where surface water runoff could mobilize particulates into the storm drain system. It is unlikely that potential discharges of particulates from the abatement of Hangar 1 will impact drinking water or groundwater.

event that treatment of the hazardous wastes generated over the course of the remedial action is required, such activities will be performed at, and by, the permitted off-site waste disposal facility (CCR Title 22 §66268.40).

5.1.3.2 Location-Specific ARARs

NASA will work with the State Historic Preservation Office to obtain concurrence that the proposed remedial actions are in compliance with the National Historic Preservation Act (16 USC §470 et seq; 36 CFR Part 800; 40 CFR §6.301).

As a fully encapsulating enclosure will be installed around the areas being abated and NTCRA wastes will be stored and managed in accordance with applicable laws and regulations (see both the chemical- and action-specific ARARs for additional information), materials deleterious to plant, fish, or bird life will not enter waters of the State (California Fish and Game Code §5650).

The Hangar 1 structure and surrounding areas do not support state or federally endangered, threatened, or candidate species, or designated critical habitat for such species (16 USC §1536(a) and (h)(1)(B); CCR Title 14 §783). However, nearby areas do provide habitat for burrowing owls and other birds protected by state and federal laws (16 USC §703), and some birds occasionally nest within the structural steel elements of the hangar (California Fish and Game Code §3503, §3503.5, §3511 and §3513). To mitigate potential impacts to migratory birds, burrowing owls, and other nesting birds, measures will be implemented to (1) exclude nesting birds from Hangar 1 before abatement activities commence and while they are underway and (2) to minimize potential disturbances to nearby burrowing owl habitats and any owls using those habitats. No birds or mammals will be taken except in accordance with an approved mitigation plan (California Fish and Game Code §3005).

5.1.3.3 Action-Specific ARARs

In accordance with the NCP, an EE/CA was prepared (40 CFR §300.415(b)(4)(i)) to evaluate potential remedial alternatives against the threshold and modifying criteria (40 CFR §300.430(e)(9)(iii)); the proposed NTCRA was selected in accordance with 40 CFR §300.430(f).

Impacted structural elements at Hangar 1 will be decontaminated via media blasting or chemical stripping.[31] While 40 CFR §761.79 lists a variety of decontamination standards and procedures for porous and non-porous surfaces in contact with liquid and non-liquid PCBs (e.g., PCB-containing paints), it does not list any accepted decontamination procedures or standards for porous surfaces such as the concrete floors and CMU walls within Hangar 1. In addition, while 40 CFR §761.79(f) indicates that confirmation sampling for non-porous surfaces (as described in 40 CFR §761.79) must be performed in accordance with 40 CFR §761 Subpart P (§761.300 to §761.316), 40 CFR §761 Subpart P was designed for large nearly flat non-porous surfaces and small irregularly shaped non-porous surfaces. Given that the recommended removal action will involve the abatement of approximately 1,800,000 square feet[32] of irregularly shaped non-porous surfaces (i.e., the structural steel elements), confirmation

[31] To minimize potential damage to the historical "board form" markings on the CMU walls, it is anticipated that existing paints and coatings on the CMU walls will be removed using chemical paint strippers and manual scraping.
[32] Of which, approximately 1,010,000 square feet is located at heights greater than 80 feet above ground surface.

sampling in accordance with the sampling frequency and sample selection procedures outlined in 40 CFR §761 Subpart P (§761.300 to §761.316) is not feasible. As such, NASA will consult with the U.S. EPA and Regional Water Board to develop wipe confirmation sampling frequencies and procedures as well as decontamination procedures for the CMU walls and concrete floors; these frequencies, procedures, and standards will be included in the NTCRA Work Plan or one of the appendices to this document.

The PCB-containing paint on the structural elements (e.g., the steel frame, CMU walls, and concrete floors) is regulated as a Bulk PCB Product Waste under TSCA (40 CFR §761.3) at its original concentration (40 CFR §761.79(g)(2)), and as a result, paint-containing abatement wastes (e.g., spent media blasting grit and chemical abatement sludges will be disposed at a permitted off-site hazardous waste landfill (40 CFR §761.62(a)) in accordance with applicable laws and regulations or in a solid waste landfill based on its leaching characteristics (40 CFR §761.62(b)). All PCB wastes with concentrations of 50 parts per million or greater will be disposed of within a one-year period (40 CFR §761.65(a)). Liquid and non-liquid PCB remediation wastes will be disposed of via one of the performance-based disposal options listed in 40 CFR §761.61(b).

Abatement wastes generated in the course of these activities will be stored, managed, and disposed of in compliance with RCRA and non-RCRA hazardous waste ARARs (i.e., 40 CFR §264.554, §761.65(a); 49 CFR Parts 107 and 171-177; CCR Title 22 §66264.171 to §66264.173, §66268.7 and §66268.9(a); CCR Title 23 §2510, §2511(d), §2520(a) to (c), and §2521; CCR Title 27 §20080, §20090(d), §20200(c), §20210, and §20220). Decontamination wastes (i.e., non-liquid cleaning materials and personal protective equipment; 40 CFR §761.79(g)(6)) generated over the course of abatement activities will be disposed of in accordance with 40 CFR §761.61(a)(5)(v)(A).

During implementation of remedial activities, NASA will comply with the requirements of its Industrial General Permit (SWRCB Order Nos. 97-03-DWQ and 2014-0057-DWQ). BMPs (e.g., filters and/or barriers at stormwater inlets) identified in the site-specific Storm Water Management Plan will be implemented to minimize or prevent discharges that may cause adverse surface water impacts (40 CFR §122.26 and 122.41(d)) and all treatment and control systems and facilities will be properly operated and maintained (40 CFR §122.41(e)).

Workers involved in the abatement activities will be protected against dermal contact and inhalation of PCBs and people, equipment, and wastes leaving the enclosure will be decontaminated to prevent the direct release of PCBs to the environment (40 CFR §761.79(e)). All asbestos abatement work will be performed by a licensed asbestos abatement contractor.

Confirmation samples from abated porous surfaces will be extracted and analyzed in accordance with 40 CFR §761.61(a)(6) and §761.292. Confirmation samples of abated non-porous surfaces (40 CFR §761.79(b)(3)) will be collected in accordance with the standard wipe test (40 CFR §761.123 and §761.310) and extracted and analyzed in accordance with (40 CFR §761.272 and §761.314). In accordance with 40 CFR §761.79(f)(2), confirmation samples are not required for movable equipment, tools, and sampling equipment that has been decontaminated in accordance with 40 CFR §761.79(c)(2).

If abatement activities do not achieve the cleanup goals at all locations, alternate mitigation measures such as land use controls (CCR Title 22 §67391.1) will be developed in consultation with the U.S. EPA and Regional Water Board.

5.1.4 Project Schedule

NASA intends to implement the NTCRA in one phase. The schedule for implementation of the NTCRA will be detailed in a forthcoming NTCRA work plan. It is currently anticipated that construction will begin in the third quarter of 2020 and will be complete within approximately 36 months. On completion of the NTCRA, the RAOs for IR Site 29 will be met.

