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**SURFACE WATER AND SEDIMENT ADDENDUM TO THE  
PHASE I FIELD SAMPLING PLAN FOR  
GROUNDWATER, SURFACE WATER, AND SEDIMENT  
SANTA SUSANA FIELD LABORATORY SITE  
AREA IV RADIOLOGICAL STUDY**

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**TO:** Nicole Moutoux, EPA Region 9 RPM  
**FROM:** Terry Stewart Williford, HGL Geologist  
**THROUGH:** L. Steven Vaughn, HGL Project Manager  
**CC:** Mary Aycock, EPA Region 9 RPM  
Craig Cooper, EPA Region 9  
Gregg Dempsey, Technical Advisor  
**DATE:** December 6, 2010  
**SUBJECT:** FSP Addendum for Surface Water and Sediment  
**CONTRACT NO:** EP-S7-05-05  
**TASK ORDER NO:** 0038

## **INTRODUCTION**

HydroGeoLogic, Inc. (HGL) has been tasked by the U. S. Environmental Protection Agency (USEPA) to conduct a radiological characterization study of the Santa Susana Field Laboratory (SSFL) at Area IV and the Northern Buffer Zone (NBZ) located in Ventura County, California. This work is being executed under USEPA Region 7 Architect and Engineering Services Contract EP-S7-05-05, Task Order 0038. The technical lead on the project is USEPA Region 9.

This document supports the field implementation of the surface water and sediment sampling program and is an addendum to the Final Phase I Field Sampling Plan (FSP) for Groundwater, Surface Water, and Sediment (HGL, 2010). A description of the overall project goals, data quality objectives, sampling strategy, laboratory analytical suites, data quality control, and data evaluation are described in the FSP.

## **PURPOSE**

The purpose of this addendum is to document the changes made to the surface water and sediment sampling location maps and completed action items based on the comments recorded at the Technical Breakout Session held on November 18, 2010.

## **REVISIONS TO THE SURFACE WATER SAMPLING LOCATION MAP**

Revisions made to the surface water sampling location map (Figure 1) are as follows:

- EPASW37 – Added to investigate the surface water that may originate from the sodium burn pit area and receives surface run off from the Arness fire road located in the northwest corner of the NBZ.
- EPASW38 – Added to investigate the surface water received from the fire road located in the northwest corner of the NBZ that leads to the RD-33 cluster of wells.
- EPASW39 – Added to focus sampling efforts downgradient of Outfall 3 and the Radiological Materials Disposal Facility.
- EPASW40 – Added to characterize the surface water leaving the Area IV to the southeast.

## **REVISIONS TO THE SEDIMENT SAMPLING LOCATION MAP**

Revisions made to the sediment sampling location map (Figure 2) are as follows:

- EPASED15A (alternate location) – This location was eliminated in order to focus sediment sampling efforts to the areas of primary concern.
- EPASED15 - Relocated in order to focus sediment sampling locations in drainages downgradient of roads that may have been used to facilitate the release of discarded waste.
- EPASED34 - Relocated to be co-located with surface water sample EPASW34. The original location was in the drainage located in the southern portion of Subarea 5B. The drainage will be sampled as part of the Subarea 5B soil sampling program.
- EPASED36 - Added to investigate the sediment that may have originated in the sodium burn pit area or from the Arness fire road located in the northwest corner of the NBZ.
- EPASED37 - Added to characterize sediment that potentially originated from the 56 Landfill located northwest of the Building 56 excavation.
- EPASED38 - Added to characterize sediment transported downgradient from the SNAP area.
- EPASED39 - Added to characterize sediment transported downgradient from roads that may have been used to facilitate the release of discarded waste.
- EPASED40 - Added in an effort to further evaluate the plutonium result reported in the Boeing paper “Plutonium-238 at Brandeis-Bardin” (Boeing, 2008).

Additional samples will be collected in drainages throughout Area IV and the NBZ as part of the soil sampling program. These samples will be designated as drainage samples and will target areas where sediment samples have not been located. For example, drainages in the southern portion of Area IV do not have sediment samples located within them, but drainage samples will be collected as part of the soil sampling program. The drainage sample locations and the site specific analytes will be presented in each of the soil sampling program subarea addendums.