5.2 Estimated Costs

NASA estimated the total capital cost of the NTCRA in the Final EE/CA (Alternative 3) to be approximately $85,800,000 (2019 fiscal year dollars).[33] In accordance with U.S. EPA guidance (U.S. EPA, 1999, U.S. EPA, 2000), the accuracy of the cost estimate for the NTCRA is intended to be within -30 to +50 percent of the actual cost.

This estimated capital cost includes: the removal of all visible paint[34] from the structural steel elements, CMU walls, and concrete floors within Hangar 1; recoating the structural steel with a protective paint; the rental of scaffolding and other equipment necessary to implement this alternative; procurement and construction costs for the setup of the enclosures; abatement materials (e.g., blasting media and chemical paint strippers); the cost of sampling supplies, the performance perimeter air monitoring and confirmation sampling and analytical fees associated with the analysis of these samples; the off-site disposal of removed paints and coatings as a bulk PCB product and off-site disposal of other abatement wastes in accordance with their chemical characteristics[35]; and construction management and reporting. As OMM activities will not be necessary under this alternative, no OMM or present worth costs were estimated.

This cost estimate was based on cost estimates provided by construction and abatement contractors and the actual cost of the NTCRA may vary significantly if unit costs and/or quantities estimated by these entities differ from the amounts assumed in the cost estimate.

[33] As outlined in Appendix C of the Final EE/CA, this estimate does not include the costs associated with scaffolding or the required seismic upgrades that would be conducted following abatement and preceding recoating activities.
[34] And asbestos containing materials where present.
[35] In the EE/CA, several assumptions were made regarding the classification of various waste streams based on previously collected data. As all waste from the NTCRA will be characterized prior to off-site disposal, the various waste streams from the NTCRA will be managed in accordance with the analytical data for these waste streams.

6 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If action should be delayed or not taken, degradation of the CM15 epoxy coating will continue and PCBs and lead from the impacted paint at Hangar 1 will continue to enter the environment which could result in potentially unacceptable risks for both human and ecological receptors.

7 PUBLIC INVOLVEMENT

A draft of the EE/CA was submitted to the U.S. EPA and Regional Water Board (collectively "Regulatory Agencies") on 20 December 2018. The DRAFT EE/CA was significantly revised based on input from the Regulatory Agencies and new information about the implementability of one of the proposed alternatives. The DRAFT Final EE/CA was issued to the public for review on 15 August 2019 with a 30-day comment period ending 13 September 2019. The availability of the EE/CA for public review and an invitation to a public meeting to discuss the EE/CA was published in four local papers[36] and was mailed separately to approximately 1,400 addresses; Appendix D of the Final EE/CA includes copies of the public notices and a quote from the direct mailer. The public meeting was held on 27 August 2019 at 18:00 and was attended by approximately 25 community members.

The responsiveness summary included in Appendix D of the Final EE/CA (EKI, 2019) documents the written comments from the public that were received by NASA and provides responses to all significant comments received. Responses to the written comments from the Regulatory Agencies on the DRAFT EE/CA and the DRAFT Final EE/CA were also included in Appendix D of the Final EE/CA (EKI, 2019).

Community relations activities that are anticipated to be conducted during the NTCRA include:

- The periodic release of fact sheets regarding progress of the removal action; and
- Maintenance of the Information Repository located at the Mountain View Public Library (585 Franklin Street, Mountain View, CA, 94041).

NASA Ames' CERCLA Administrative Record for IR Site 29 is maintained at the NASA Ames Research Center (M/S 204-15, Moffett Field, CA, 94035) and can be reviewed by making and appointment with Mr. Garrett Michael Turner (650-604-1406; garrett.michael.turner@nasa.gov), the Restoration Program Manager for the NASA Ames Research Center; NASA's Administrative Record documents and index are also available for viewing and downloading from NASA Ames' website (https://environment.arc.nasa.gov/).[37]

[36] The San Jose Mercury News, the Palo Alto Weekly, the Sunnyvale Sun, and the Mountain View Voice.

[37] The Administrative Record can also be accessed by appointment at the U.S. EPA's Superfund Record Center (95 Hawthorne Street, San Francisco, CA, 94105; 415-536-3000).

8 OUTSTANDING POLICY ISSUES

No outstanding policy issues are associated with IR Site 29 or this NTCRA.

9 RECOMMENDATION

This Action Memorandum documents, for the Administrative Record, NASA's decision to undertake a NTCRA at IR Site 29 and it was developed in accordance with current EPA guidance documents for removal actions under CERCLA (U.S. EPA, 2009).

The purpose of the recommended NTCRA is to remove contaminated paints from the structure of Hangar 1. As the recommended NTCRA will eliminate the source of contamination at IR Site 29, NASA intends this NTCRA to be the final action at IR Site 29. The actions to be conducted for the NTCRA are recommended because they eliminate the potential for exposure (or reduce it to *de minimus* levels) of future human and ecological receptors, do not involve significant administrative or technical constraints, and are not cost-prohibitive.

Media Blasting and Cleaning (Alternative 3 in the Final EE/CA) is the recommended alternative to address potential risks to human health and the environment from IR Site 29. This action meets the two threshold criteria of overall protection of human health and the environment and compliance with ARARs and provides the best balance of long-term protectiveness and permanence, short-term exposure, implementability, and cost.

This decision document represents NASA's selected NTCRA for IR Site 29 within the NAS Moffett Field Superfund Site, California, developed in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act, and is consistent with the NCP. It is NASA's intention to prepare a Record of Decision for IR Site 29 once the NTCRA has been successfully implemented.

DONALD CHUCK Digitally signed by DONALD CHUCK Date: 2020.11.04 12:02:24 -08'00'

November 4, 2020

Donald M. Chuck
Chief, Environmental Management Division
NASA Ames Research Center

Date

10 REFERENCES

ACC, 2015. PCB, Lead, and Asbestos Sampling Report, Hangar 1 Moffett Federal Airfield, Mountain View, California. ACC Environmental Consultants, 24 February 2015.

ACC, 2017. Pilot Scale Abatement Study of Hangar 1, Hangar One, Moffett Federal Airfield, Mountain View, California. ACC Environmental Consultants, 9 October 2017.

AMEC, 2010. DRAFT Sampling and Analysis Plan (Field Sampling and Quality Assurance Project Plan) for Non-Time-Critical Removal Action for PCB Contamination at Installation Restoration Site 29, Hangar 1, Former Naval Air Station Moffett Field, Moffett Field, California, AMEC Earth & Environmental, Inc., San Diego, CA. January 2010.

AMEC, 2013. Final After Action Completion Report for Non-Time-Critical Removal Action for Polychlorinated Biphenyl (PCB Contamination, Installation Restoration (IR) Site 29, Hangar 1, Former Naval Air Station (NAS) Moffett Field, CA. AMEC Environment & Infrastructure, Inc., San Diego, CA. November 2013.