## ACTION ITEMS FROM NOVEMBER TECHNICAL BREAKOUT SESSION

A total of seven action items were recorded during the Technical Breakout Session held on November 18, 2010. Below is a list of those action items and the current status of their completion.

- **Action Item 1:** Add the list of damaged and abandoned wells not sampled during the Phase I Groundwater sampling event to the Share Point web site.

**Status:** Table 4.1 presents the wells that were not sampled during the Phase I groundwater sampling because they were damaged or abandoned.

**Table 1**  
**Abandoned and Damaged Wells**

<b>RD-25</b>	Abandoned/Well has been completely abandoned.
<b>RD-28</b>	Abandoned/Well has been completely abandoned.
<b>RD-30</b>	Abandoned/Well has been permanently capped.
<b>RD-74</b>	Damaged/Obstruction at 70 feet bgs.
<b>RD-89</b>	Damaged/Obstruction at 40 feet bgs.
<b>RS-28</b>	Abandoned/Well has been permanently capped.
<b>PZ-051</b>	Damaged/Well casing bent. Transducer stuck in well.
<b>PZ-097</b>	Damaged/Well casing bent.
<b>PZ-099</b>	Abandoned/Well has been completely abandoned.
<b>PZ-104</b>	Damaged/Well casing bent.
<b>PZ-107</b>	Damaged/Well casing bent.
<b>PZ-115</b>	Damaged/Well casing melted and bent.

- **Action Item 2:** Add offsite well in Runkle Canyon to list of offsite wells to be sampled.

**Status:** The Runkle Canyon Well (OS-21) has been added to the offsite well sampling program and will be sampled during the Phase II groundwater sampling event.

- **Action Item 3:** Check into adding the southern buffer zone well WS9A (NASA well) to the offsite well sampling program.

**Status:** Well WS9A, located in Area II, has been added to the offsite well sampling program and will be sampled during the Phase II groundwater sampling event.

- **Action Item 4:** Evaluate groundwater data to establish whether tritium plume is adequately defined or whether additional wells are needed.

**Status:** The results of the Phase I and II groundwater sampling events will be evaluated and potential future actions will be discussed with DTSC and DOE.

- **Action Item 5:** Research solvent (TCE) effect on the fate and transport of radionuclides in groundwater.

**Status:** A literature search has been conducted and one document has been found. USEPA is currently in the process of acquiring the document.

- **Action Item 6:** Is there enough coverage (sampling locations) at Outfall 3 (previously detected Sr-90).

**Status:** An additional sediment sample has been added downgradient of Outfall 3 to better characterize any potential run-off from the Radiological Materials Handling Facility.

- **Action Item 7:** California Department of Health Services (CADPH) analysis of Area IV well exceedances 4-5 years ago.

**Status:** Document has been supplied by Boeing (CADPH and H&A, 2004).

## **REFERENCES**

The Boeing Company (Boeing), 2008. Plutonium-238 at Brandeis-Bardin, Paper in response to Various Recent Queries by DTSC and Statements by a Member of the Public Regarding Plutonium-238 Results for Soil on Brandeis-Bardin Property. July 29, 2008.

California Department of Health Services (CADHS) and Haley and Aldrich, Inc. (H&A), 2004. Radioactive Contamination in Groundwater at Santa Susana Field Laboratory for the Years 1989 through 2002, Prepared by the California Department of Health Services, December 2004.

HydroGeoLogic, Inc., 2010. Final Phase I Field Sampling Plan for Groundwater, Surface Water, and Sediment, Area IV Radiological Study, Santa Susana Field Laboratory, Ventura County, California. July 28, 2010.

## **ATTACHMENT**

Attachment 1    Figures

**ATTACHMENT 1**

**FIGURES**

- Figure 1      Surface Water Sampling Locations  
Figure 2      Sediment Sampling Locations

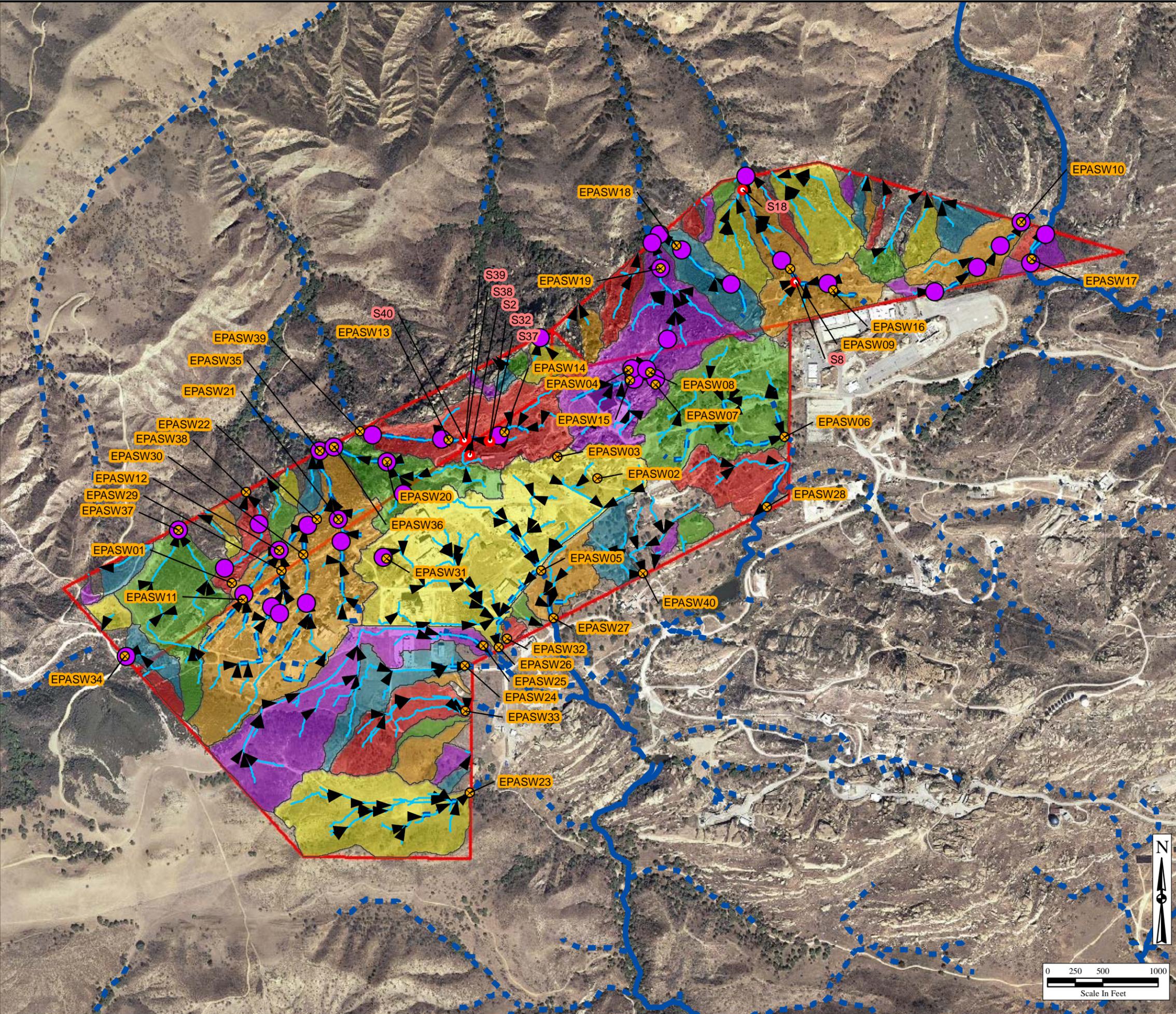
**Figure 1**  
**Surface Water, Seeps, and Drainage**

**U.S. EPA Region 9**



**Legend**

-  Seeps and Springs
-  Surface Water Samples
-  Drainage Pathways
-  Intermittent Stream
-  Permanent Stream
-  Area IV and NBZ
-  Catchments (Multi-Colored)



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Project: EP9038  
Source: Boeing 2009, CIRGIS 2007, HGL 2010  
12/6/2010 pbillock