Benchmark, 2003. Polychlorinated Biphenyl, Lead, and Asbestos Sampling Report. Hangar 1/Moffett Field, Mountain View, California, Benchmark Environmental Engineering, 9 January 2003.

DTSC, 2018. Human Health Risk Assessment (HHRA) Note 3, DTSC-modified Screening Levels (DTSC-SLs), California Department of Toxic Substances Control, Human and Ecological Risk Office, June 2018.

EKI, 2019. Final Hangar 1 Engineering Evaluation/Cost Analysis, Former Naval Air Station Moffett Field, California. EKI Environment & Water, Inc. 12 December 2019.

Harding, 2000. Environmental Baseline Survey, NASA Research Park Parcel 1, Moffett Federal Airfield, Moffett Field, California, Harding Lawson Associates, 18 October 2000.

NASA, 2002. Record of Decision, NASA Ames Development Plan, Environmental Impact Statement. National Aeronautics and Space Administration, November 2002.

Navy, 2008a. Engineering Evaluation/Cost Analysis, Revision 1, Installation Restoration Site 29, Hangar 1, Former Naval Air Station Moffett Field, Moffett Field, California, Tetra Tech, 30 July 2008.

Navy, 2008b. Action Memorandum, Non-Time Critical Removal Action for the PCB Contamination at Installation Restoration Site 29, Hangar 1, Former Naval Air Station Moffett Field, Moffett Field, California, December 2008.

Navy, 2010. Final Work Plan for Non-Time-Critical Removal Action for the PCB Contamination at Installation Restoration Site 29, Hangar 1, Former Naval Air Station Moffett Field, Moffett Field, California, June 2010.

Navy, 2013a. Draft Final Focused Feasibility Study, Installation Restoration Site 29 (Hangar 1), Former Naval Air Station Moffett Field, California, May 2013.

Navy, 2013b. Final Long-Term Management Plan for Non-Time-Critical Removal Action for Polychlorinated Biphenyl Contamination at Installation Restoration Site 29, Former Naval Air Station Moffett Field, California. Department of the Navy, 11 June 2013.

Navy, 2013c. Proposed Plan for Hangar 1, Former Naval Air Station Moffett Field Site 29, Mountain View, California, July 2013.

PRC, 1996. Final Station-Wide Remedial Investigation Report, Moffett Federal Airfield, California, PRC Environmental Management, 21 May 1996.

Regional Water Board, 2019. Environmental Screening Levels, January 2019 (Revision 1), California Regional Water Quality Control Board, San Francisco Bay Region, January 2019.

TT, 2004. Time-Critical Removal Action Completion Report for Hangar 1, Former Naval Air Station Moffett Field, Moffett Field, California, Tetra Tech FW, Inc., 16 March 2004.

U.S. EPA, 1990. Federal Facility Agreement Under CERCLA Section 120 Between the U.S. Environmental Protection Agency and U.S. Department of the Navy and The State of California Represented by the California Department of Health Services and the California Regional Water Quality Control Board, San Francisco Bay Region, August 1990.

U.S. EPA, 1993. Amendment of the Federal Facility Agreement, NAS Moffett Field, U.S. Environmental Protection Agency and U.S. Department of the Navy and The State of California Represented by the California Department of Toxic Substances Control and the California Regional Water Quality Control Board, San Francisco Bay Region, 17 December 1993.

U.S. EPA, 1999. A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents. EPA/540/R-98/031. United States Environmental Protection Agency. July 1999.

U.S. EPA, 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. U.S. Army Corps of Engineers, Hazardous, Toxic, and Radioactive Waste Center of Expertise and U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, July 2000.

U.S. EPA, 2001. Risk Assessment Guidance for Superfund: Volume III – Part A, Process for Conducting Probabilistic Risk Assessment, United States Environmental Protection Agency, Office of Emergency and Remedial Response, December 2001.

U.S. EPA, 2009. Superfund Removal Guidance for Preparing Action Memoranda, U.S. Environmental Protection Agency, Office of Emergency Management, Office of Solid Waste and Emergency Response, September 2009.

U.S. EPA, 2010. Record of Decision Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, California, 16 August 2010.

U.S. EPA, 2011. Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBs), United States Environmental Protection Agency, Region 1, May 2011.

U.S. EPA, 2013. Risk-Based Disposal Approval for Polychlorinated Biphenyl Bulk Product Waste at the Ranier Commons Facility, 3100 Airport Way South, Seattle, WA, EPA ID No. WAD 05123 9994, Letter from the Unites States Environmental Protection Agency to Mr. Shimon Mizrahi (Ranier Commons, LLC) dated 18 December 2013.

U.S. EPA, 2014. Federal Facility Agreement Under CERCLA Section 120 Between the U.S. Environmental Protection Agency and the National Aeronautics and Space Administration and The State of California Represented by the California Regional Water Quality Control Board, San Francisco Bay Region, 14 November 2014.

U.S. EPA, 2016a. ProUCL Software (Version 5.1.002), United States Environmental Protection Agency, 20 June 2016. Downloaded from: https://www.epa.gov/land-research/proucl-software.

U.S. EPA, 2016b. Agreement and Order on Consent for Certain Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC § 9601, *et seq*. Response Activities by PV as the Bona Fide Prospective Purchaser and United States, dated 21 November 2016.

U.S. EPA, 2020. Letter from Lucrina Jones (United States Environmental Protection Agency) to Garrett Turner (National Aeronautics and Space Administration) with Subject Line "EPA Acceptance of the Final Hangar 1 Engineering Evaluation/Cost Analysis, Former Naval Air Station Moffett Field, California" dated 14 January 2020.

TABLE 5-1
LIST OF CHEMICAL-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

Requirement	Description	ARAR or TBC
	TSCA Standards	
PCB Remediation Waste: Cleanup Levels [40 CFR §761.61(a)(4)(i) and (ii)]	40 CFR §761.61(a)(4)(i) and (ii) presents cleanup levels for cleaning, decontaminating, or removing PCB remediation wastes. These cleanup levels are based on the kind of material and the potential exposure to PCBs left after cleanup is completed. The four general waste categories include: bulk PCB remediation waste, non-porous surfaces, porous surfaces, and liquids. The cleanup levels presented below are for non-porous surfaces, porous surfaces, and bulk PCB remediation waste. For high occupancy areas: ● ≤10 ug/100 cm^2 for non-porous surfaces; and ● ≤1 mg/kg for bulk remediation wastes (e.g., soil) and porous surfaces (e.g., decontaminated concrete). For low occupancy areas: ● <100 ug/100 cm^2 for non-porous surfaces; and ● ≤25 mg/kg for bulk remediation wastes (e.g., soil) and porous surfaces (e.g., decontaminated concrete).	Applicable
	Water Quality Standards	
National Pollution Discharge Elimination System - Water Quality Standards [40 CFR §122.44(d)]	Discharges into surface water will achieve federal and state water quality standards (40 CFR §122.44 (d)).	Applicable
Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California [40 CFR §131.38]	The Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California promulgates criteria for priority toxic pollutants in the State of California for inland surface waters and enclosed bays and estuaries. These pollutants include lead and PCBs.	Relevant and Appropriate
Safe Drinking Water and Toxic Enforcement Act of 1986 ("Proposition 65") [State of California Health and Safety Code §25349.5 - §25349.14]	Proposition 65 prohibits the discharge, into a source of drinking water, of chemicals listed in 22 CCR §12000 et seq. The statute also requires that a reasonable warning be given to individuals who may be exposed to listed substances at levels posing an unacceptable risk.	Applicable
San Francisco Bay Basin Water Quality Control Plan ("Basin Plan"). Porter-Cologne Water Quality Control Act [California Water Code §13240, §13241, and §13242]	The Basin Plan outlines surface water quality objectives for selected toxic pollutants and quantifies concentrations of chemical constituents in amounts that adversely affect any designated beneficial use. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface water and groundwater. ● Chapter 2 describes beneficial uses of surface water and groundwater. ● Chapter 3 sets forth water quality objectives for surface water and groundwater. ● Chapter 4 describes implementation plans, discharge prohibitions, and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning. ● Chapter 7 includes the TMDL for PCBs to decrease loading of PCBs to San Francisco Bay.	Relevant and Appropriate
Sources of Drinking Water [California State Water Resources Control Board Resolution 88-63]	The resolution states that all surface waters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply, unless the surface or ground waters contain total dissolved solids in excess of 3,000 mg/L or the waters contain high levels of contamination (unrelated to pollutant releases from the site).	Relevant and Appropriate

TABLE 5-1
LIST OF CHEMICAL-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

Requirement	Description	ARAR or TBC
RCRA/Non-RCRA Hazardous Waste Standards		
Hazardous Waste Determination [40 CFR §262.11 and CCR Title 22 §66262.11]	Person who generates waste shall determine if that waste is a hazardous waste.	Applicable
Definition of non-RCRA Hazardous Waste [CCR Title 22 §66261.3(a)(2)(C) and (F), §66261.22(a)(3) and (4), §66261.24(a)(2) through (8), §66261.101]	Definition of non-RCRA State of California regulated hazardous waste. Establishes numeric criteria for priority toxic pollutants; lists TTLCs and STLCs for classification in the state of California.	Applicable
Land Disposal Restrictions [CCR Title 22 §66262.34]	On-site RCRA hazardous waste accumulation is allowed and must follow the protocols included in this section.	Applicable
RCRA Identification and Listing of Hazardous Waste [CCR Title 22 §66264.13 (a) and (b), §66261.21, §66261.22(a)(1), §66261.23, §66261.24(a)(1), and §66261.100]	Definition of RCRA hazardous waste; these regulations define RCRA hazardous waste if "characteristically" hazardous. TCLP criteria classify RCRA hazardous wastes for off-site disposal of remediation waste.	Applicable
Land Disposal Restrictions [CCR Title 22 §66268.1(f), §66268.40, and §66268.105]	Land disposal restrictions and requirements for hazardous wastes.	Applicable
Federal and California Lead Regulations		
Lead; Identification of Dangerous Levels of Lead [66 FR 1205]	Resident Lead-Based Paint Hazard Reduction Act (Title X) defined a lead-based paint hazard as any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, and lead-contaminated paint that is deteriorated or present in accessible surfaces that would result in adverse human health effects (42 USC 4851b(15)). 66 FR 1205 established dust hazard levels for floors and interior window sills (40 ug/ft^2 and 250 ug/ft^2, respectively) and dust clearance standards for floors, interior window sills, and window troughs (40 ug/ft^2, 250 ug/ft^2, and 400 ug/ft^2, respectively).	Relevant and Appropriate
Lead-contaminated dust [CCR Title 17, Division 1, Chapter 8, §35035]	"Lead-contaminated dust" means dust that contains an amount of lead equal to, or in excess of: (a) 40 ug/ft^2 for interior floor surfaces; or (b) 250 ug/ft^2 for interior horizontal surfaces; or (c) 400 ug/ft^2 for exterior floor and exterior horizontal surfaces.	Applicable
Lead-contaminated soil [CCR Title 17, Division 1, Chapter 8, §35036]	"Lead-contaminated soil" means bare soil that contains an amount of lead equal to, or in excess of, 400 mg/kg in children's play areas and 1,000 mg/kg in all other areas.	Applicable

TABLE 5-1
LIST OF CHEMICAL-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

Requirement	Description	ARAR or TBC
Other Federal and State Guidance		
U.S. EPA RSLs	RSLs (formerly Region IX PRGs) developed by the U.S. EPA with DOE's ORNL combine current U.S. EPA toxicity values with standardized exposure factors to estimate constituent concentrations in soil, groundwater, and ambient air that are protective of humans, including sensitive groups, over a lifetime on a screening-level basis.	TBC
DTSC HERO HHRA Note 3	DTSC HERO HHRA Note 3 outlines the most recent HERO review of the soil, tap water, and ambient air RSLs. HHRA Note 3 presents recommended SLs derived using DTSC-modified exposure and toxicity factors for constituents in soil and tap water for which the DTSC-SL is at least three-fold more protective than the corresponding RSL.	TBC
DTSC HERO HHRA Note 8	DTSC HERO HHRA Note 8 discusses recommendations for evaluating PCBs at contaminated sites in California. HHRA Note 8 presents recommended SL for PCBs in wipe samples of 0.1 ug/100 cm^2.	TBC
Water Board ESLs	The ESLs were developed by the Water Board to address environmental protection goals presented in the Basin Plan. These goals include protection of surface water, groundwater, soil, and soil vapor for human health, drinking water and non-drinking water resources, aquatic and terrestrial biota, and nuisance conditions.	TBC
Air Quality Standards		
BAAQMD Regulation 6 Rule 1	Regulation 6 Rule 1 limits the emission of particulates.	Applicable
BAAQMD Regulation 11 Rule 1	Regulation 11 Rule 1 prohibits the discharge of lead at concentrations in excess of 1 microgram per cubic meter (as measured at ground level) above background concentrations of lead averaged over 30-days.	Applicable
BAAQMD Regulation 11 Rule 2	Regulation 11 Rule 2 describes the asbestos management requirements during demolition and renovation projects.	Applicable
BAAQMD Regulation 12 Rule 4	Regulation 12 Rule 4 apply to media blasting operations (other than permanent abrasive blasting operations or equipment) and outline standards and requirements for the performance of media blasting activities.	Applicable

TABLE 5-1
LIST OF CHEMICAL-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

Requirement	Description	ARAR or TBC
	Local Guidance	
NASA Lead Management Plan [APR 8715.1, Chapter 35]	Rules set forth for NASA Occupational Safety, Health, and Medical Services with respect to inspecting, assessing, monitoring and remediation of lead.	TBC
NASA Lead Management Plan [APR 8715.1, Chapter 35]	● Floor wipe: <40 ug/ft^2; and ● Interior horizontal surfaces: 400 ug/ft^2.	TBC
NASA Asbestos Management Plan [APR 8715.1, Chapter 30]	Rules set forth for NASA Occupational Safety, Health, and Medical Services with respect to inspecting, assessing, monitoring and remediation of asbestos.	TBC
MFA Leasehold TCLs	● 320 mg/kg for lead in soil; and ● 1 mg/kg for PCBs in soil.	TBC