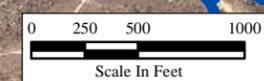
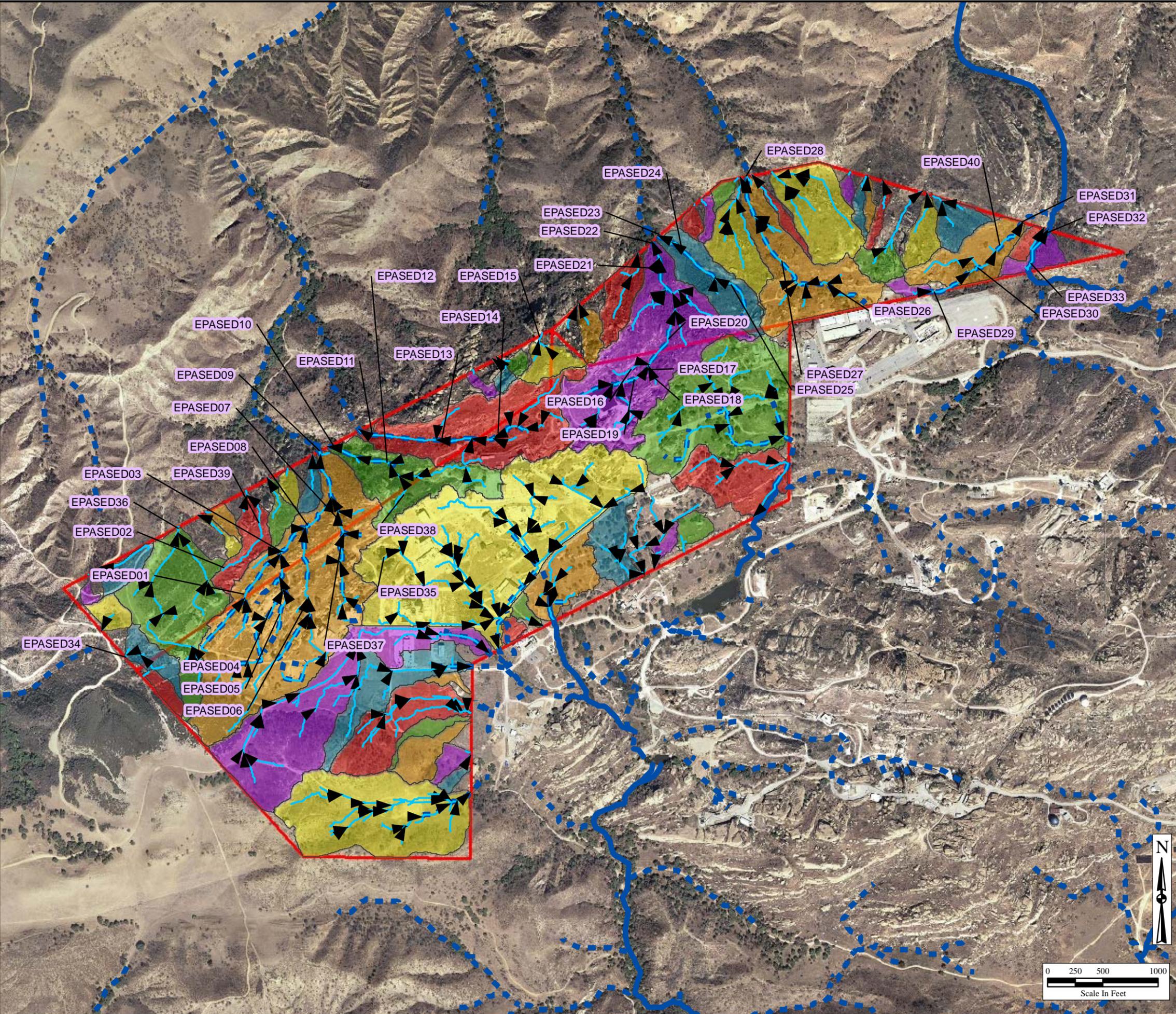
**Figure 2**  
**Sediment and Drainage**

**U.S. EPA Region 9**



**Legend**

-  Sediment Samples
-  Drainage Pathways
-  Intermittent Stream
-  Permanent Stream
-  Area IV and NBZ
-  Catchments (Multi-Colored)



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(2)\_Sed\_Drainage\_11x17.mxd  
Project: EP9038  
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