Abbreviations

ARAR: applicable or relevant and appropriate requirement
CCR: California Code of Regulations
DOE: Department of Energy
DTSC: Department of Toxic Substances Control
ESL: Environmental Screening Level
HERO: Human and Ecological Risk Office
HHRA: human health risk assessment
mg/kg: milligrams per kilogram
mg/L: milligrams per liter
NASA: National Aeronautics and Space Administration
ORNL: Oak Ridge National Laboratory
PCB: polychlorinated biphenyl
PRG: preliminary remediation goals
RSL: Regional Screening Level
SL: screening level
TBC: to be considered
TCL: target concentration level
TMDL: total maximum daily load
TSCA: Toxic Substances Control Act
ug/100 cm^2: micrograms per 100 square centimeters
ug/ft^2: micrograms per square foot
U.S. EPA: United States Environmental Protection Agency
Water Board: Regional Water Quality Control Board, San Francisco Bay Region

Notes

(a) Implementation of Federal Clean Air Act requirements has been delegated, in part, to California. The BAAQMD is the local implementing agency.

TABLE 5-2
LIST OF LOCATION-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

Requirement	Description	ARAR or TBC
Federal Regulations		
National Historic Preservation Act of 1966 [as amended 16 USC §470 et seq; 36 CFR, Part 800; 40 CFR §6.301]	Action to preserve historic properties; planning of action to minimize harm to properties listed on or eligible for listing on the NRHP. Hangar 1 is included in the Shenandoah Plaza Historic District which was added to the NRHP in 1994.	Applicable
Migratory Bird Treaty Act of 1972 [16 USC §703]	The Act protects migratory birds (listed at 50 CFR §10.13) from unregulated takings which can include poisoning from hazardous waste sites.	Relevant and Appropriate
Endangered Species Act of 1973 [16 USC §1536(a), (h)(1)(B)]	The federal Endangered Species Act requires that actions conserve endangered or threatened species and critical habitat.	Relevant and Appropriate
State Regulations		
California Endangered Species Act [CCR Title 14 §783]	The California Endangered Species Act protects wildlife and plants listed as threatened and endangered. The act requires state agencies to conserve threatened and endangered species. This section pertains to the incidental take of endangered, threatened, and candidate species, if required.	Relevant and Appropriate
California Fish and Game Code [§5650]	Prohibits the deposition or placing of material deleterious to plant, fish, or bird life where it can pass into waters of the State.	Relevant and Appropriate
California Fish and Game Code [§3005, §3503, §3503.5, §3511 and §3513]	§3005 prohibits the taking of birds or mammals except in accordance with an approved mitigation plan. Protect nesting birds (including raptors and passerines) under §3503.5 and §3513; birds of prey under §3503.5 (including hawks, falcons and owls); fully protected birds under §3511.	Relevant and Appropriate
Local Guidance		
NASA ARC Burrowing Owl Habitat Management	Protects western burrowing owl (Athene cunicularia hypogea).	TBC
NASA HRPP	The HRPP established criteria and guideline for the ongoing preservation and maintenance of historic resources within the Shenandoah Plaza Historic District.	TBC

Abbreviations
ARAR: applicable or relevant and appropriate requirement
HRPP: Historic Resources Protection Plan
NRHP: National Register of Historic Places
TBC: to be considered
USC: United States Code

TABLE 5-3
LIST OF ACTION-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

Requirement	Description	ARAR or TBC
RCRA/Non-RCRA Hazardous Waste Standards		
Staging Piles [40 CFR §264.554]	Regulation is part of the RCRA corrective action management unit regulations and allows hazardous waste generators to accumulate remediation wastes in staging piles for storage without triggering land disposal restrictions.	Applicable
Hazardous Materials Transportation Regulations [49 CFR Parts 107, 171-177]	Federal regulations were established for the safe and secure transportation of hazardous materials in commerce under the federal hazardous materials transportation law (49 USC §5101 et seq.). These regulations are applicable to those who cause hazardous materials to be transported and to those who manufacture or maintain a packaging or a component of a packaging qualified for use in the transportation of a hazardous material.	Applicable
Containers for Storing RCRA Hazardous Waste [CCR Title 22 §66264.171 to §66264.173]	Regulations pertain to the condition of the containers to be used to store hazardous wastes, the compatibility of the hazardous waste with the storage containers, and the management of containers.	Applicable
Management of Hazardous Waste [CCR Title 22 §66268.7 and §66268.9(a)]	Provides testing, tracking, and recordkeeping requirements for generators, treaters, and disposal facilities and special rules for wastes that exhibit RCRA characteristics.	Applicable
Discharges of Hazardous Waste to Land - Applicability Exemptions [CCR Title 23 §2510 and §2511(d)]	Actions taken by or at the direction of public agencies to cleanup or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment; provided that wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to CCR Title 23 §2520; and further provided that remedial actions intended to contain such wastes at the place of release shall implement applicable provisions of this chapter to the extent feasible.	Relevant and Appropriate
Discharges of Hazardous Waste to Land - Waste Classification and Management [CCR Title 23 §2520(a) to (c) and §2521]	Applicability and classification criteria. Requires that Hazardous Waste be managed according to Chapter 11 of Division 4.5 of Title 22 of this code (i.e., Title 22 §66260 et seq.) and that hazardous wastes only be discharged at Class I management units unless the wastes qualify for a variance under Title 22 §66260.210.	Applicable
Discharge Requirements - Hazardous and Designated Wastes [CCR Title 27 §20080, §20200(c), §20210, and §20220]	Requires that designated waste as defined at California Water Code §13173 be discharged to Class I or Class II waste management units and requires that nonhazardous solid waste as defined at §20210 or §20220 be discharged to a classified waste management unit. CCR Title 27 §20230 allows inert waste to be discharged at units that are not classified. Because this removal action is conducted under CERCLA, all site waste must be disposed of in accordance with the CERCLA Off-Site Rule; therefore, §20230 is not applicable to the removal action.	Applicable
Treatment, Storage, Processing or Disposal of Solid Waste - Exemptions [CCR Title 27 §20090(d)]	Actions taken by or at the direction of public agencies to cleanup or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment; provided that wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to the SWRCB-promulgated sections of Article 2, Subchapter 2, Chapter 3, Subdivision 1 of this division (§20200 et seq.); and further provided that remedial actions intended to contain such wastes at the place of release shall implement applicable SWRCB-promulgated provisions of this division to the extent feasible.	Relevant and Appropriate

TABLE 5-3
LIST OF ACTION-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

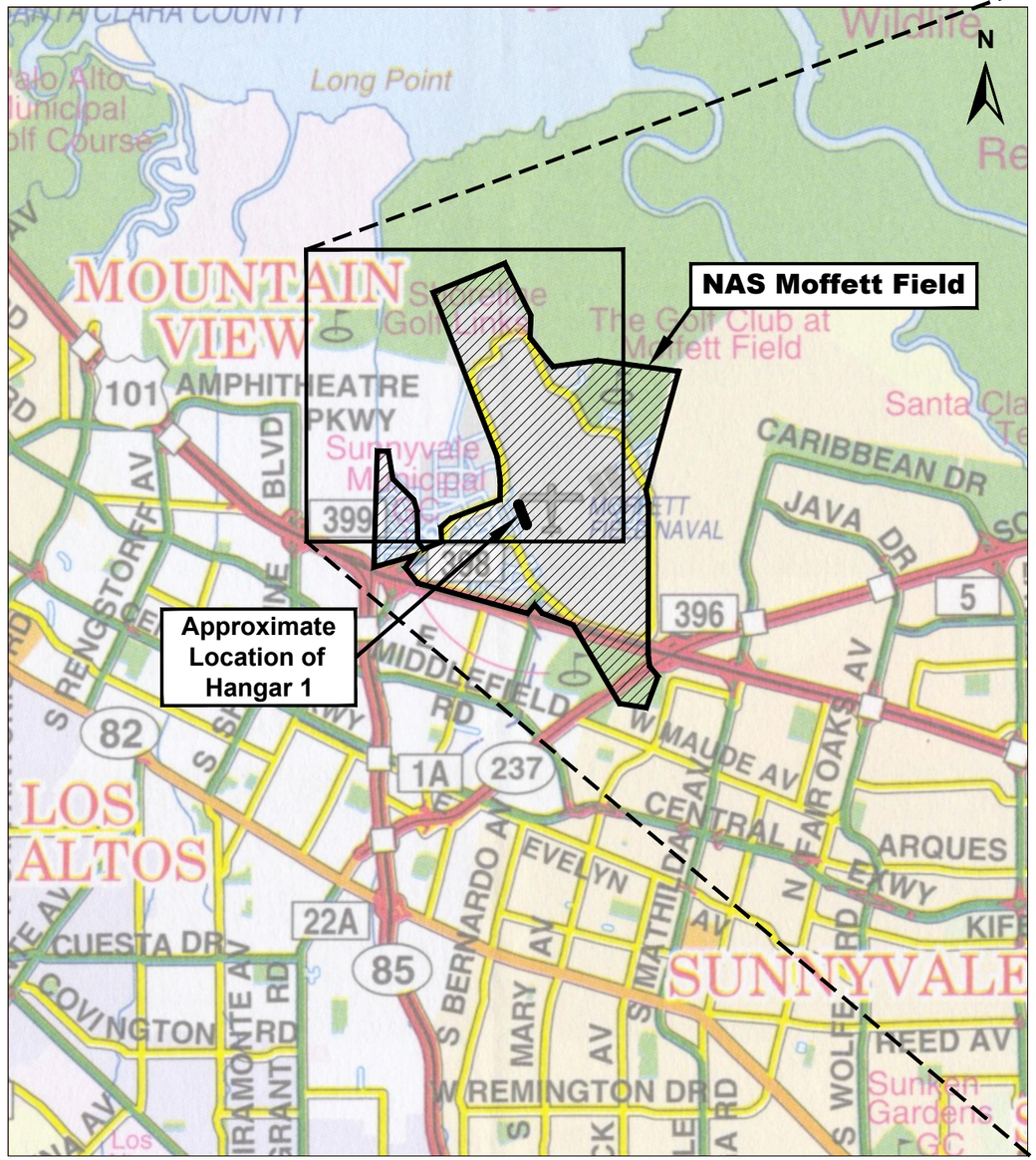
Requirement	Description	ARAR or TBC
	TSCA Disposal Standards	
PCB Remediation Wastes: Cleanup Wastes [40 CFR §761.61(a)(5)(v)(A)]	§761.61(a)(5)(v)(A) requires that non-liquid cleaning materials and personal protective equipment waste at any concentration, including non-porous surfaces and other non-liquid materials such as rags, gloves, booties, and other disposable personal protective equipment, and similar materials resulting from cleanup activities be either decontaminated in accordance with §761.79(b) or (c) or disposed of in one of the following facilities: ● a permitted municipal solid waste facility; ● a permitted non-municipal solid waste facility; ● a hazardous waste landfill; or ● a PCB disposal facility.	Applicable
PCB Remediation Waste: Performance-Based Disposal [40 CFR §761.61(b)]	Lists decontamination methods and disposal options for liquid and non-liquid PCB remediation wastes and PCB remediation waste dredged or excavated from waters of the United States.	Applicable
PCB Bulk Product Waste: Performance-Based Disposal and Disposal in Solid Waste Landfills [40 CFR §761.62(a) and (b)]	PCB bulk product wastes may be disposed of via one of the performance based disposal options listed under §761.62(a) (e.g., in a hazardous waste landfill, by thermal decontamination, or decontamination) or in a solid waste landfill based on its leaching characteristics as described in §761.62(b).	Applicable
Disposal of PCB wastes (50 ppm or greater) [40 CFR §761.65(a)]	§761.65(a) requires disposal of PCB wastes with concentrations 50 ppm or greater within one year of storage.	Applicable
PCB Decontamination Standards and Procedures: Movable Equipment [40 CFR §761.79(c)(2)]	Decontamination procedures for movable equipment, tools, and sampling equipment.	Applicable
PCB Decontamination Standards and Procedures: Decontamination Waste and Residues [40 CFR §761.79(g)(2)]	PCBs physically separated from non-regulated wastes during decontamination (e.g., media blasting) are regulated for disposal at their original concentration.	Applicable
PCB Decontamination Standards and Procedures: Decontamination Waste and Residues [40 CFR §761.79(g)(6)]	Requires that non-liquid cleaning materials and personal protective equipment waste at any concentration, including non-porous surfaces and other non-liquid materials such as rags, gloves, booties, other disposable personal protective equipment, and similar materials resulting from decontamination be disposed of in accordance with 40 CFR §761.61(a)(5)(v)(A).	Applicable
	TSCA Confirmation Sampling and Other Requirements	
PCB Decontamination Standards and Procedures: Limitation of Exposure and Control of Releases [40 CFR §761.79(e)]	Discusses requirements to protect against direct release of PCBs to the environment from the decontamination area and the use of protective equipment by persons participating in decontamination activities to protect against dermal contact or inhalation of PCBs or materials containing PCBs.	Applicable
PCB Decontamination Standards and Procedures: Sampling and Recordkeeping - Confirmation Sampling [40 CFR §761.79(f)(2)]	Confirmation sampling is not required for the decontamination of movable equipment decontaminated in accordance with 40 CFR §761.79(c)(2).	Applicable
Subpart N - Cleanup Site Characterization Sampling for PCB Remediation Waste in Accordance with §761.61(a)(2): Chemical Extraction and Analysis [40 CFR §761.272)]	40 CFR §761.272 requires that PCBs must be extracted using U.S. EPA Method 3500B/3540C or U.S. EPA Method 3500B/3550B and that extracts from these samples be analyzed using U.S. EPA Method 8082.	Applicable

TABLE 5-3
LIST OF ACTION-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

Requirement	Description	ARAR or TBC
TSCA Confirmation Sampling and Other Requirements (continued)		
Subpart O - Sampling to Verify Completion of Self-Implementing Cleanup and On-Site Disposal of Bulk PCB Remediation Waste and Porous Surfaces in Accordance with §761.61(a)(6): Chemical Extraction and Analysis [40 CFR §761.292)]	40 CFR §761.292 requires that PCBs must be extracted from the bulk remediation waste samples using U.S. EPA Method 3500B/3540C or U.S. EPA Method 3500B/3550B and that extracts from these samples be analyzed using U.S. EPA Method 8082.	Applicable
Subpart P - Sampling Non-Porous Surfaces for Decontamination under 40 CFR §761.79(b)(3): Collecting the Sample [40 CFR §761.310)]	Wipe samples will be collected in accordance with the standard wipe test as defined in 40 CFR §761.123.	Applicable
Subpart P - Sampling Non-Porous Surfaces for Decontamination under 40 CFR §761.79(b)(3): Chemical Analysis [40 CFR §761.314)]	Requires chemical analysis of the wipe samples in accordance with 40 CFR §761.272.	Applicable
Other Federal Regulations		
NCP [40 CFR §300.415(b)(4)(i)]	Requires the preparation of an EE/CA.	Applicable
NCP [40 CFR §300.430(e)(9)(iii) and 40 CFR §300.430(f)]	The NCP is the federal government's framework for responding to both oil spills and hazardous substance releases. The NCP provides a framework for evaluating removal action alternatives. Potential remedial alternatives will be evaluated against the nine criteria identified in 40 CFR §300.430(e)(9)(iii) and a preferred remedial alternative will be selected in accordance with 40 CFR §300.430(f).	Applicable
Other State Regulations		
Requirements for Land Use Restrictions [CCR Title 22, §67391.1]	Requires the execution and recording of a land use covenant imposing appropriate limitations on the use of the property when hazardous materials or substances remain on the property at levels not suitable for unrestricted use of the property.	Relevant and Appropriate
Water Quality Standards		
NPDES [40 CFR §122.26, §122.41(d), and §122.41(e)]	Requirements to ensure storm water discharges from remedial action activities do not contribute to a violation of surface water quality standards. All reasonable steps will be taken to minimize or prevent discharges which have a reasonable likelihood of causing adverse impacts on surface water quality (40 CFR §122.41(d)). All treatment and control systems and facilities will be properly operated and maintained (40 CFR §122.41(e)).	Applicable
NPDES Industrial General Permit For Storm Water Discharges and Non-Storm Water Discharges [SWRCB Order No. 97-03-DWQ and SWRCB Order No. 2014-0057-DWQ]	During implementation of the EE/CA, NASA will comply with the requirements of its Industrial General Permit for storm water discharges.	Relevant and Appropriate
Local Guidance		
NASA Construction Safety Management [APR 8715.1, Chapter 27]	Rules set forth for work under the jurisdiction of Ames Research Center.	TBC

TABLE 5-3
LIST OF ACTION-SPECIFIC ARARs AND TBCs
DRAFT Hangar 1 Action Memorandum
Former Naval Air Station Moffett Field, California

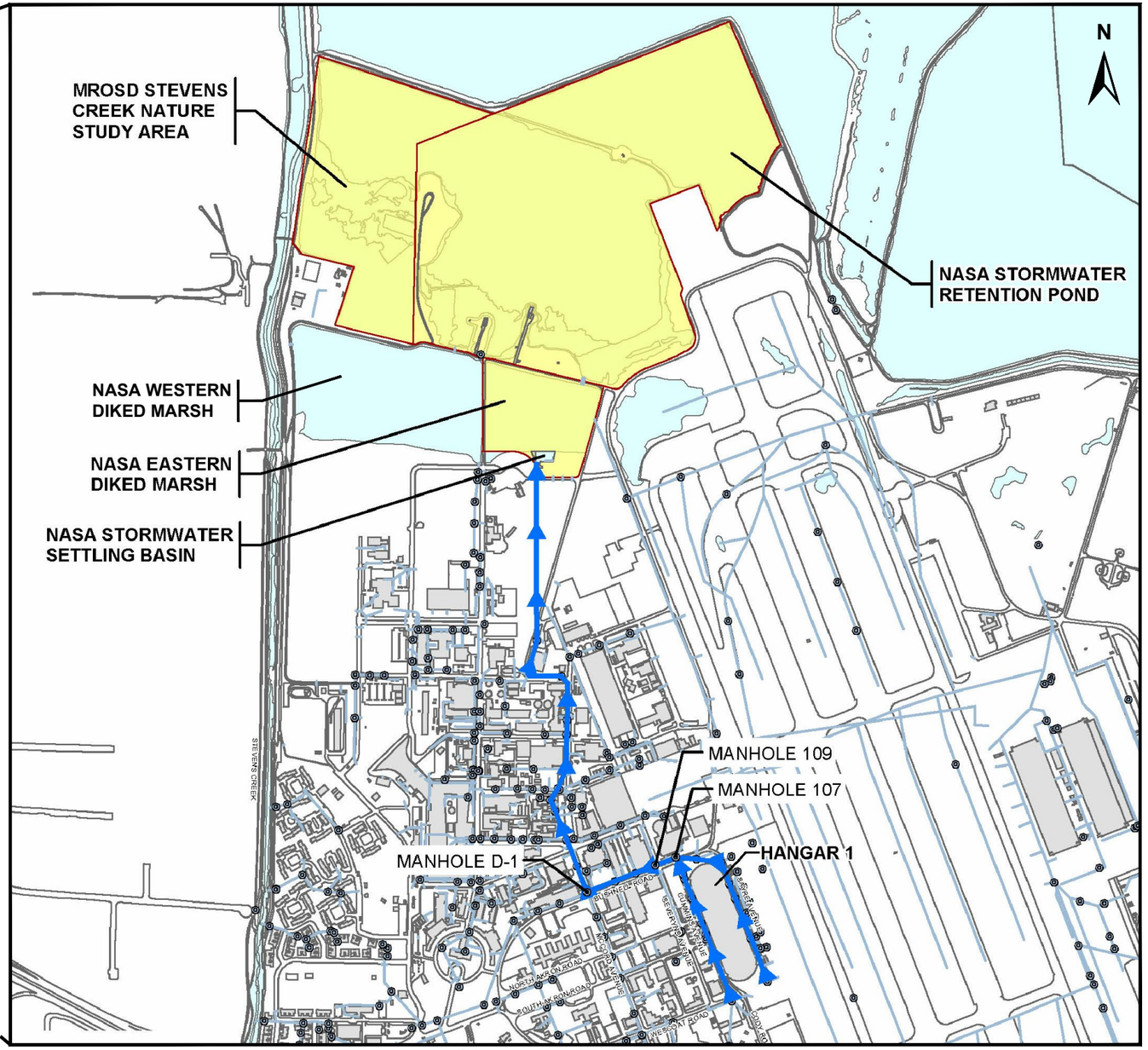
Abbreviations
ARAR: applicable or relevant and appropriate requirement
BAAQMD: Bay Area Air Quality Management District
CCR: California Code of Regulations
CFR: Code of Federal Regulations
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CWA: Clean Water Act
NASA: National Aeronautics and Space Administration
NCP: National Oil and Hazardous Substances Pollution Contingency Plan
NPDES: National Pollutant Discharge Elimination System
PCB: polychlorinated biphenyl
ppm: parts per million
RCRA: Resource Conservation and Recovery Act
STLC: soluble threshold limit concentration
TBC: to be considered
TCLP: toxicity characteristic leaching procedure
TSCA: Toxic Substances Control Act
TTLC: total threshold limit concentration
Water Board: Regional Water Quality Control Board, San Francisco Bay Region



Key Map

0 5,000 10,000

(Scale in Feet)



Storm Drain System

0 1,200 2,400

(Scale in Feet)

Legend:

- Manhole
- Base-Wide Stormwater System
- Stormwater Flow from Hangar 1 to Stormwater Settling Basin
- Site 25
- Building
- Water/Wetland

Notes:

1. All locations are approximate.
2. Basemap source: Rand McNally San Francisco Bay Area Regional Map, dated 2013.

Abbreviations:

NAS = Naval Air Station
MROSD = MidPeninsula Regional Open Space District
NASA = National Aeronautics and Space Administration

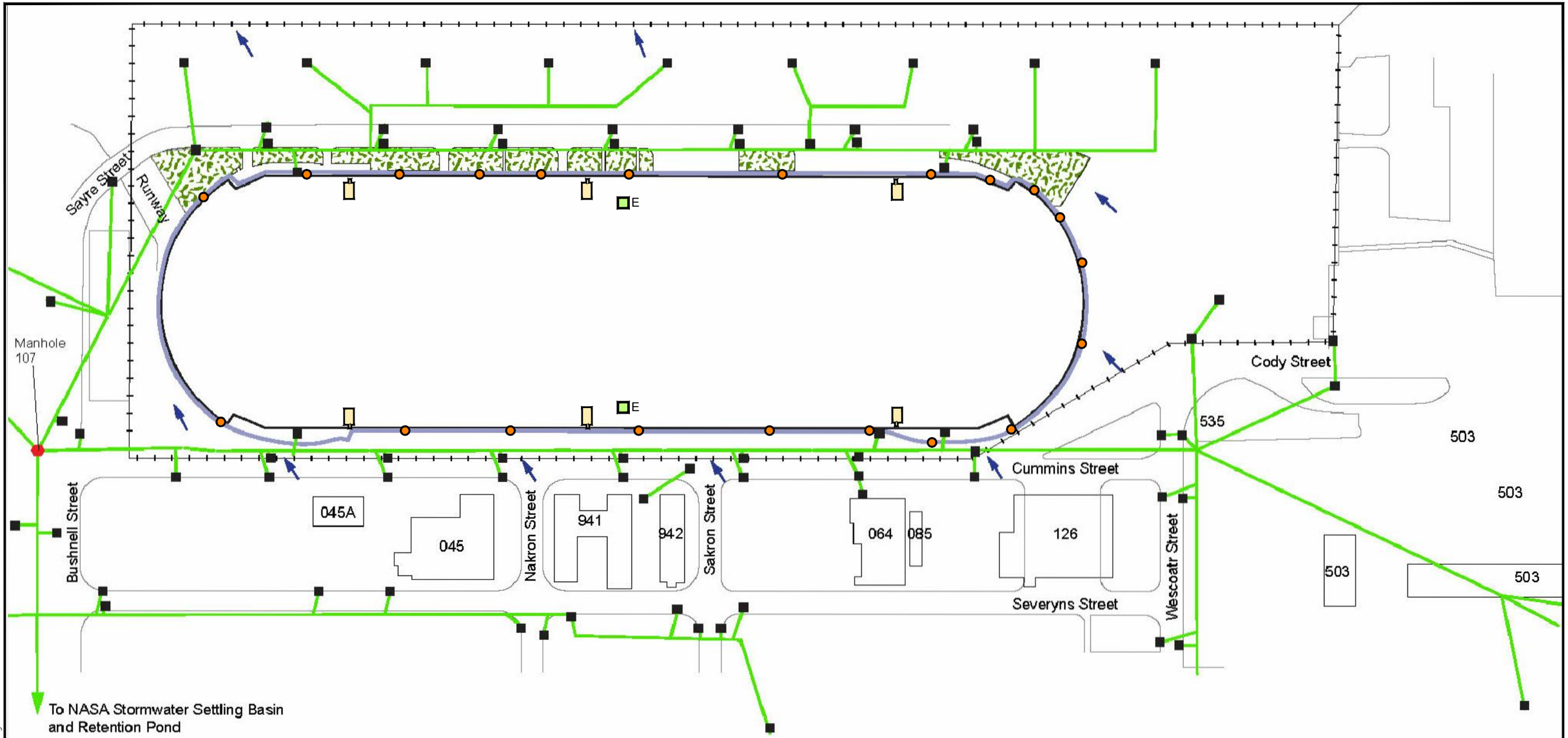
Location of Former NAS Moffett Field and the Storm Drain System Around Hangar 1

Former NAS Moffett Field
Mountain View, CA
November 2020
EKI B20019.191

Figure 1

eki environment & water

20190611.14285 G:\B20019.19\2019-06\Figure 1.dwg Layout1



Legend:

- Electrical Vault
- E — Elevator Pit
- Perimeter Trench Outfalls
- Storm Drain Catch Basin
- Manhole
- Hangar Perimeter Trench
- Site Boundary Fence
- Landscape Soil Areas
- Surface Flow Direction
- Storm Drains

Notes:

1. All locations are approximate.
2. Basemap source for surface features: Final After Completion Report for Non-Time-Critical Removal Action for Polychlorinated Biphenyl (PCB) Contamination, Installation Restoration (IR) Site 29, Hangar 1, Former Naval Air Station (NAS) Moffett Field, Moffett Field, California, AMEC Environment & Infrastructure, Inc., 19 November 2013.
3. Storm Drain source: Final Storm Water Pollution Prevention Plan for Non Time Critical Removal Action for Polychlorinated Biphenyl (PCB) Contamination, Installation Restoration (IR) Site 29, Hangar 1 Former Naval Air Station (NAS) Moffett Field, Moffett Field, California. AMEC Earth & Environmental, Inc., 27 May 2010.

N

0 120 240

(Scale in Feet)

Hangar 1 Footprint, Existing Surface Features, and Surface Flows and Storm Drain System

Former NAS Moffett Field
Mountain View, CA
November 2020
EKI B20019.191

Figure 2

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20180827.0916577 G:\B20019.19\2018-09\Figure 2.dwg Figure 2